

# **Chapter 1:**

# **Work In Process (WIP)**

## **Set Up**

### **Objectives**

After completing this section, you will be able to:

- Set Up WIP Drop-Down Lists
- Set Up Inventory Items as Products
- Create Operations and Steps
- Develop Work Flows (Processes) Utilizing Operations
- Understand the Concept of Work Order vs. Batch Number (Lot)
- Work with Variable Groups and Data Collections
- Include Conditions Based on Data Collections to Direct Users through the Process
- Manage Inventory (Material) Consumption Via Bill of Material (BOM)
- Set Up Assets for Start/Stop Equipment



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## WIP Work Order Templates Using Processes and Operations Overview

The basic organizational structure of a WIP Work Order Template (Work Flow) utilizes the concept of Operations set up as a flow within a Process. The chart below provides an example of a template showing the relationship between Processes, Operations and Steps:

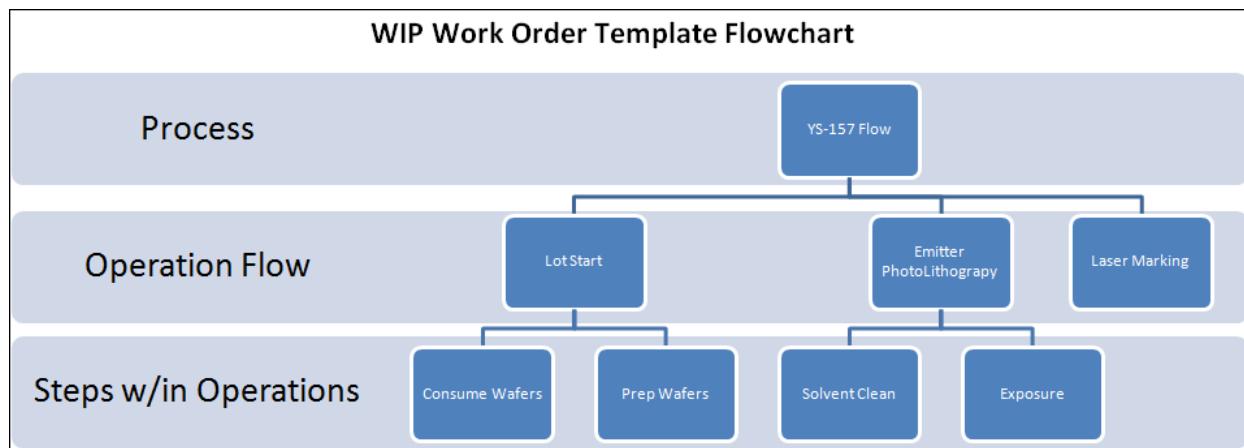


Figure 1 WIP Work Order Template Flowchart

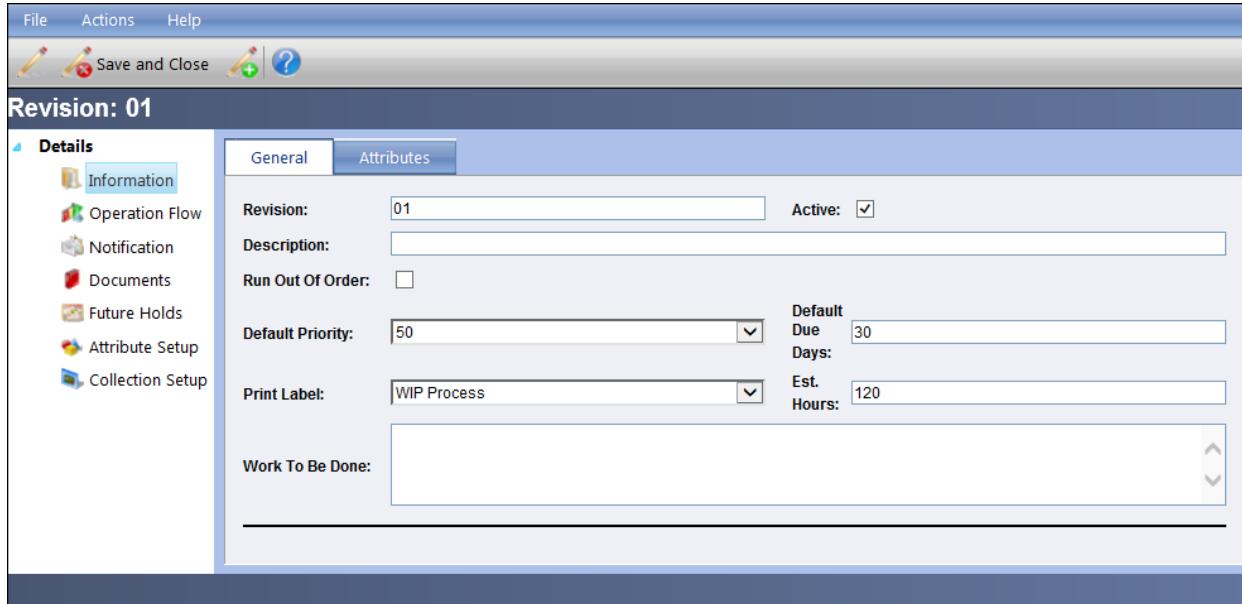
In this example, the Process is titled "YS-157 Flow" and is set up in the Processes SubModule. It contains three Operations that are set up separately from the Process in the Operations SubModule. These Operations are standalone items that can be included in any number of Processes. Each Operation contains Steps that can be set up with its own logic and rules.

This screenshot shows the "Process: YS-157 Flow" detail screen. The interface includes a toolbar with File, Actions, and Help buttons, and standard save and close icons. The main area displays the process details:

Details		
Information	Name: YS-157 Flow	Active: <input checked="" type="checkbox"/>
Revisions	Current Rev.: 01	Category: Lot Based
Products		SubCategory: WF-2
Permissions	Notes:	

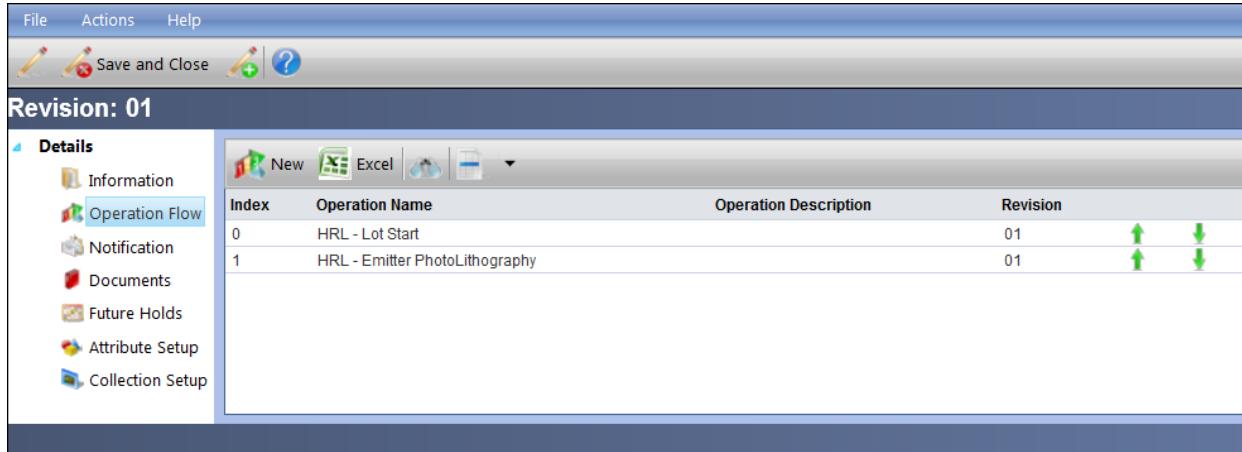
Figure 2 Process Detail Screen

In addition to setting up the Operation Flow and therefore the Steps, the Process also defines what Documents, Future Holds, and Notifications are available for the WIP Work Order. See the Operations and Processes sections of this chapter for more information.



Field	Value
Revision:	01
Description:	
Run Out Of Order:	<input type="checkbox"/>
Default Priority:	50
Default Due Days:	30
Print Label:	WIP Process
Est. Hours:	120
Work To Be Done:	

Figure 3 Process Details on Revision Screen



Index	Operation Name	Operation Description	Revision
0	HRL - Lot Start		01
1	HRL - Emitter PhotoLithography		01

Figure 4 Operation Flow

Index	Name	Up	Down
0	Post MBE Clean	↑	↓
1	Solvent Clean	↑	↓
2	Photoresist Coat	↑	↓
3	Resist Thickness SPC	↑	↓
4	Blind step and expose	↑	↓
5	Image Reversal	↑	↓
6	Flood Expose	↑	↓
7	Develop	↑	↓
8	Inspect	↑	↓
9	Split for Rework	↑	↓
10	Rework	↑	↓
11	Go back to Photoresist	↑	↓
12	Plasm Clean	↑	↓

**Figure 5 Steps within an Operation**

**Step: Post MBE Clean**

Name:	Post MBE Clean
Notes:	(Large text area)
Message Enabled:	<input checked="" type="checkbox"/>
Asset Enabled:	<input type="checkbox"/>
Consume Enabled:	<input type="checkbox"/>
Convert Enabled:	<input type="checkbox"/>
Inspect Enabled:	<input type="checkbox"/>
To Inventory Enabled:	<input type="checkbox"/>

**Figure 6 Step Detail Screen**

As the Process is the template for the overall work order itself by providing Documents, Bill of Materials, Notifications, etc., the Steps can have those items set up as well. Each Step can have its own set of Documents, its own Work To Be Done, its own Inventory consumed, Attributes, Data Collection, etc.

## WIP Set Up

There are two primary locations within TME for setting up WIP. The first sets up the drop-down lists for WIP Processes (Work Order Templates), Operations (Steps for the Templates) and Work Orders. The second sets up the defaults for individual Products via a WIP Setup link on the inventory item detail screen.



The rest of this chapter will presume that the prerequisite Chapters such as Inventory, Settings and Assets have been covered and will therefore not go into the details of how to create, edit, delete records, click on links, etc.

## WIP Options

Access WIP Options via Tools > Options > WIP.

Asset Management	Check In/Out	Contacts	Inventory	Production	Purchasing	WIP
Work Tracking	System					

Please select from one of the following:

- [Auto Batch# Rules](#)
- [Auto Serial# Rules](#)
- [Hold Reasons](#)
- [Hold Release Codes](#)
- [Inspection Positions](#)
- [Operation Categories](#)
- [Operation Attributes](#)
- [Process Attributes](#)
- [Scrap Locales](#)
- [Split Types](#)
- [WIP Types](#)
- [Work Order Categories/SubCategories](#)
- [Work Order Close Codes](#)

Must Create Before Release

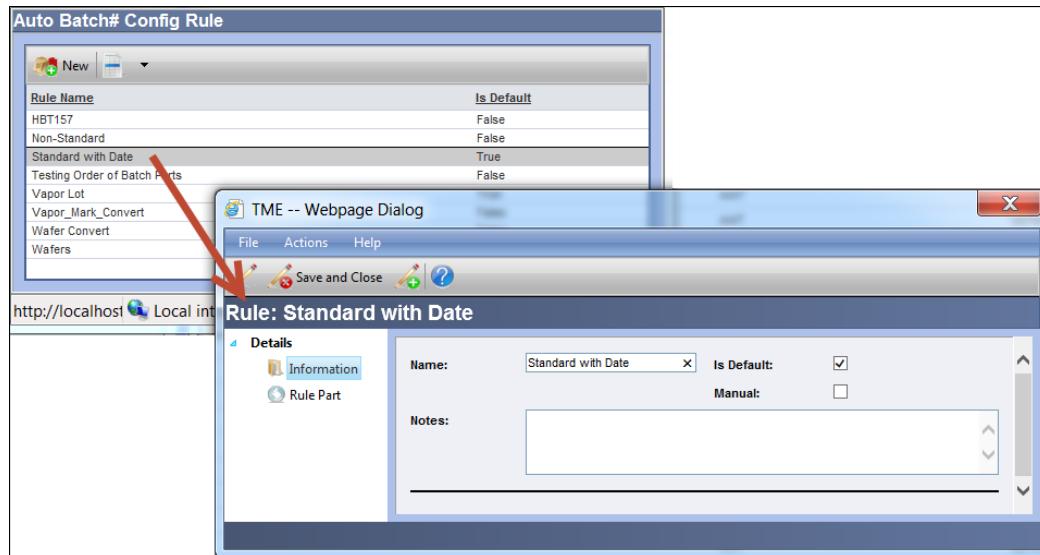
Auto Print Labels

**Help** **OK**

Figure 7 WIP Options Screen

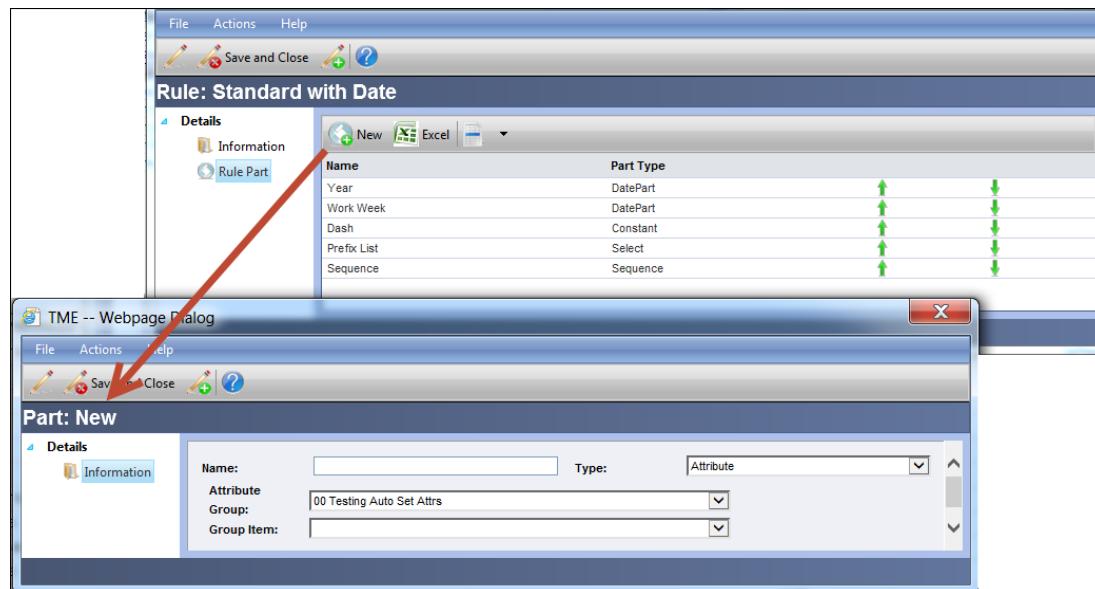
### **Auto Batch# Rules**

The Auto Batch# Rules provide the means for setting up rules by which the Product batch numbers are automatically generated when the WIP Work Order is created. Each Product will be set with a default rule (configured in WIP Setup on the Inventory Item detail screen). The Rule that is set with Is Default selected will be the one that populates the drop-down as part of the WIP Setup of a new Product.



**Figure 8 Auto Batch# Config Rule Viewer and Detail Screen**

If the Batch Number is to be entered Manually at the time of creating the WIP Work Order, select the Manual checkbox. Otherwise, keep deselected and click on Rule Part to add the rules which will automatically build the Batch Number.



**Figure 9 Rule Part Viewer and Detail Screen**

The Batch Number for a WIP Work Order is built in parts with rules that are displayed on the Rule Viewer in sequential order. The available options for setting up the batch numbers are:

### Attribute

This option inserts the value of an Attribute associated with the Product. When opening the Part screen from the Rule viewer, provide a name for this portion of the Batch Number and choose “Attribute” from the Type drop-down list. Choose an Attribute Group and a corresponding Group Item. If the Attribute is not associated with the Product for which a new Batch is created, TME will skip this portion.

For more information on setting up Attributes, see the Variable Groups portion of the Settings Chapter.

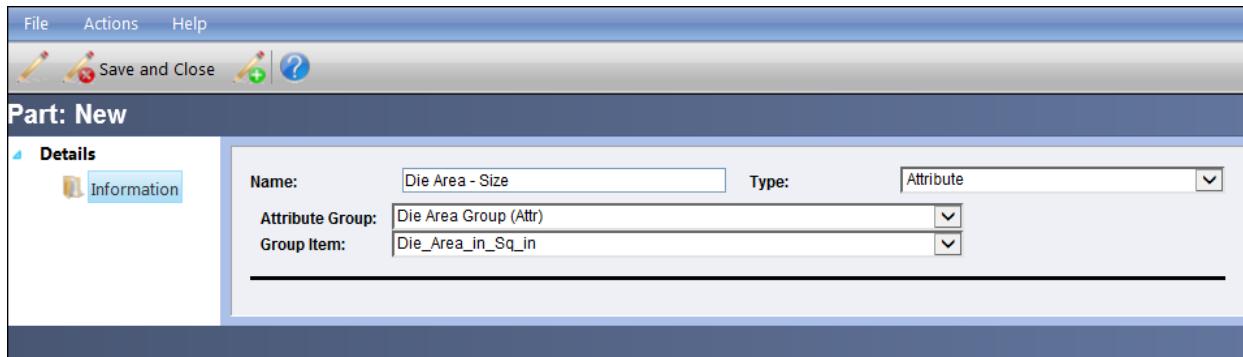


Figure 10 Example of Set Up of Part of Batch Number: Attribute

### Constant

This option inserts a constant value, for example, a dash or particular letter or word.

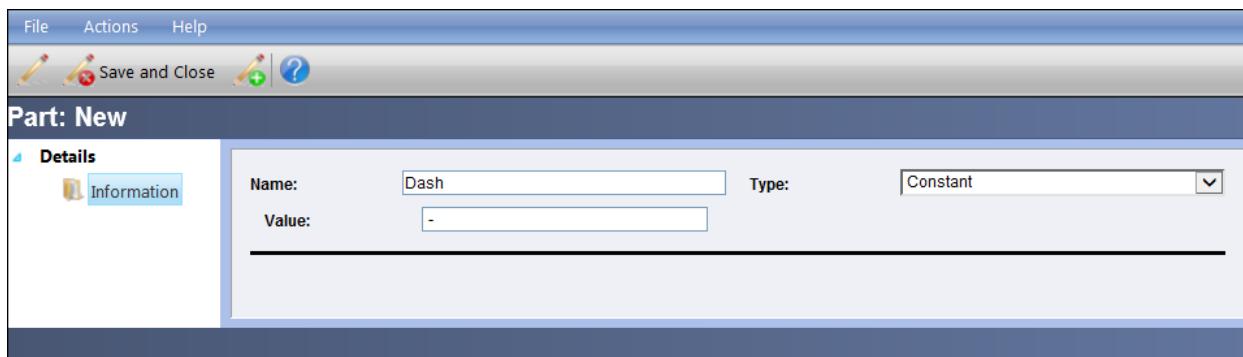
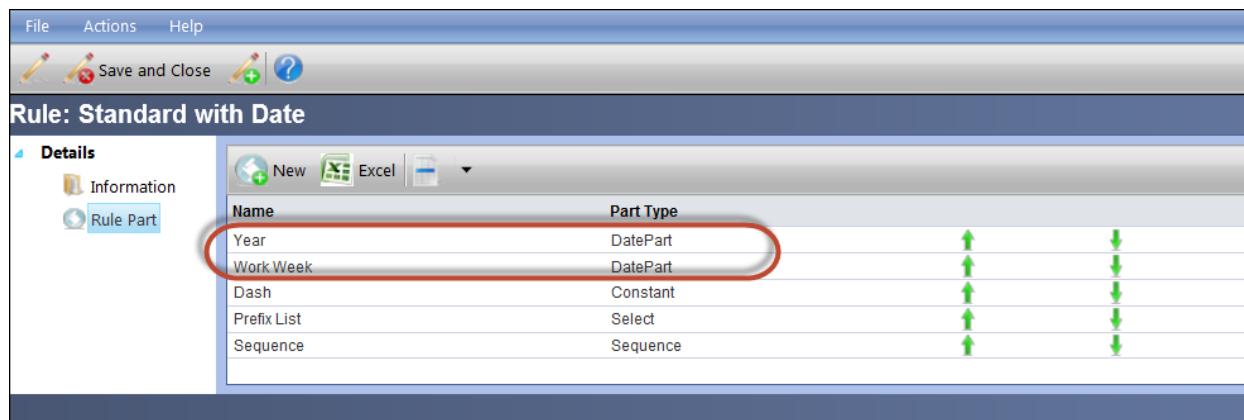


Figure 11 Example of Set Up of Part of Batch Number: Constant

### Date Part

This option inserts a part of the current date from the moment that the WIP Work Order and the Batch are created. The choices are Year, Quarter, Month, Week of Year, Day of the Year, Day of the Month, Day of the Week. For each choice, a format can be chosen, i.e., 2 Digit Number or 4 Digit Number for the Year or 1 Digit Number, 2 Digit Number or Abbreviated Name for the Month.

To build a full date as part of the Batch Number, create several records and sequence accordingly. For example:



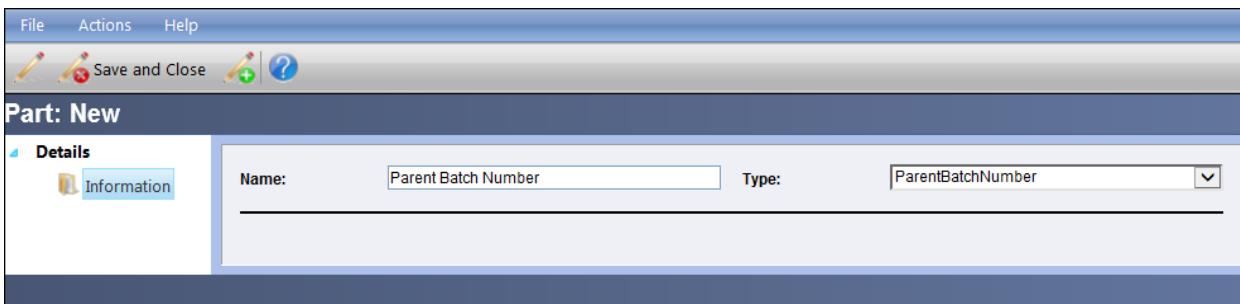
**Figure 12 Example of Set Up of Part of Batch Number: Date Part**

If the WIP Work Order is created on Monday, October 28, 2013, then 201344 will be inserted as the first part of the Batch Number.

### Parent Batch Number

This option is used in conjunction with converting a Product into other Product(s) within the WIP Work Order—not upon initial release. Any Product set with an Auto Batch Rule that contains a Parent Batch Number cannot be associated with a WIP process and therefore not available to be selected when creating a new WIP Work Order.

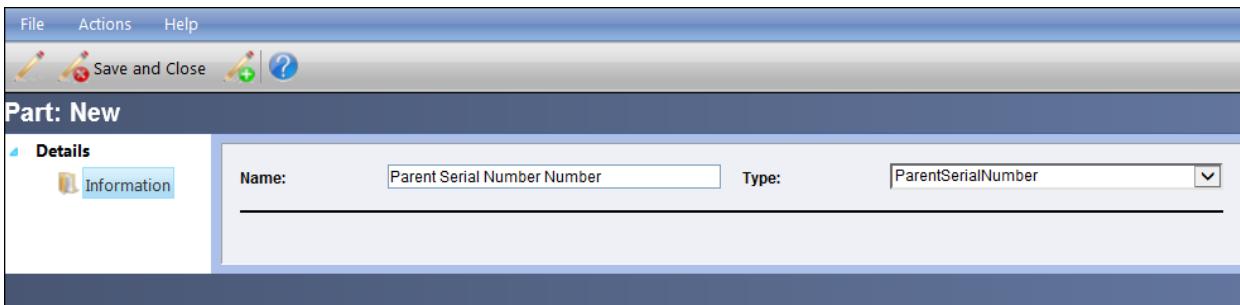
Upon the completion of a Convert transaction (see the Convert portion of WIP Work Orders or WIP Operations or the Conversion portion of Product WIP Setup within this chapter for more information), the resulting Products will have the Batch Number of the Parent Product inserted.



**Figure 13 Example of Set Up of Part of Batch Number: Parent Batch Number**

### Parent Serial Number

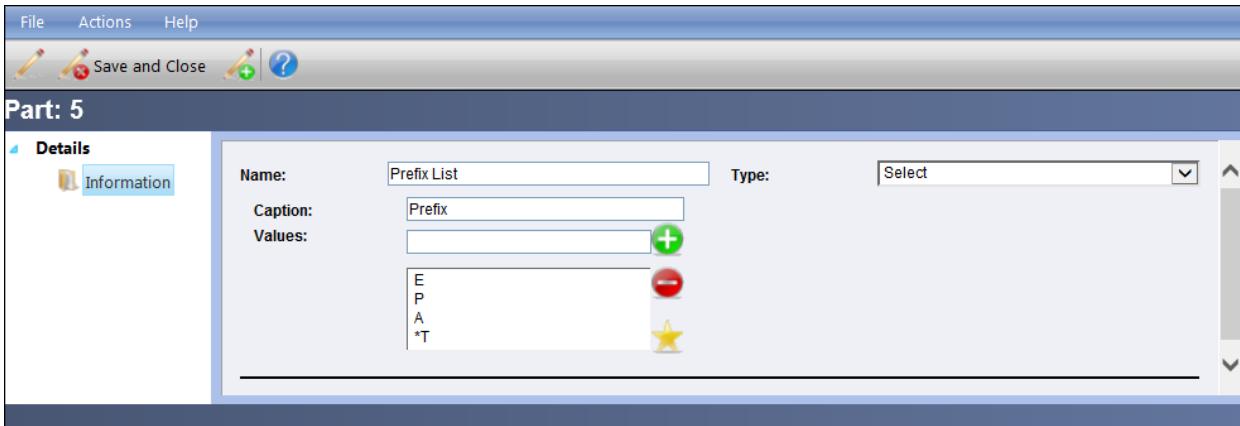
This option inserts the Serial Number of the Parent Product (as opposed to the Batch Number of the Parent) after a conversion has taken place. As with the Parent Batch Number, this part of a rule cannot apply to a Product upon initial release via a WIP Work Order.



**Figure 14 Example of Set Up of Part of Batch Number: Parent Serial Number**

### Select

Using this option allows the creator of the WIP Work Order to choose a value from a drop-down list to insert as part of the Batch Number.



**Figure 15 Example of Set Up of Part of Batch Number: Select**

To set one of the values as the default for the drop-down list, select the value and then click on . An asterisk will appear next to the value.

### Sequence

The Sequence adds a number in sequence from a previously created WIP Work Order. It can be set as a Global sequence meaning it adds a single count from the previously generated WIP Work Order where this Rule is in effect regardless of the values of the Batch Number leading to the sequence.

For example, there are three work orders that have been generated off of the following rule:

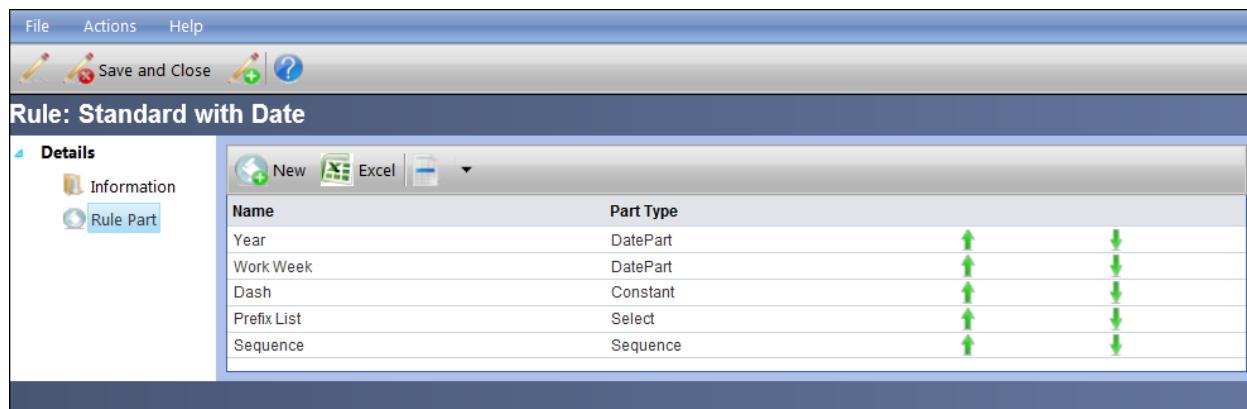


Figure 16 Example of Set Up of an Auto Batch # Rule

- 201343-E005
- 201344-P006
- 201344-A007

The fourth work order will have 008 for its sequence part regardless of the date and the Select value.

The Global option can be deselected and the count will be added from the previously generated WIP Work Order with identical preceding Auto Batch Rules. Using the same example above, the next work order is going to have 201344-E so its sequence without the Global is 001 as the week number is different; the result is 201344-E001. If P had been chosen instead of E, then the next sequence would be 007; the result is 201344-P007.

### Work Order ID

This is used during conversions whereby the Product created has the same Batch Number as the Work Order itself (and most likely, the Batch Number of the Product prior to the conversion) .

## Auto Serial# Rules

The Auto Serial# Rules provide the means for setting up rules by which the Product serial numbers are automatically generated in the same manner as the Auto Batch# Rules.

However, the Auto Serial# Rule does provide the option to hand enter the serial numbers instead of having the process automated. Simply deselect the Auto Generate checkbox.

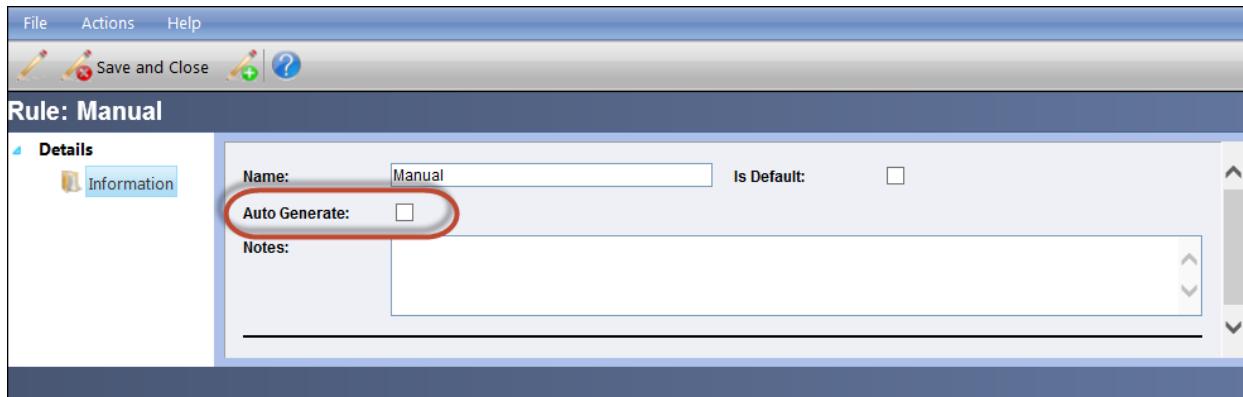


Figure 17 Example of Set Up of a Manual Serial# Rule

## Hold Reasons

Hold Reasons is a simple drop-down list from which the Operator selects the Reason why a WIP Work Order is being placed on Hold. This allows for easy filtering and searching via Reports.

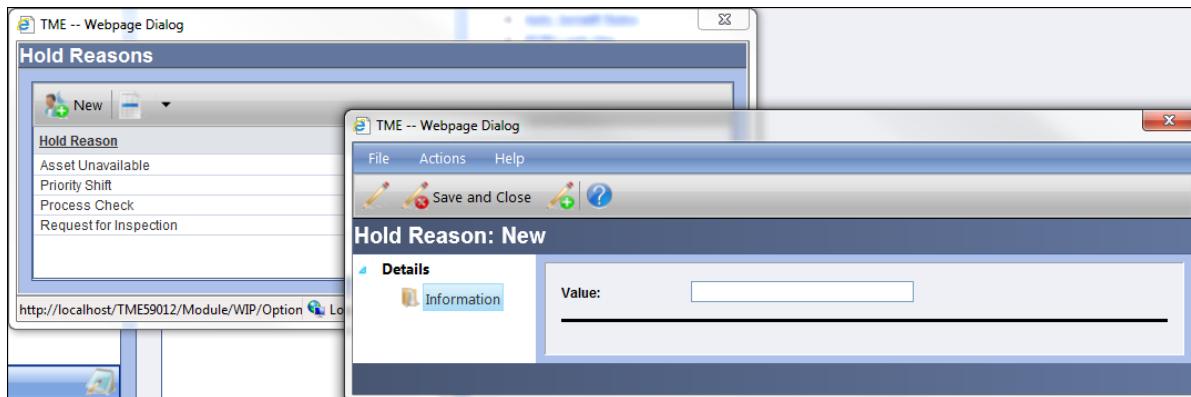


Figure 18 Hold Reasons Screens

### ***Hold Release Codes***

Hold Release Codes is also a simple drop-down list from which the Operator selects the Reason why a WIP Work Order is being released from Hold. This allows for easy filtering and searching via Reports.

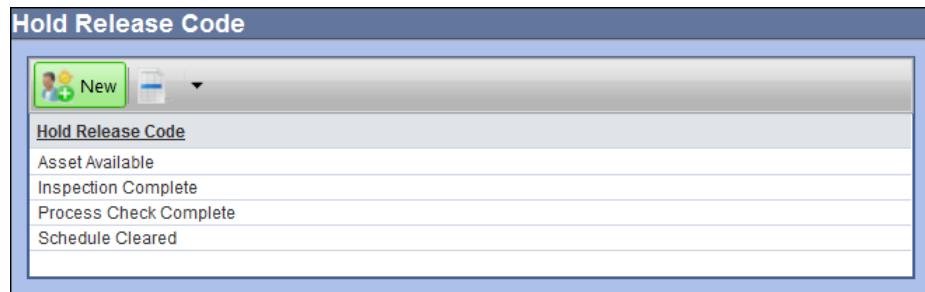


Figure 19 Hold Release Code Viewer

### ***Inspection Positions***

Inspection Positions is a simple drop-down list from which the Operators selects the position on a Product (such as a wafer) for which a Defect code needs to be associated. This occurs during the Inspection portion of a Step within an Operation.

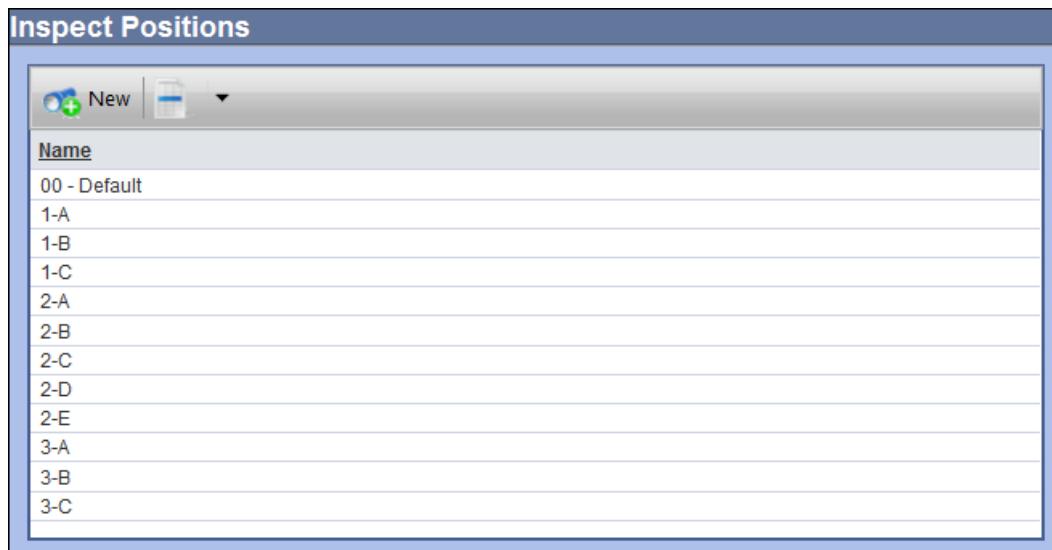


Figure 20 Inspection Positions Viewer

## Operation Categories

Operation Categories is a simple drop-down list of the Categories to which WIP Operations can be associated.

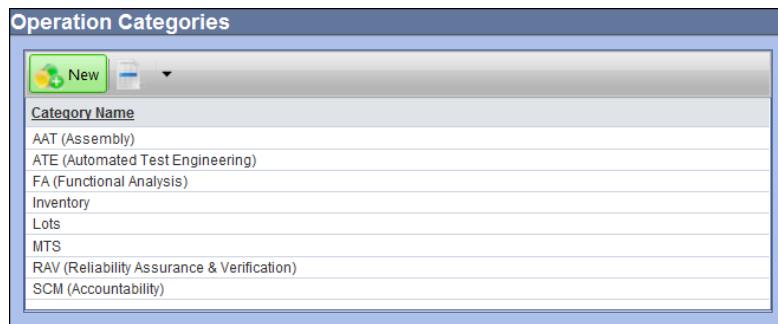


Figure 21 Operations Categories Viewer

## Operation and Process Attributes

Attributes are single instance collections of user defined data for an object such as an Operation or Process. These data fields can be Text, Date, Number, Drop-Down, Check Box, Document, and Formula data types. Many of them can have ranges and default values as appropriate.



**Attributes associated to WIP Operations and Processes** are fields that provide information regarding the Operation or Process themselves. They are not passed on as part of any WIP Work Order generated from them.

The user defined fields are all set up in the Settings module in the Variable Groups which are then used as Attributes (or added to Data Collections to be used for multi-instance data collection).

See the How to Associate Data Collections to Objects and the Run Rule Violations Setup portions of the Settings Chapter of this manual for more information.

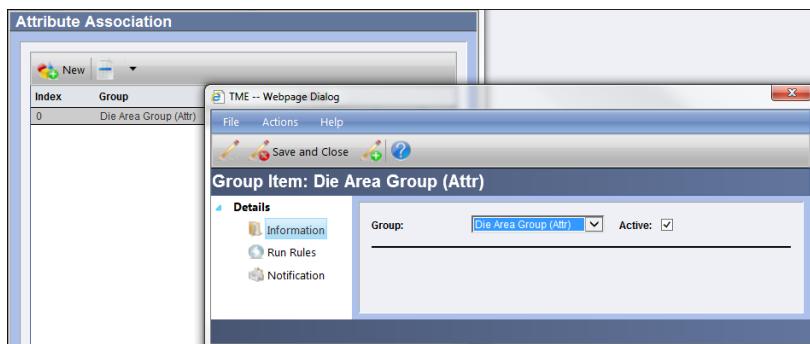


Figure 22 Operations and Processes Attributes Screens

## Scrap Locales

The Scrap Locales provides a drop-down list of locales from which to send scrap Product from within WIP. The Scrap Locale selected as the Default will initially appear in the drop-down. No other locales will be available for selection other than what is included in this list.

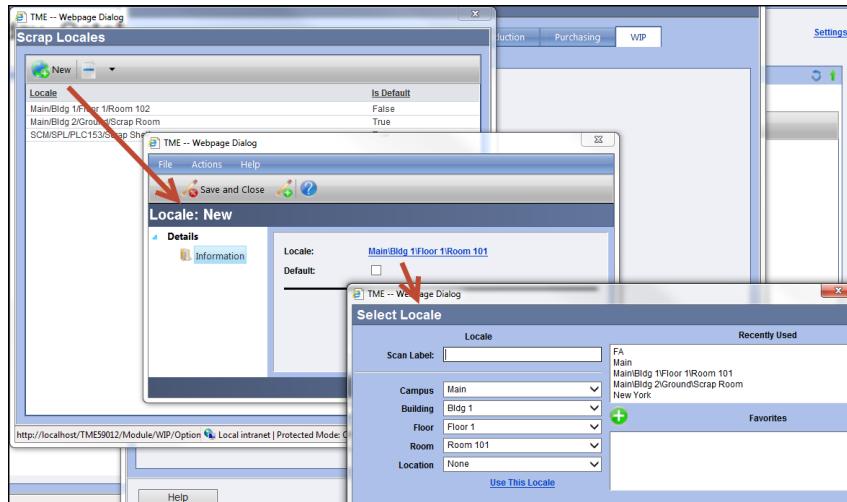


Figure 23 Scrap Locales Screens

## Split Types

The Split Types feature provides a drop-down list of the types of splits that can occur within WIP. The Split itself takes the specified quantity of Product, moves it into a new WIP Work Order and adds to the Batch Number a signifier that it is Split Product. The signifier is the Split Char as defined with the Split Type along with a three digit number in sequence (first split will product -X001, next is -X002, etc.).

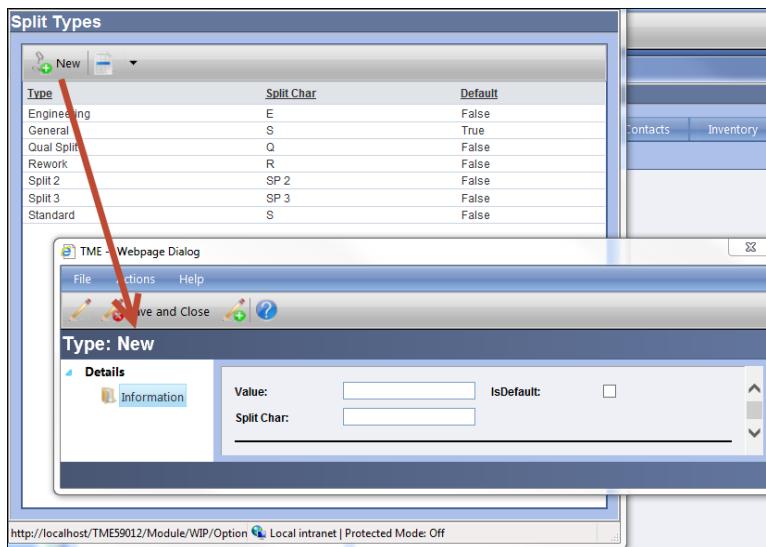


Figure 24 Split Types Screens

## WIP Types

WIP Types is a simple drop-down list for selection when creating a WIP Work Order. It can be used to define ownership of a Process, type of sale order, etc.

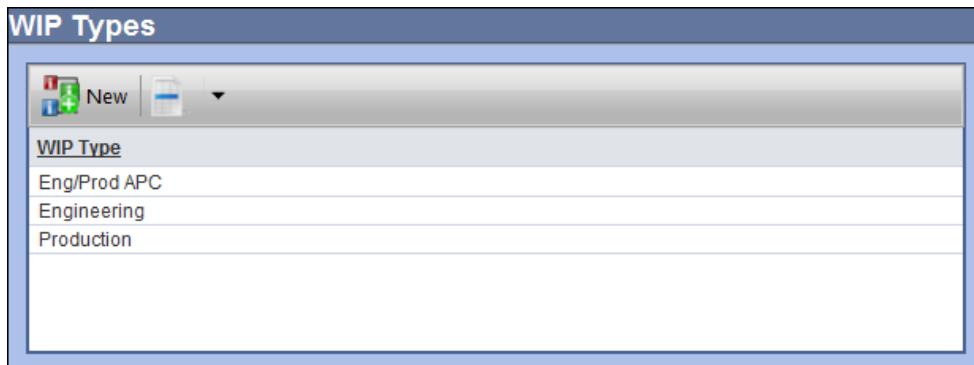


Figure 25 WIP Types Viewer

## Work Order Categories/SubCategories

Work Order Categories/SubCategories provides the managed drop-down list for selecting the Category and the SubCategory upon creating a WIP Work Order. They can be set up at the Process level and flow through when the WIP Work Order is created as well.

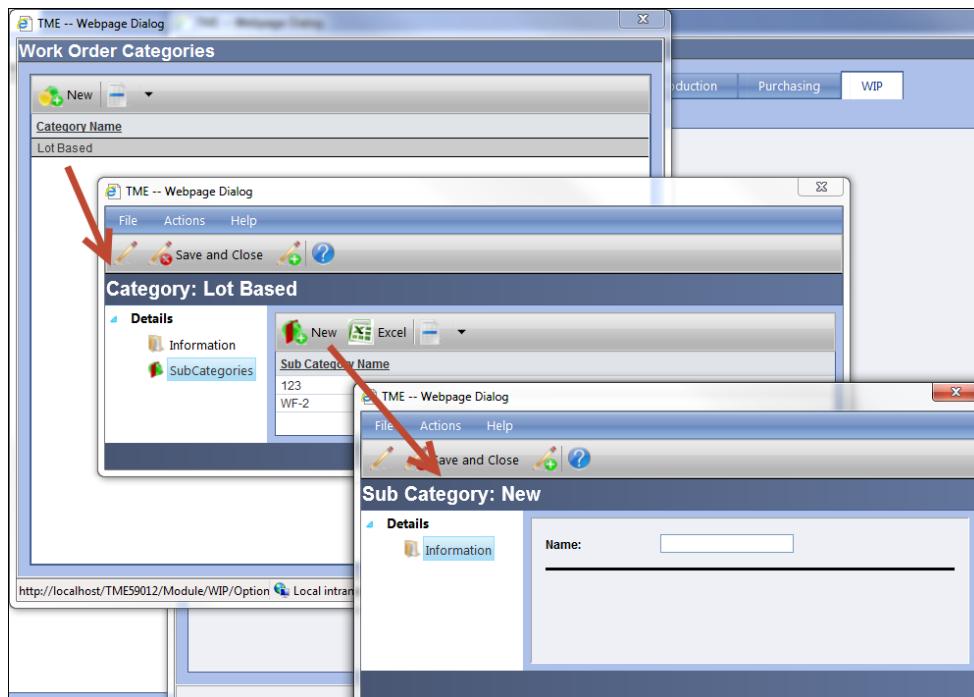


Figure 26 Work Order Categories/SubCategories Screens

### Work Order Close Codes

Work Order Close Codes is a simple drop-down list of Codes (reasons for the closure) from which a User can select when closing a WIP Work Order. This allows for easy filtering and searching when running Reports.

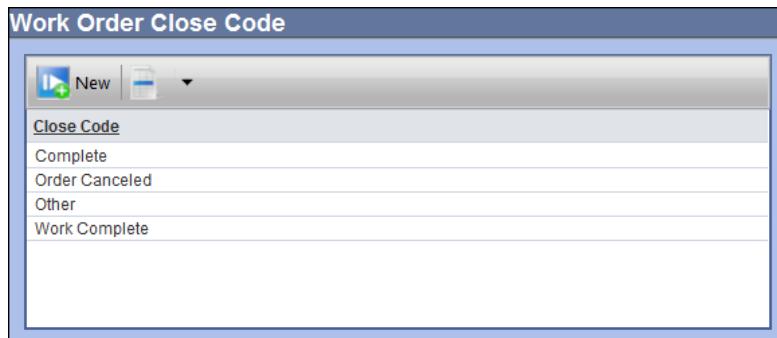


Figure 27 Work Order Close Codes Viewer

### Checkbox Selections

- Must Create Before Release: This setting will require that all WIP Work Orders must be Saved with the status of Create before they can be released. This will ensure that the User has to enter values for required Work Order Attributes prior to Release.
- Auto Print Labels: Immediately upon release, the label(s) for the WIP Work Orders will open in a web browser or Adobe PDF for printing.

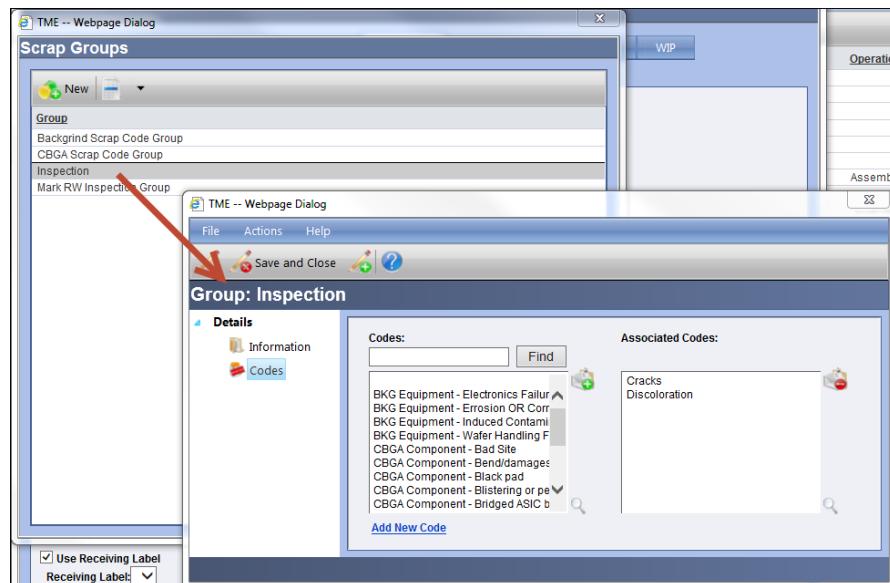


Figure 28 WIP Options Checkbox Selections

### Scrap Groups/Codes

The **Scrap Groups/Codes** link is located on the Inventory tab instead of WIP as it can be used with any Inventory transaction, not just within WIP.

The Scrap Group is a named Group that sets up different Scrap codes (basic reasons) that a User can select when scrapping from a WIP Work Order. As part of the WIP Setup, a Scrap Group must be associated to a Product (Inventory Item) as well as any Operation in WIP whereby the Product can be scrapped. This allows for different codes to be available for a Product based on the Operation it's in.



**Figure 29 Scrap Groups/Codes Screens**

In the screenshot above, if the Inspection Scrap Group is associated to Operation 1 as well as Product 201337-A025, then when the Scrap transaction is taking place, “Cracks” and “Discoloration” will be available in the Scrap Code drop-down list for the User to select.

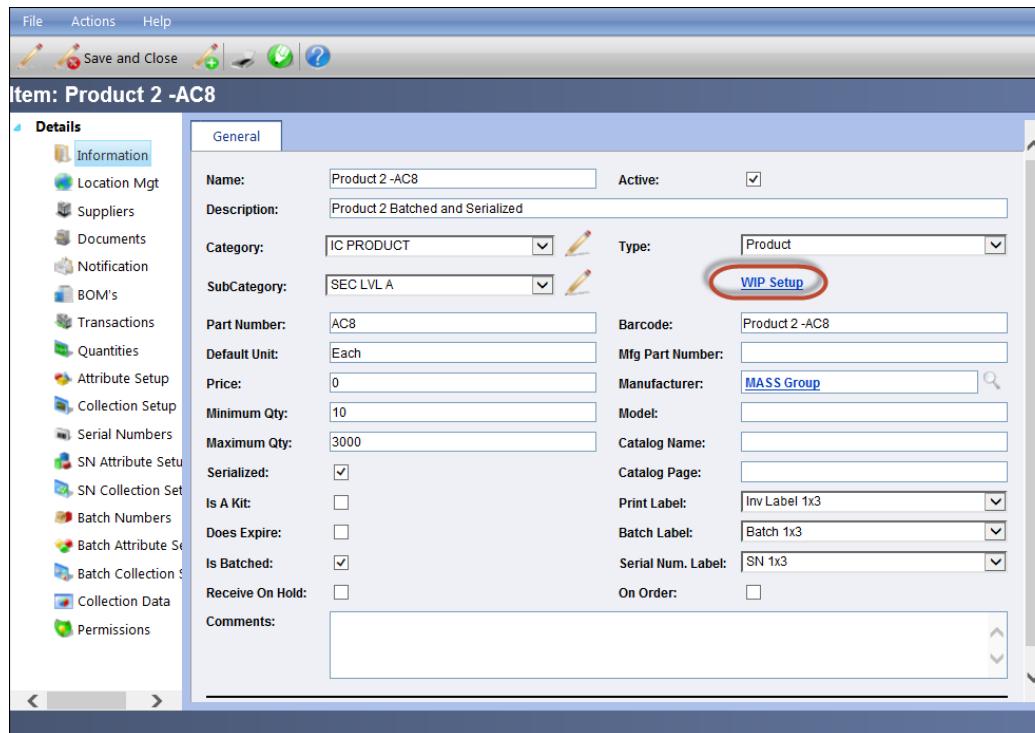
If a different Product runs through the same Operation and both are associated with Mark RW Inspection Group, then the Codes set up for Mark RW Inspection Group will populate the drop-down list.



**Basically, in order to use Scrap Groups/Codes, they need to be created and associated to the appropriate Product as well as to any Operation that is set up to allow the Scrap transaction to take place.**

## **WIP Set Up at Product**

Access the WIP Set Up feature on the detail screen of each Inventory Item that has Type set to “Product.”



**Figure 30 WIP Set Up Link on Product Detail Screen**

The WIP Setup feature is for associating Auto Batch# and Auto SN# rules to the Product as well as the Default Release Quantity when creating a WIP Work Order, Products that will result upon conversion, the WIP Processes that it can go through, and the Scrap Groups/Codes that are applicable.

### ***Default Release Qty, Auto Batch# and Auto Serial# Rules***

When a WIP Work Order is created, the Default Release Qty for the selected Product will populate based on what was entered in WIP Setup. It may be kept for the Work Order as is or changed to another quantity as needed.

The Auto Batch# and Auto Serial# Rules must be supplied so that the WIP Work Order will generate the appropriate numbers. All Products can follow the same rules or different ones can be established for groups of Products or each individual Product.

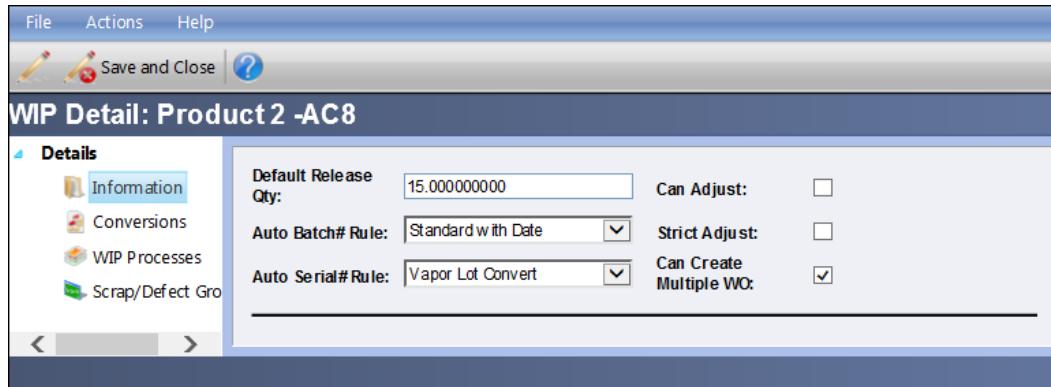


Figure 31 WIP Setup Screen: Default Settings

- Select the Can Adjust checkbox if the quantity of the Product can be adjusted from the default at any time during the flow. The quantity can always be adjusted at time of Create/Release.
- Select Strict Adjust if the total quantity of Product in a Work Order containing this Product cannot be adjusted to more or less than the total quantity at the time of the Adjust.
- Select the Can Create Multiple WO if the User can open a New Work Order screen and enter a quantity that upon submittal will create/release that quantity of Work Orders in a single transaction. Each of those Work Orders will be identical, but have its own Work Order Number and ID.

## Conversions

Products can go through WIP and return to Inventory as the same product. However, often times the Product needs to be converted into other Products. The Conversions link provides the means of associating the Parent Product to the Children (Final) Product. There can be multiple levels of conversion established.

For example, a Wafer can be consumed into a WIP Work Order with the Product being the Wafer itself. As part of the process of going through WIP, it can be converted into hundreds of dies (of one or more types) which then can continue through WIP and eventually be moved to Inventory as final Products.

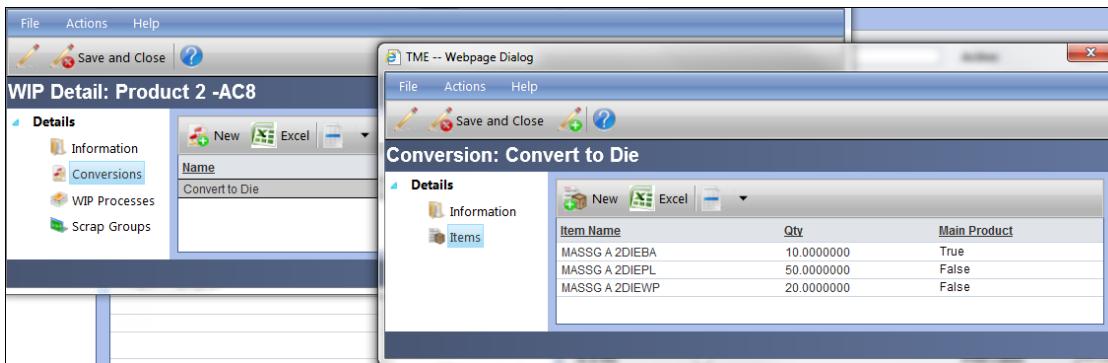
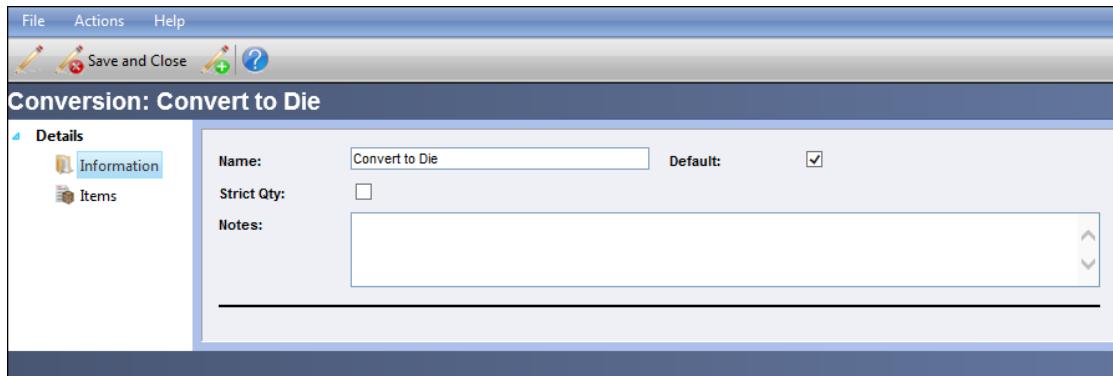


Figure 32 WIP Setup Screen: Conversions

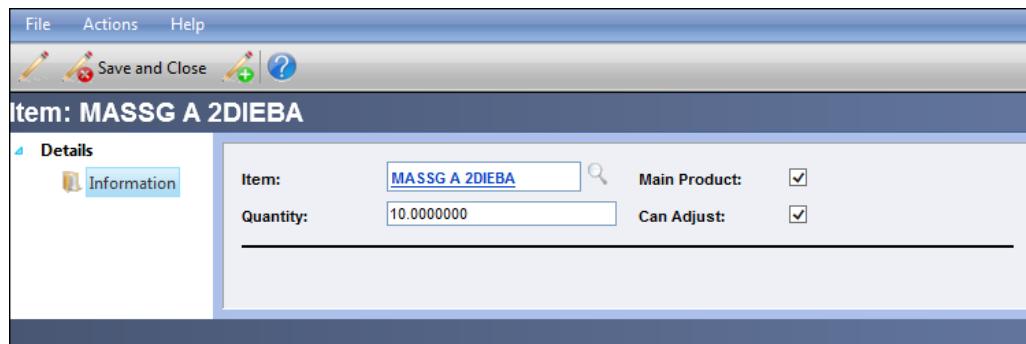
- Type in a Name for the conversion that will be easily recognizable by the User—especially if the Product can have more than one conversion.
- Select Default if it is the conversion that should automatically populate the drop-down list once the User clicks on Convert from the Work Order
- Select Strict Qty if the total quantity of all Products must remain constant. For example, if there are four types of die on the wafer, the total quantity cannot be more than what exists on the wafer. Each quantity may be adjusted, but not the total.



**Figure 33 Conversion Detail Screen**

For the individual Items on the Conversion:

- Select the Product using the Item LookUp
- Enter the Quantity that will be set as the default for the conversion
- Select Main Product for the Item that becomes the Main Product of the Work Order post conversion
- Select Can Adjust if the quantity of the individual Item may be changed



**Figure 34 Conversion Item Detail Screen**

### **WIP Processes**

Products can be associated with multiple WIP Processes. When a WIP Work Order is created, the Product is selected and the drop-down list for the Processes populates with the Default process. The user can then change to another Process as needed.

The Product can also be associated to a Process from the Process' detail screen.

If a Product is not associated with any Process, a WIP Work Order for that Product cannot be created.

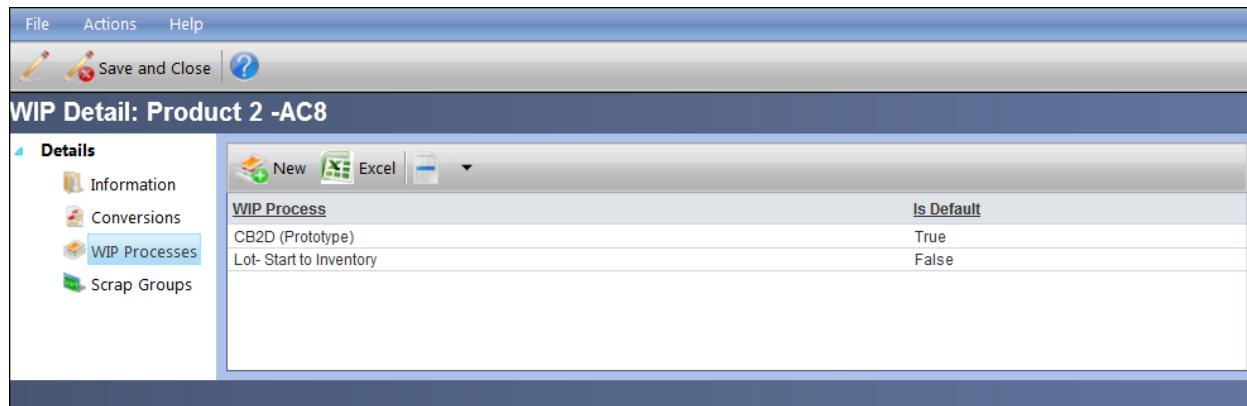


Figure 35 WIP Setup Screen: WIP Processes

### **Scrap/Defect Groups**

As described in the Scrap Groups/Codes portion of the WIP Options section of this chapter, Scrap Groups must be associated not only to Operations but to the Products as well in order for Scrap Codes to populate on a WIP Work Order.

In addition to associating existing Scrap Groups to a Product, the Scrap Groups screen provides a link for adding new Scrap Groups on the fly.

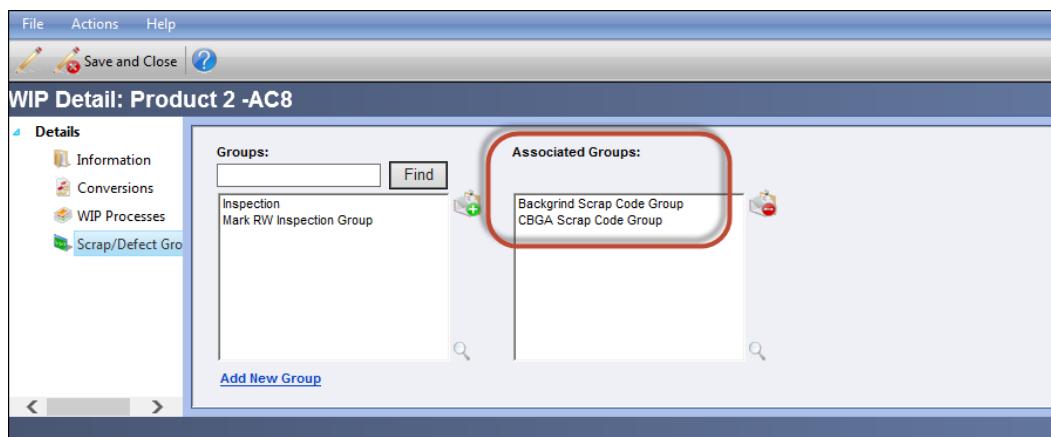


Figure 36 WIP Setup Screen: Scrap Groups

## Recipes Submodule

Recipes appear onscreen when an Asset is selected to start work in WIP. Which Recipe appears is determined by the Recipe Look Ups feature previously described. In TME, it is only the name of a recipe that is provided, not the full instructions. If those are needed, that can be done by adding a document or providing them within a Message screen (see the Operations section of this chapter).

To create Recipes, go to the Recipes Submodule within the WIP Module.

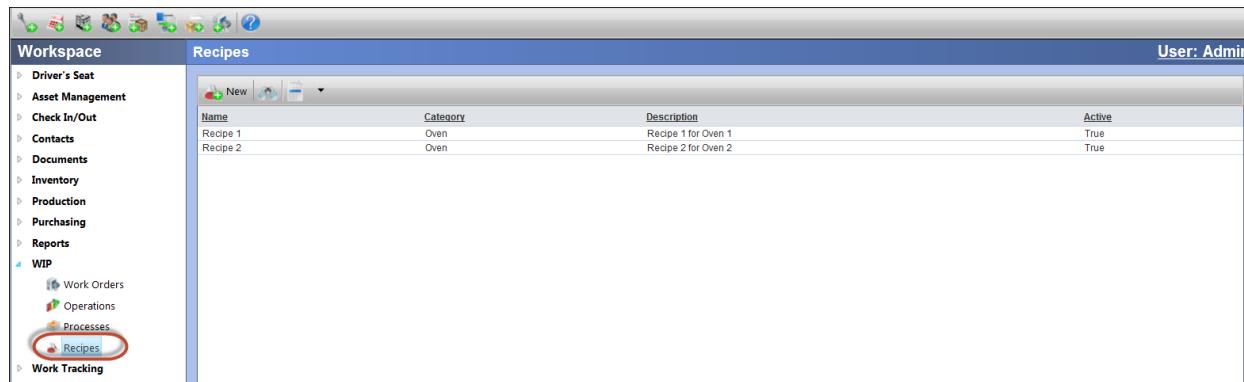


Figure 37 Recipe Viewer

When adding a new Recipe, the only field required is the Name as that is what appears for selection on the Recipe Look Ups feature and on the WIP Work Order. Make sure the Active checkbox is selected.

Documents and Attributes can be set up just as with most other objects in TME.

Figure 38 Recipe Detail Screen

## BOM Look Ups Submodule

The BOM Look Ups feature provides the ability to create cross references of Bills of Material to Products. By setting up a BOM Look Up for each type of Consume, the Bill of Material is predetermined for any given Product.

In the example below, there are three available BOMs for the consumption of material when conducting a Seal (which would be set up as a step within an Operation). They are each associated to one or more Products (but not the other way around, a Product cannot be associated to more than one BOM). In addition, the BOM can be associated to a Batch Number of the selected Product (Inventory Item) as well as the ECO or Test Number of a WIP Work Order (values selected from drop-down lists when creating the WIP Work Order).

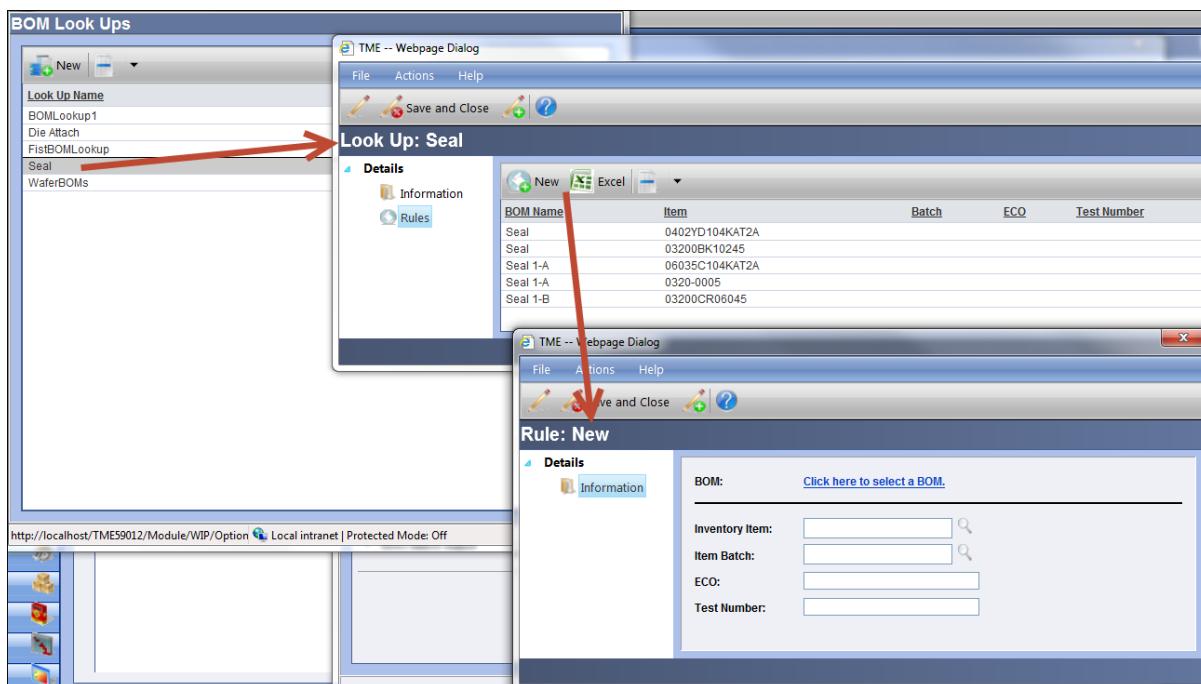


Figure 39 Example of a BOM Look Up

The BOM Look Up is then associated to a step within an Operation (See the Operation Setup portion of this chapter).

When a WIP Work Order is created and the selected Product runs through WIP at the Seal Step, the Bill of Material is “looked up” and automatically selected for the Operator. The Operator sees the list of materials needed and consumes them accordingly.

For example, if the WIP Work Order was created for the Product 0320-0005, when the Operator arrives at the Seal step, the items for Bill of Material “Seal 1-A” will display. If the Product in WIP is 0402YD104KAT2A, then the items for Bill of Material “Seal” will display.

By using the BOM Look Up feature, Products can be set up with a different Bill of

Material for similar Operations going through different WIP Processes. For example, the “Seal A” BOM Look Up can be set for Operation “Seal A” and a “Seal B” BOM Look Up can be set for Operation “Seal B.” Each Operation is set up on a different WIP Process. If product 0320-0005 goes through the Process with Operation “Seal A” it would have a certain glue that gets consumed whereas if it goes through a Process with Operation “Seal B” it utilized a different glue that has different properties. Same Product, different Bill of Material based on the WIP Process selected.



**Be careful when setting BOM LookUps. There can only be one BOM per Product per Operation. TME cannot have competing BOMs trying to populate Inventory Items when the Operator tries to Consume.**

### Recipe Look Ups Submodule

The Recipe Look Ups feature provides the ability to create cross references of Recipe Names to Assets that are started in WIP. When the Asset is selected to Start, the Recipe name will be displayed. In addition to setting the Recipe up against the Asset, it can also be set up in combination with the Product (Inventory Item), Item Batch Number, ECO, Test Number as well as the Batch Qty. The purpose of including the Batch Qty is that a large quantity of Product may require a different recipe than when using a smaller quantity of the same Product. In the example below, any Step within an Operation that is associated with the “Ovens” Look Up that has the Oven 1 Asset selected to start, will have Recipe 1 displayed onscreen. If the Asset getting started is Oven 2, Recipe 2 will display onscreen.

See the Recipes Submodule section of this chapter for more information on setting up Recipe records for selection onto a Recipe Look Up.

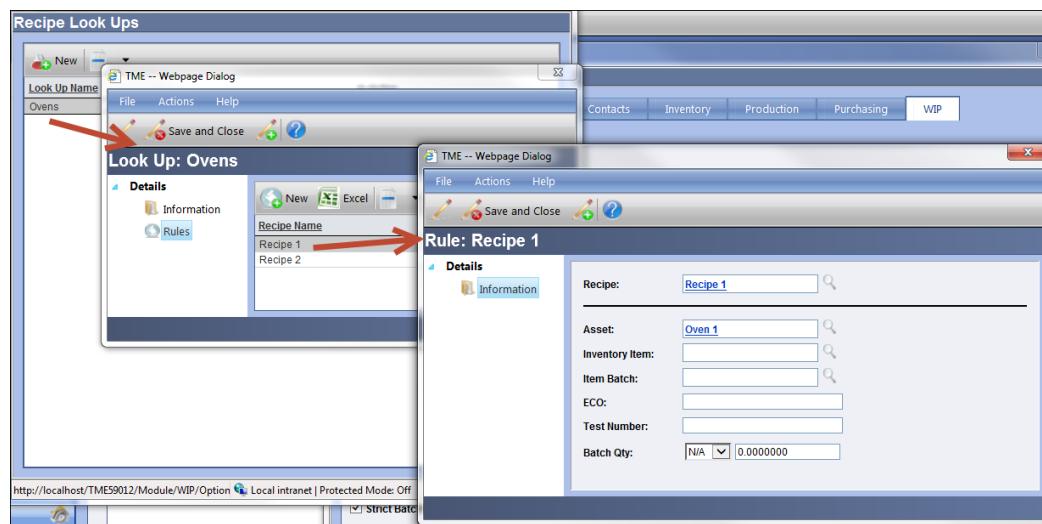


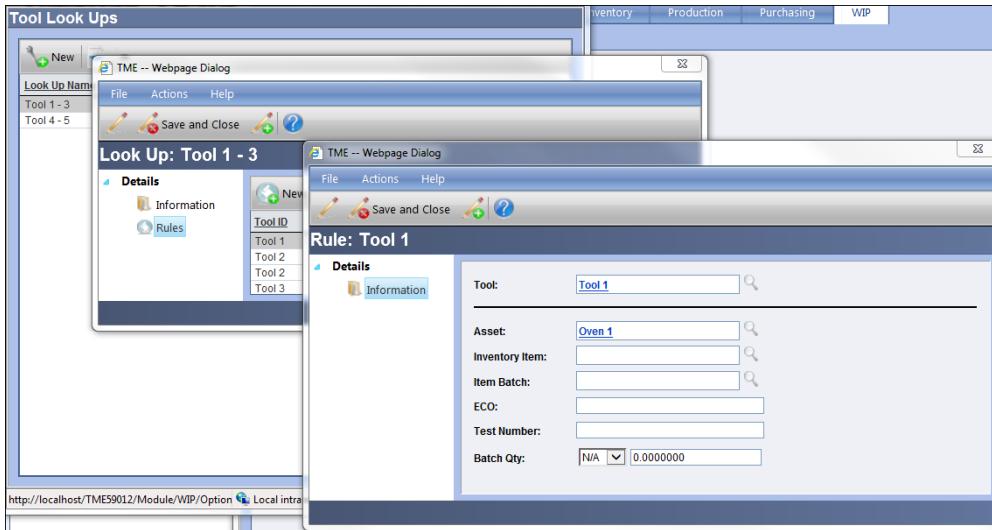
Figure 40 Recipe Look Up Screens

## Tool Look Ups Submodule

The Tool Look Ups feature provides the ability to create cross references of Tools to Assets. It works in the same exact manner as Recipe Look Ups except that instead of typing in a Recipe Name, an Asset is selected as the Tool.



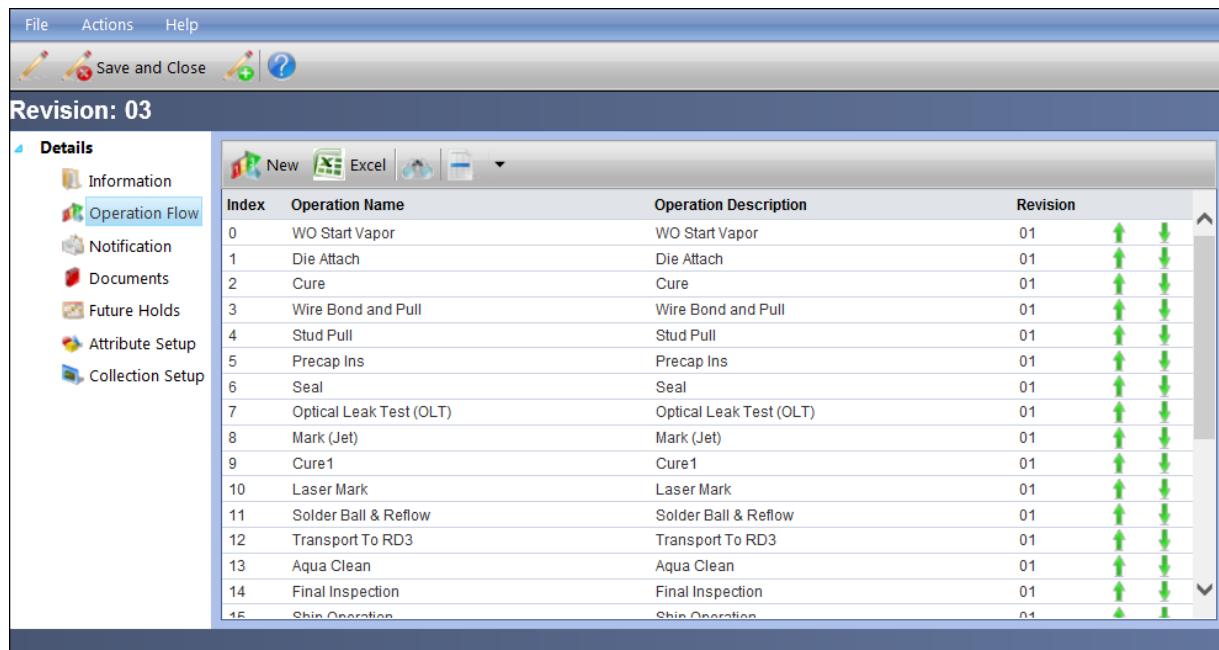
**Tools must be entered into TME as Assets prior to setting them up in the Tool Look Ups feature.**



**Figure 41 Tool Look Ups Screens**

## Operations

The basic building blocks for creating WIP Processes (Work Flows) are the Operations. Each Operation contains one or more Steps which are set up with rules and tasks. The Operations can be utilized by a single Process in a one-to-one relationship or used over and over again in a one-to-many relationship.



The screenshot shows a software interface for managing operations. The top menu bar includes File, Actions, and Help. Below the menu is a toolbar with icons for Save and Close, New, Excel, and other functions. The main area is titled "Revision: 03". On the left, a sidebar under "Details" lists various options: Information, Operation Flow (which is selected), Notification, Documents, Future Holds, Attribute Setup, and Collection Setup. The main content area displays a table of operations:

Index	Operation Name	Operation Description	Revision	Up	Down
0	WO Start Vapor	WO Start Vapor	01	▲	▼
1	Die Attach	Die Attach	01	▲	▼
2	Cure	Cure	01	▲	▼
3	Wire Bond and Pull	Wire Bond and Pull	01	▲	▼
4	Stud Pull	Stud Pull	01	▲	▼
5	Precap Ins	Precap Ins	01	▲	▼
6	Seal	Seal	01	▲	▼
7	Optical Leak Test (OLT)	Optical Leak Test (OLT)	01	▲	▼
8	Mark (Jet)	Mark (Jet)	01	▲	▼
9	Cure1	Cure1	01	▲	▼
10	Laser Mark	Laser Mark	01	▲	▼
11	Solder Ball & Reflow	Solder Ball & Reflow	01	▲	▼
12	Transport To RD3	Transport To RD3	01	▲	▼
13	Aqua Clean	Aqua Clean	01	▲	▼
14	Final Inspection	Final Inspection	01	▲	▼
15	Ship Operation	Ship Operation	01	▲	▼

Figure 42 Example of Operation Flow Set on a WIP Process

The Operations Submodule is accessed via the WIP Module.

File New Go To Tools Help

**Operations**

User: Admin

Name	Description	Revision	Active
233 to Bldg 8 Handoff	233 to Bldg 8 Handoff	01	True
233 to ICX Handoff	233 to ICX Handoff	01	True
233 to ICX Handoff	233 to ICX Handoff	01	True
Aqua Clean - 01	Aqua Clean - 01	01	True
Aqua Clean - 02	Aqua Clean - 02	01	True
Assy - Build Unit	Assy - Build Unit	01	True
Assy - Kit BOM	Assy - Kit BOM	01	True
Assy - Test	Assy - Test	01	True
Background Handoff to Bldg 8	Background Handoff to Bldg 8	01	True
Background Operation	Background Operation	01	True
Background Ship	Background Ship	01	True
Background Start - 01	Background Start - 01	01	True
Background Start - 02	Background Start - 02	01	True
Background UV Tape Application	Background UV Tape Application	01	True
Background UV Tape Cure	Background UV Tape Cure	01	True
Background UV Tape Removal	Background UV Tape Removal	01	True
Background-Post Final Inspect	Background-Post Final Inspect	01	True
Background-Pro Final Inspect	Background-Pro Final Inspect	01	True
Bldg 8 Handoff to 233	Bldg 8 Handoff to 233	01	True
Bldg 8 Handoff to GKI (Wafers)	Bldg 8 Handoff to GKI (Wafers)	01	True
Bldg 8 to RT Handoff	Bldg 8 to RT Handoff	01	True
Burn In	Burn In	01	True
Centrifuge Procedure	Centrifuge Procedure	01	True
Cold Post Burn In	Cold Post Burn In	01	True
Cure	Cure	01	True

1 2 3 4

Figure 43 Operations Viewer

New Operations can be added by clicking on the  icon.

File Actions Help

**Operation: New**

**Details**

Information	Name:	<input type="text"/>	Active:	<input type="checkbox"/>
Revisions	Category:	<input type="text"/>		
Permission to Process	SubCategory:	<input type="text"/>		
Permission to Manage	Work Area:	<input type="text"/>		
	Description:	<input type="text"/>		
	Current Rev.:	<input type="text"/>		

Figure 44 New Operation Detail Screen

File Actions Help

**Operation: Die Attach**

**Details**

Information	Name:	<input type="text"/> Die Attach	Active:	<input checked="" type="checkbox"/>
Revisions	Category:	<input type="text"/> Assembly		
Permission to Process	SubCategory:	<input type="text"/> Wafer		
Permission to Manage	Work Area:	<input type="text"/> GT-3		
	Description:	<input type="text"/> Die Attach		
	Current Rev.:	<input type="text"/> 01		

Figure 45 Operation Detail Screen

Type in the name of the Operation. This is what will be visible when selecting onto a Process. Click on the Active checkbox in order for the Operation to be available for selection. If applicable, select the Category, SubCategory and Work Area. Use the pencil icons to add additional values as needed. Type in the Description of the Operation.

The Current Rev. drop-down list will be empty for now.

### Operation Revisions

An Operation can have multiple Revisions. There are two basic reasons for this:

1. Once a WIP Work Order has been triggered off of a Revision of an Operation, it's good practice to maintain a history of how the Operation had been set up. A new Revision will need to be made and the older Revision(s) made Inactive when changes are needed.
2. More than one Revision may be active within an Operation in order to keep the overall template of a Work Order, but have slightly different Steps in order to accommodate the needs of different Products (i.e., different Bills of Materials, Data Collections, etc.).

To set up a Revision, click on the Revisions link on the Operation Detail screen. Click the  icon. Once the Revision has been saved, it needs to then be selected as the Current Revision on the Information screen. As a new Revision is added, change the Current Revision selection accordingly.

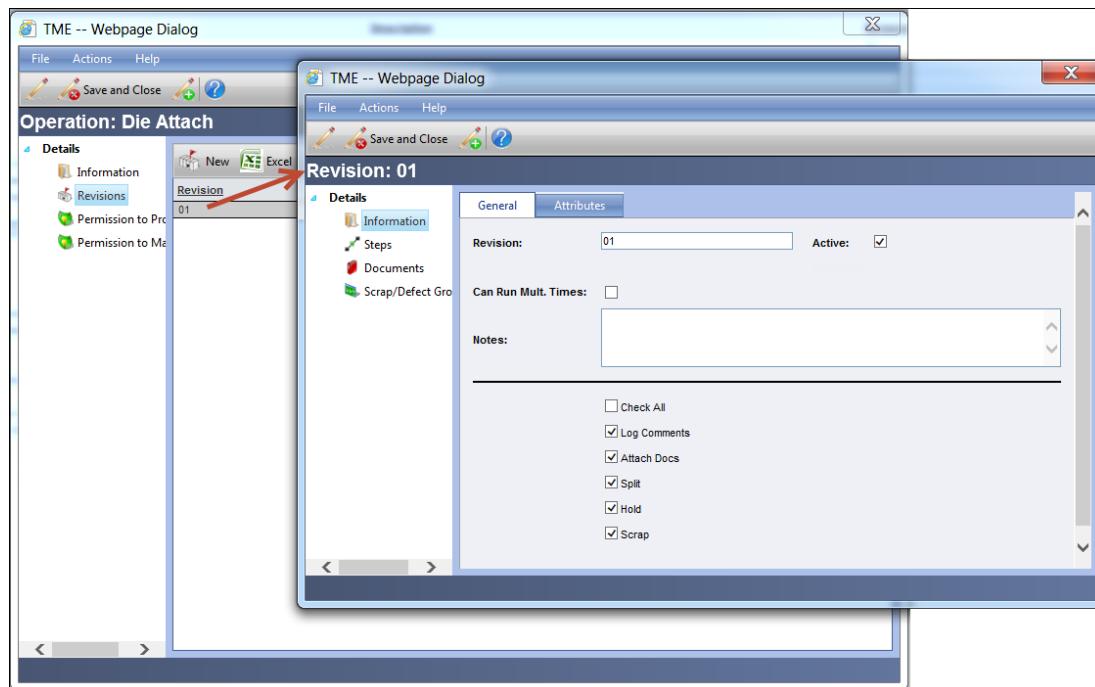


Figure 46 Operation Revision Detail Screen

Type in the name of the Revision. This is what will be on the Operation LookUp screen along with the Operation Name when making a selection for a Process.

Check the Active checkbox so that the Revision will be available on the LookUp screen.

Check the Can Run Mult. Times checkbox if the Operation may be added to a Process more than once.

Enter Notes accordingly. These do not appear on the Work Order, they are meant only as notes for anyone looking at this particular screen.

Select all Actions that can occur at the Work Order level during the Operation (separate from within a Step):

- Log Comments: Comments may be logged to the Work Order
- Split: Items may be split off into another Work Order for re-work, testing, inspection, etc.
- Hold: The Work Order can be placed on Hold
- Scrap: Product may be scrapped to a locale – all of it or a portion. The option to Destroy is also available.

## Steps

Steps within Operations provide the Operators with detailed instructions and tasks in order to move through the WIP Process. They can be simple single messages or provide multiple tasks of various types.

To set up the Steps in an Operation, click on the Steps link on the Operation Revision Detail screen. Click the  icon.

Users can move from Step to Step detail screens within an Operation without closing and opening those screens by clicking on the  on the Step toolbar.

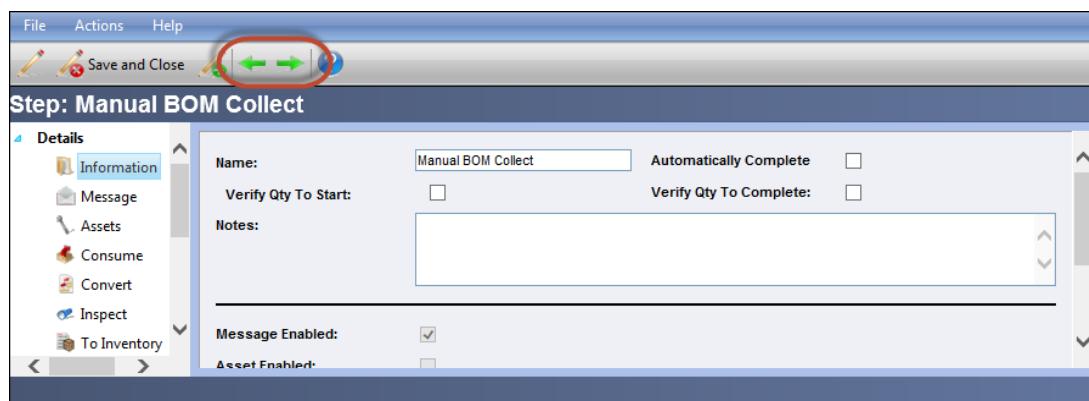


Figure 47 Step to Step Mobility

- Select the Verify Qty to Start/to Complete checkboxes to force an Operator to verify and input the quantity of the product at either the Start and/or Completion of the Step.
- Select Automatically Complete to have the Step automatically complete without the User having to click “Complete Step” once all required tasks have been handled.

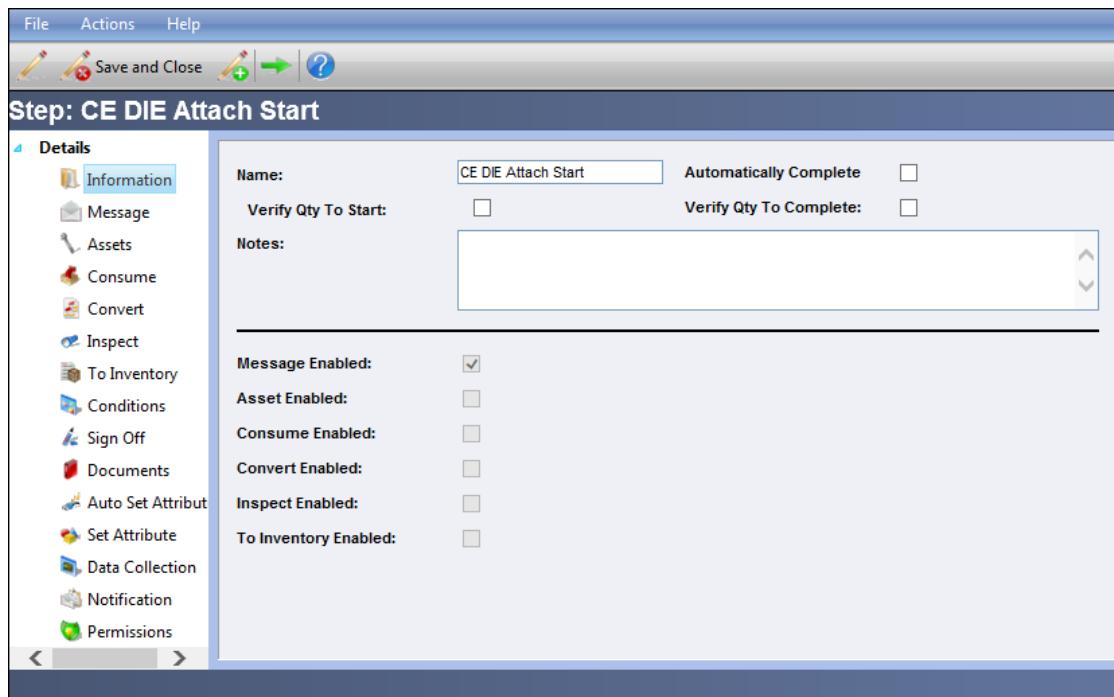


Figure 48 Step Detail Screen

Type in the Name of the Step as it is to appear on the Work Order.

The Enabled checkboxes will get selected automatically as the named functions are set up. For instance, if a Message is set up, then the “Message Enabled” checkbox will be selected the next time the screen is accessed.

The checkbox for Required will force the Operator to process the particular task. The link to the action will have an asterisk. If the task is not completed, then the Complete Step link will not appear.

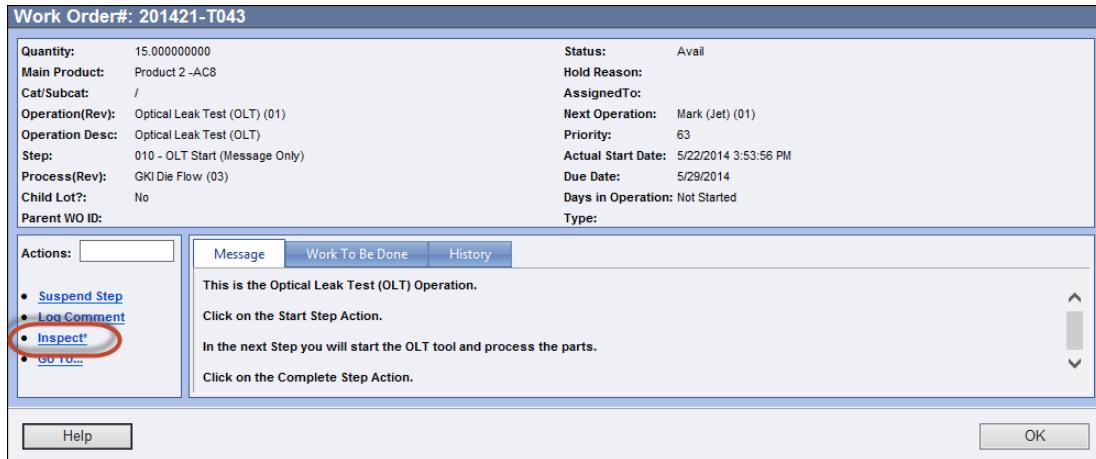


Figure 49 Action Link on Work Order with Asterisk to Show It Is Required

## Message

The Message feature supplies three types of Messages that are displayed as the first visible tab when an Operator accesses a Step. The three types are:

- Message: Text to provide instructions or information
- Asset: Provides the Asset Status (Uptime, Downtime, etc.) as well as information regarding overdue Scheduled Work (which could block further processing until the PM is completed) for selected Assets
- Attribute: Lists the Attribute values entered for the Product selected for the Work Order or for those of the Work Order itself.

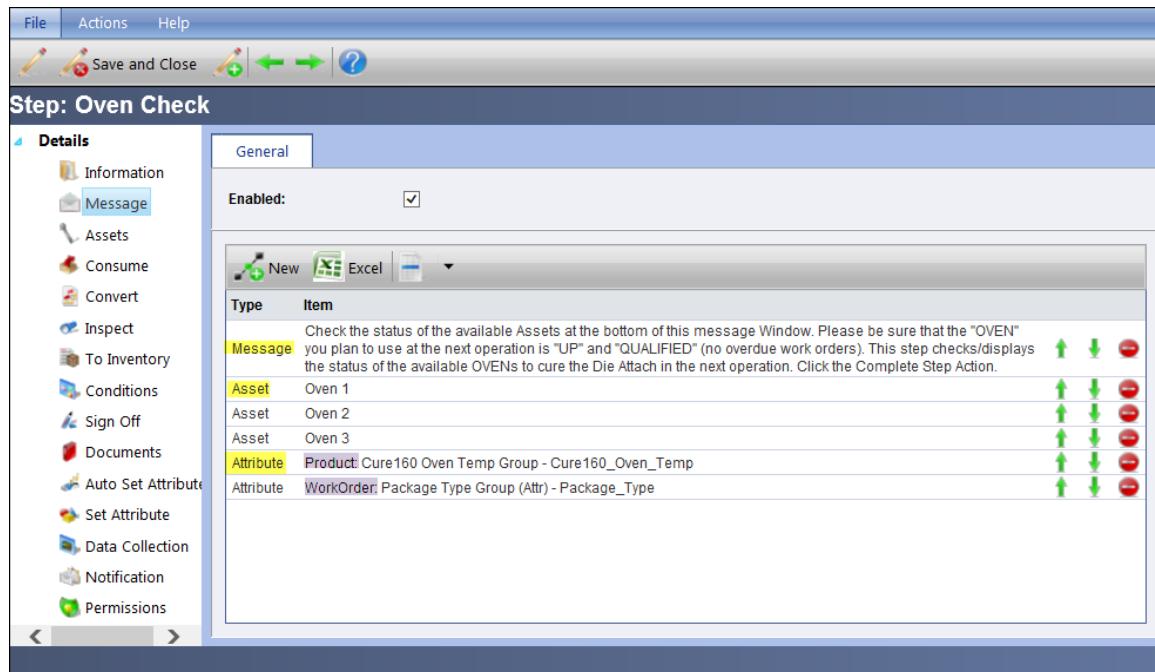


Figure 50 Step Set Up: Message

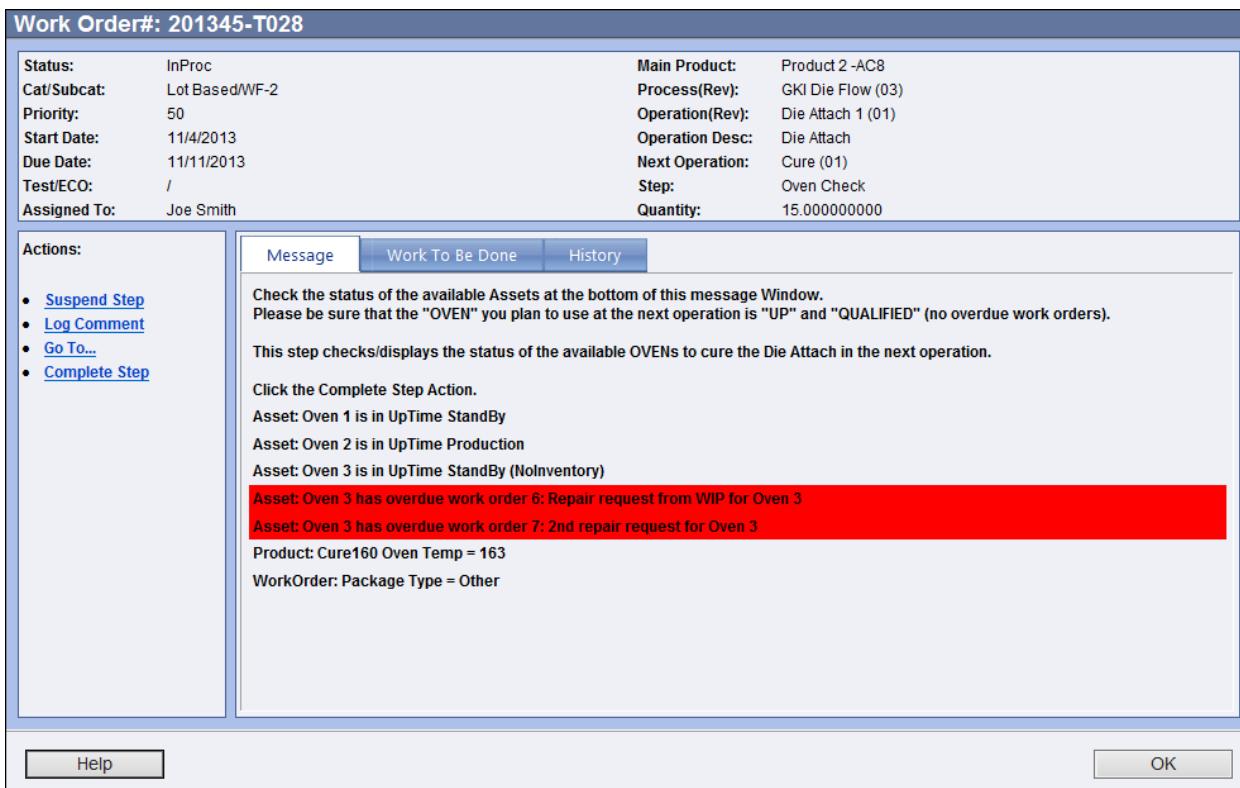


Figure 51 Step Message on Work Order Screen

To create a standard **Message**, click on the Message link, make sure the Enabled checkbox is selected, click on the New icon, and choose “Message” from the Type dropdown list. Type in the message as it should be viewed on the Work Order Screen. Save/Close.

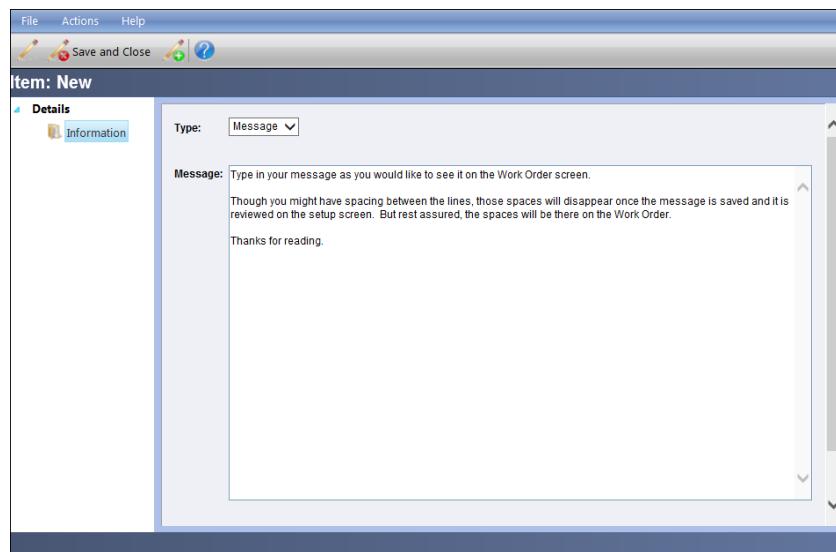


Figure 52 Step Message: Standard

To create an **Asset Message**, choose “Asset” from the Type drop-down list instead. Click on the Look Up icon to bring up the Item LookUp screen in order to select an Asset. The Message as it appears on the Work Order will show the Asset, its Status as well as any overdue Work Orders.

Asset Messages can be set up Steps ahead of when they are needed to provide the Operators plenty of time to make sure the Asset(s) is ready (in the appropriate Status, don't have overdue Work Orders) when they do get to the appropriate Step.

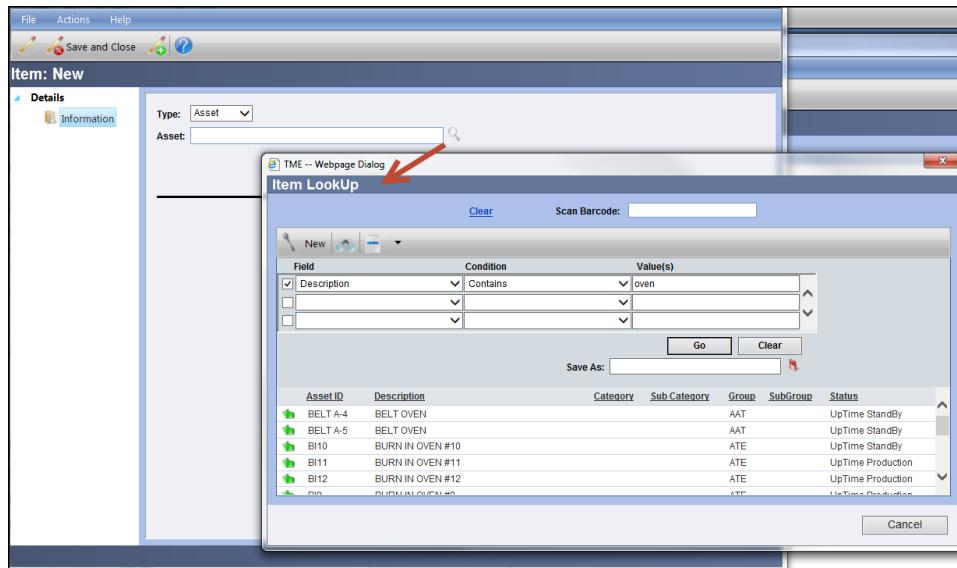


Figure 53 Step Message: Asset

To create an **Attribute Message**, choose “Attribute” from the Type drop-down list instead. Select whether the source of the Attribute is the Product or the Work Order and then choose the Group (Variable Group) and the corresponding Attribute for which its value will be displayed. The value will be pulled from the entry provided to the Product (See the Attributes Portion of the Inventory Chapter for more information) or the Work Order (set at creation/release).

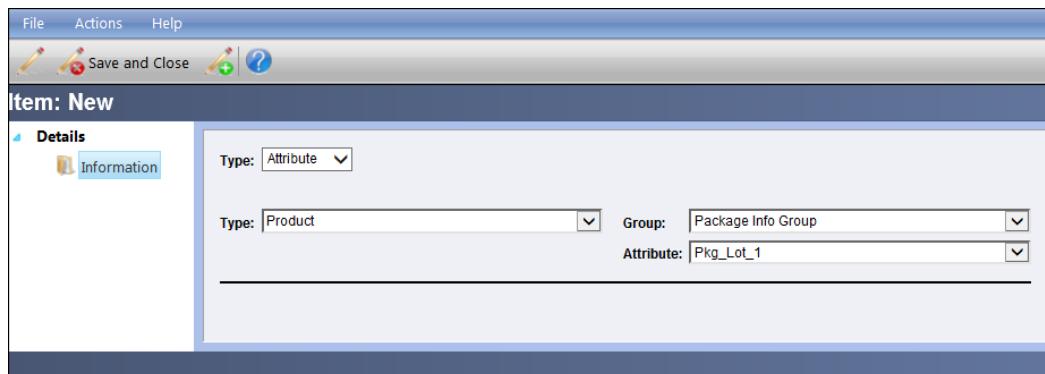
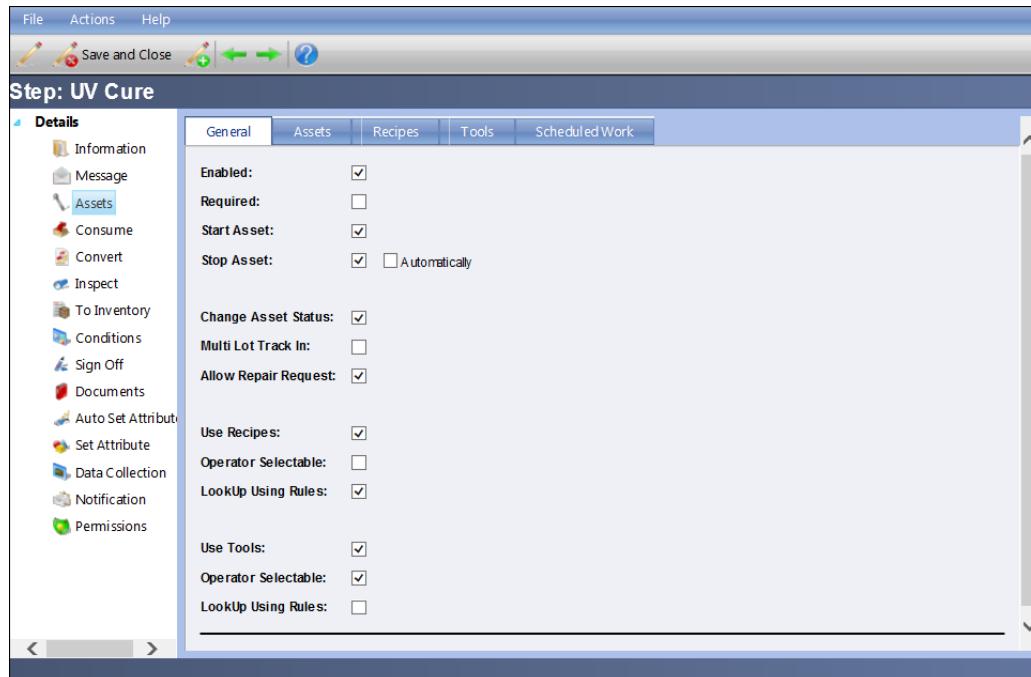


Figure 54 Step Message: Attribute

## Assets

The Assets feature sets up the Assets that may be started and/or stopped within a Step.



**Figure 55 Step Setup: Assets**

What the checkboxes mean:

- Enabled: The Step incorporates the start and/or stop of Assets. Selection will automatically set the Asset Enabled checkbox on the Information screen.
- Required: User is required to start and/or stop an Asset(s). Step cannot be completed otherwise.
- Start Asset: Asset(s) selected on the Assets tab can be started within the Step.
- Stop Asset: Asset(s) selected on the Assets tab can be stopped within the Step. If Asset(s) was started in a previous Step, must still be included on the Assets tab in a Step set with Stop Asset in order to be able to stop it.
- Automatically: TME will immediately stop the Asset as soon as the Operator clicks on the Stop Asset link. The Stop Asset screen (along with a Submit button to perform the transaction) will not appear showing which Asset is actually getting stopped.
- Change Asset Status: An Asset that is started will go into the Uptime Production

state and when stopped, will go into Uptime Standby; otherwise, it will remain in its current state prior to the start/stop.

- Multi Lot Track In: Multiple WIP Work Orders may have batches started within the same Asset. If not checked, the WIP will be blocked if the Asset is not in the Uptime Standby state.

For example, a small oven might only handle single batches set at specific temperatures at any given time, so Multi Lot Track In will be turned off. Work Orders can only start the Asset when it does not already contain Product. A belt oven on the other hand, might be set up to continuously run at a set temperature. Work Orders do not need to wait for other work to be completed and can start the Asset as needed.

- Allow Repair Request: The Repair Request button will be available on the Asset Start/Stop screens. This is to be used when the selected Asset is down and needs repair. A maintenance Work Order will be generated, the Asset will be placed into a Downtime Repair Request state and will no longer be available to start.
- Use Recipes: This function activates the Recipes tab for this Step which allows for the creation of a list of Recipes that are displayed or the selection of a Recipe LookUp (see the Recipe Look Ups portion of this Chapter) to automatically display a Recipe based on the Asset to be started. Named Recipes are created in the Recipes Submodule (described earlier in this Chapter).
- Use Tools: This function activates the Tools tab for this Step which allows for the creation of a list of Tools that are displayed or the selection of a Tools LookUp (see the Tools Look Ups portion of this Chapter) to automatically display a Tool based on the Asset to be started. Tools are defined as Assets. There is no special designator for these Assets, they can be any active Asset within TME.
- Operator Selectable: The Recipes and Tools tabs will be set for the creation of a list of named Recipes or Tools from which the Operator will be able to choose while in WIP.
- LookUp Using Rules: The Recipes and Tools tabs will be set for the selection of the Look Ups instead of the actual Recipes or Tools. The Recipe/Tool Look Up will automatically select the Recipe Name/Tool to be displayed onscreen during WIP based on the Product of the Work Order and/or the Asset selected to start.

## Assets Tab

The Assets tab is for selecting the Assets to be started/stopped at this Step.

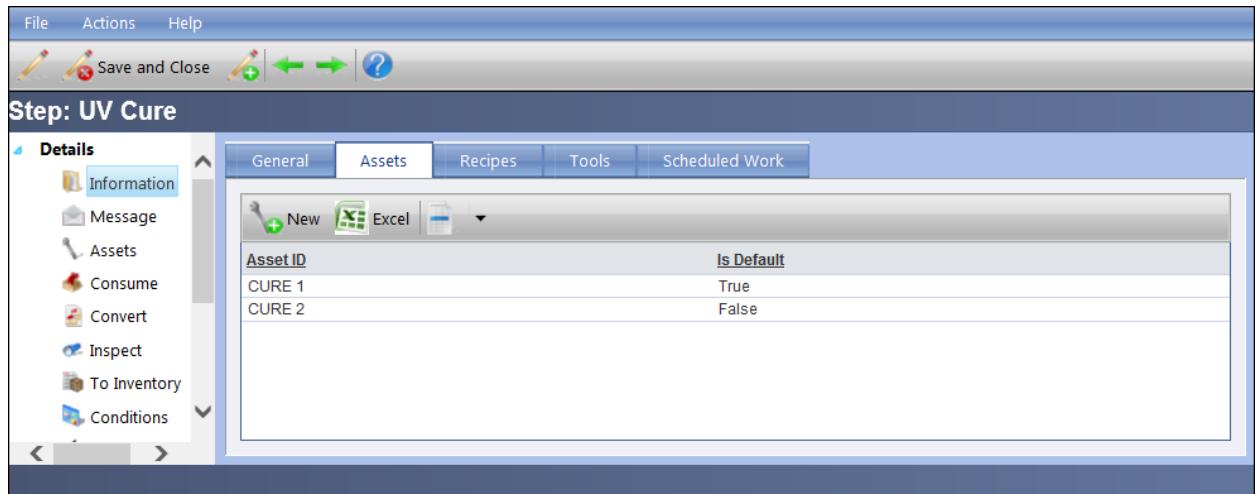


Figure 56 Step Setup: Assets - Assets Tab

The Asset selected as the default will be displayed in the drop-down list upon the start of the Step.

## Recipes Tab

The Recipes tab is for selecting the Recipes to be displayed or the Recipe Look Up which will determine which Recipe gets displayed based on the Asset selected to start and/or the Product running through WIP.

The column header will either be Recipe or Recipe Look Up depending on whether Operator Selectable or LookUp Using Rules is selected.

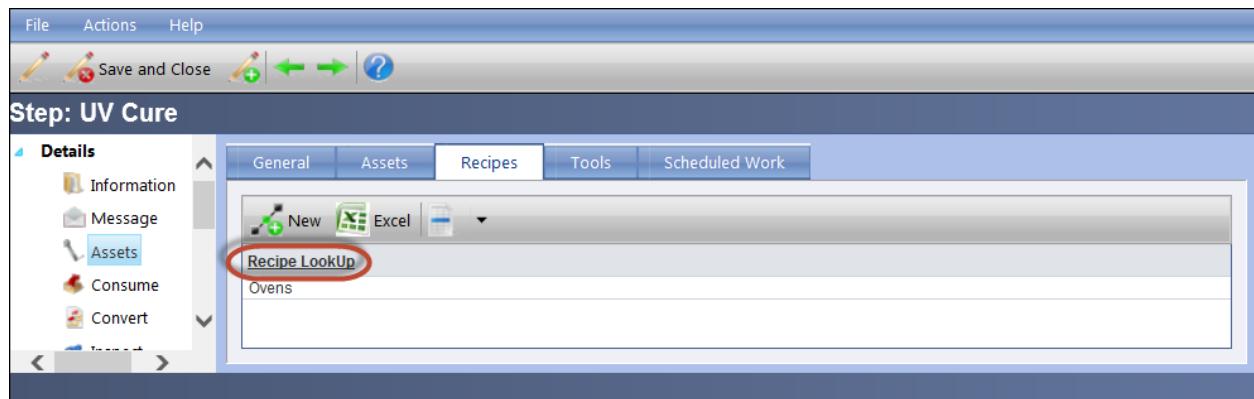


Figure 57 Step Setup: Assets - Recipes Tab

## Tools Tab

The Tools tab is for selecting the Tools to be displayed or the Tools Look Up which will determine which Tool gets displayed based on the Asset selected to start and/or the Product running through WIP.

The column header will either be Tool ID or Tool Look Up depending on whether Operator Selectable or LookUp Using Rules is selected.

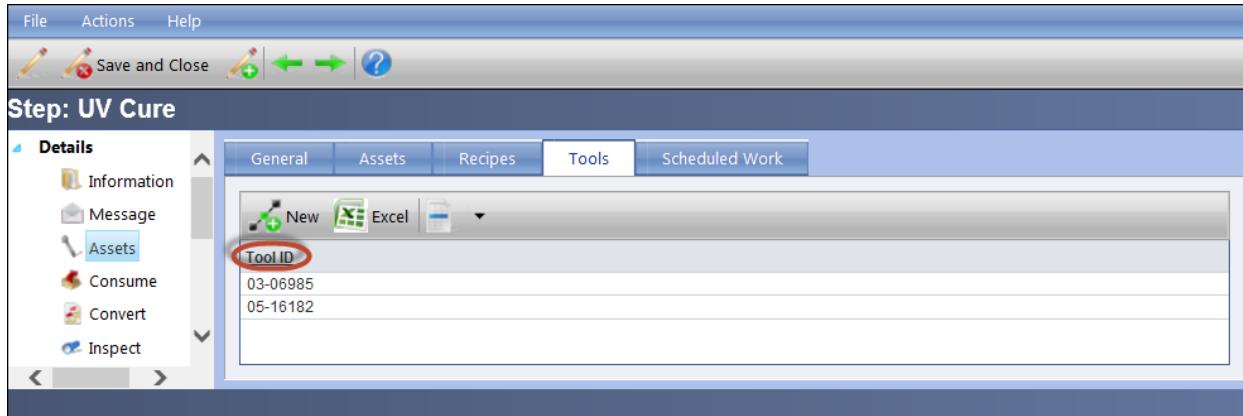
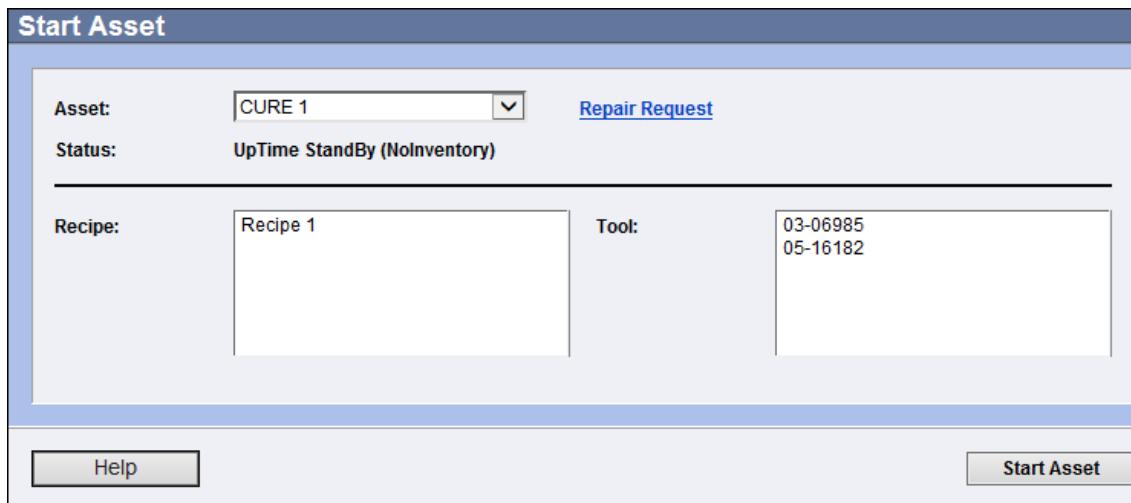


Figure 58 Step Setup: Assets - Tools Tab

For the setup of the Assets per the screenshots above, the resulting screen for the Operator at this Step is:



Asset:	CURE 1	<a href="#">Repair Request</a>	
Status:	UpTime StandBy (NoInventory)		
Recipe:	Recipe 1	Tool:	03-06985 05-16182

Figure 59 WIP Start Asset Screen

The Asset immediately displayed is the default Asset Cure 1. The Recipe in view is that set up in the Ovens Recipe Look Up whereby Recipe 1 was associated to Cure 1. The Tools listed are those selected directly.

## Scheduled Work Tab

The Scheduled Work tab is for selecting the Work Tracking Processes from which if any of the selected Assets have overdue Scheduled Work/Work Orders, they will not be populated in the drop-down list for starting an Asset. Multiple Processes may be selected.

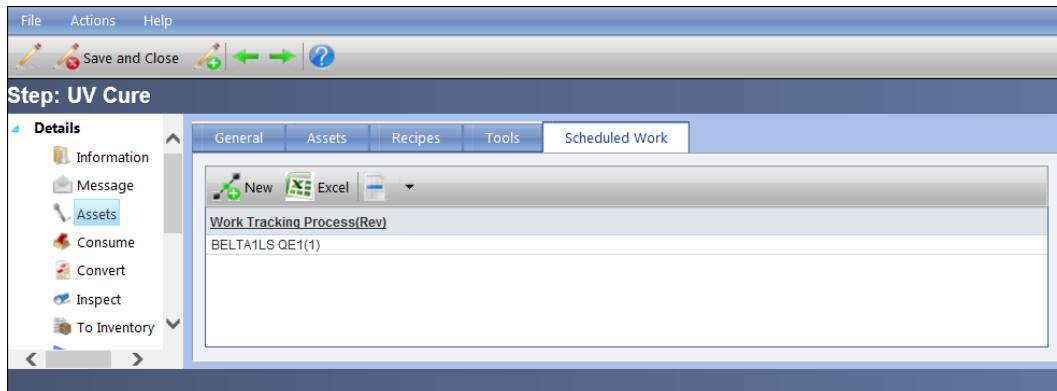


Figure 60 Step Setup: Assets - Scheduled Work Tab

In the screenshot above, the Work Tracking Process selected is BELTA1LS QE1 Revision 1. If either Cure 1 or Cure 2 have any overdue Scheduled Work/Work Tracking Work Orders generated off of this Process, it will not be available in the drop-down list of Assets to start. The Work Tracking Work Order must be closed (or rejected if not yet started) first.

The following screenshots show how the Work Tracking Process affects WIP.

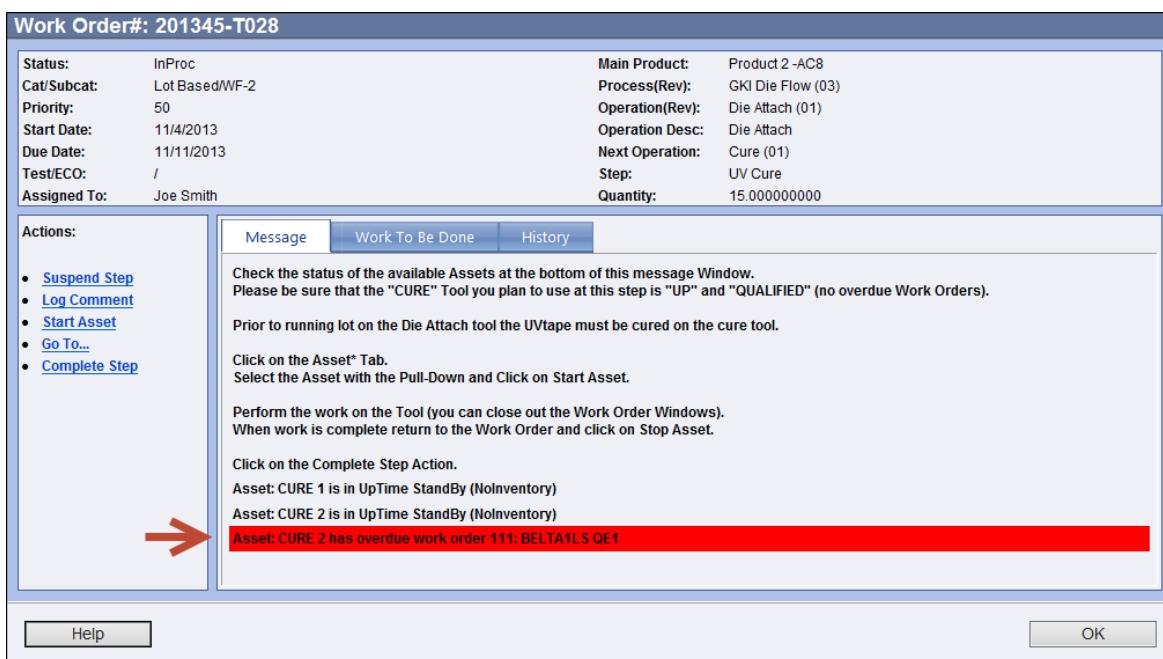


Figure 61 WIP Message Screen: Asset Message with Overdue PM

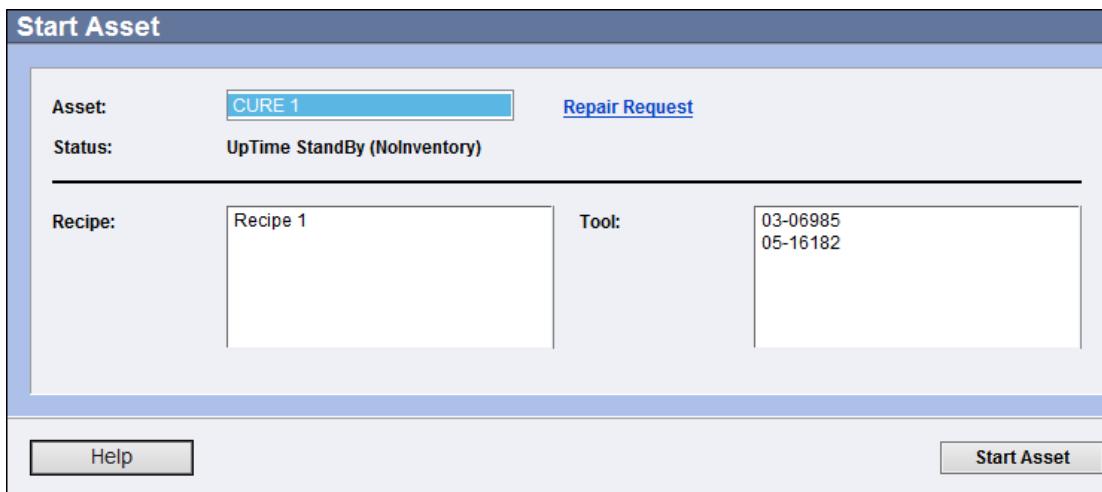


Figure 62 WIP Start Asset Screen: Asset Not Available Due to Overdue Scheduled Work

## Consume

The Consume feature sets up how Inventory Items are consumed to the Work Order, Batch or Serial Number of the Product.

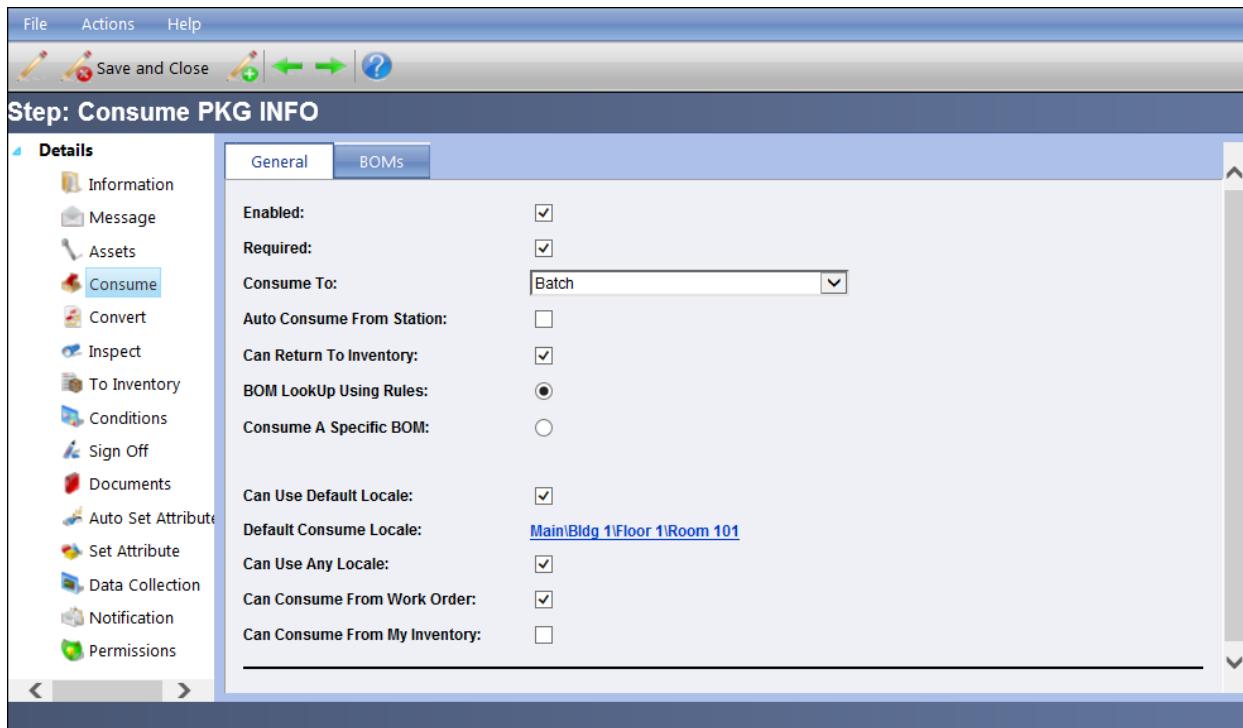


Figure 63 Step Setup: Consume

What the checkboxes/selections mean:

- Enabled: The Step incorporates consumption of Inventory Items. Selection will automatically set the Consume Enabled checkbox on the Information screen.
- Required: User is required Consume Inventory Items. Step cannot be completed otherwise.
- Consume To: Inventory Items are consumed to either the Work Order, Batch Number(s), or Serial Number(s). The Operator will have the ability to choose which Batch or Serial Number if there are more than one in the Work Order.
- Auto Consume From Station: Inventory Items are automatically consumed from the Work Order (having been supplied by the Take Inventory feature)
- Can Return to Inventory: Inventory Items that have been consumed can be returned to Inventory. The Quantity will update for the locale selected at the time of the Return. If not checked, the link to the Return to Inventory screen will not be visible.
- BOM LookUp Using Rules: The BOMs tab will appear for the selection of the BOM Look Ups (described earlier in this Chapter). The BOM Look Up will automatically select the BOM to be used for the Consume function during WIP based on the Product of the Work Order.
- Consume a Specific BOM: Rather than using the BOM Look Up, a BOM is specified. The BOMs tab will not appear. Instead, a link will appear onscreen for the selection of the BOM.

General	
Enabled:	<input checked="" type="checkbox"/>
Required:	<input checked="" type="checkbox"/>
Consume To:	Batch <input style="width: 20px; height: 15px; border: 1px solid #ccc;" type="button" value="..."/>
Auto Consume From Station:	<input type="checkbox"/>
Can Return To Inventory:	<input checked="" type="checkbox"/>
BOM LookUp Using Rules:	<input type="radio"/>
Consume A Specific BOM:	<input checked="" type="radio"/>
<a href="#" style="color: blue; text-decoration: underline;">Click here to select a BOM.</a>	

General	
Enabled:	<input checked="" type="checkbox"/>
Required:	<input checked="" type="checkbox"/>
Consume To:	Batch <input style="width: 20px; height: 15px; border: 1px solid #ccc;" type="button" value="..."/>
Auto Consume From Station:	<input type="checkbox"/>
Can Return To Inventory:	<input checked="" type="checkbox"/>
BOM LookUp Using Rules:	<input type="radio"/>
Consume A Specific BOM:	<input checked="" type="radio"/>
<span style="border: 1px solid red; border-radius: 15px; padding: 2px 10px; color: red; font-weight: bold;">PACKAGE-CBGA</span>	

**Figure 64 Step Setup: Consume - Specific BOM**

- Can Use Default Locale: When the Consume screen is opened within WIP, the locale for the Inventory Item will be set at the Default Consume Locale (selected as part of the Default Consume Locale line item, next bullet point).
- Default Consume Locale: The locale to be used as the default for the Inventory Items to be consumed is selected.

- Can Use Any Locale: May be used in conjunction with the use of the Default Locale. This feature allows the User to select other Locales when consuming Inventory Items.
- Can Consume From Work Order: The WIP Work Order has a feature that allows Operators to take Inventory Items from a Locale and relocate them to the Work Order. The Work Order effectively reserves the Items and takes the place of the Locale when viewing Inventory On Hand Reports, Item Quantities screens, etc. By selecting the Can Consume From Work Order checkbox, the Operator can Consume directly from the Work Order instead of a Locale.
- Can Consume From My Inventory: This feature works almost the same as Can Consume From Work Order. However, instead of Inventory Items relocating to the Work Order, they are relocated to the Operator via a “Take” transaction that takes place only in the Inventory Module (See the Actions portion of the Inventory Chapter for more information). In this case, the Operator’s Full Name replaces the Locale on reports and onscreen. The Operator can then Consume the Items directly from him/herself instead of a Locale.

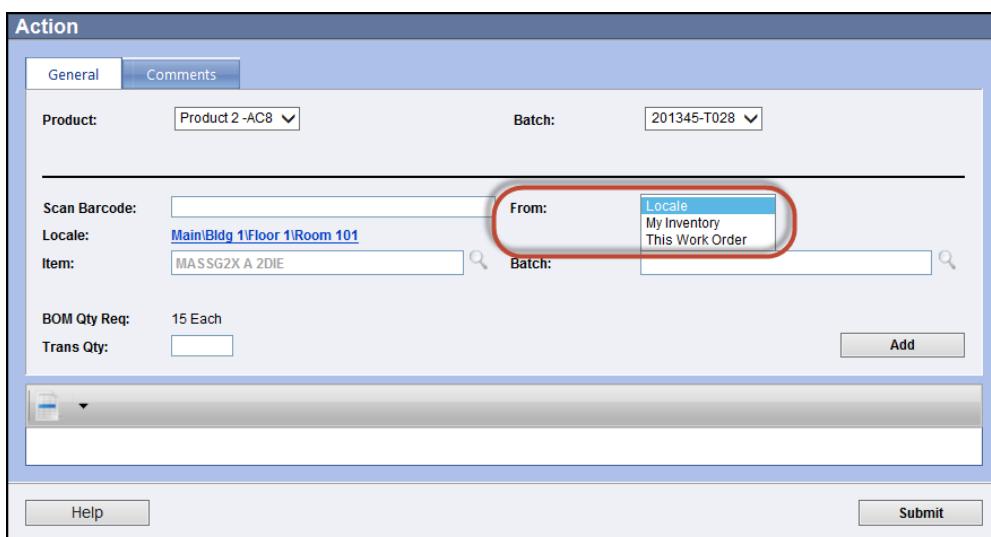


Figure 65 WIP Work Order Consume Screen

### BOMs Tab

The BOMs tab is for selecting the BOM Look Up which will determine which BOM's Inventory Items get displayed based the Product running through WIP.

 Be careful when setting BOM LookUps and selecting on the BOMs Tab – there can only be one BOM per Product per Operation. TME Cannot have competing BOMs trying to populate their Inventory Items when the Operator tries to Consume.

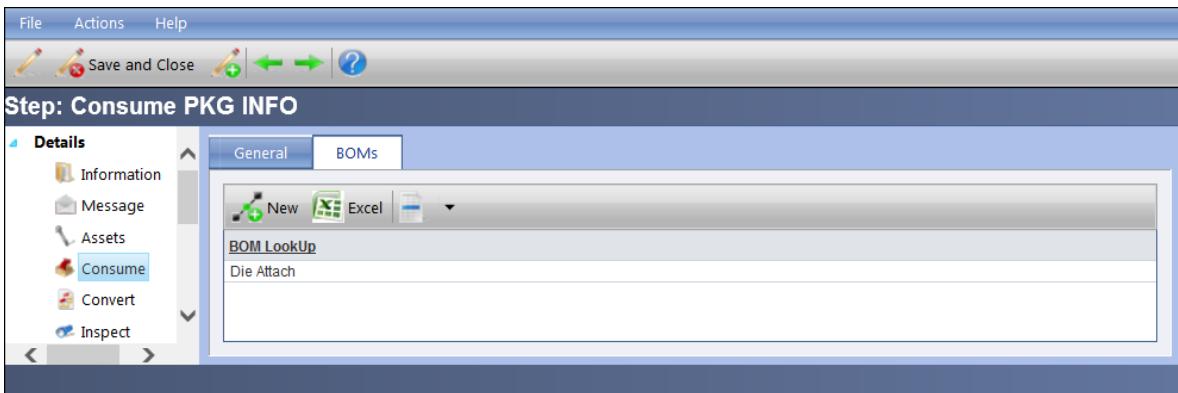


Figure 66 Step Setup: Consume - BOMs Tab

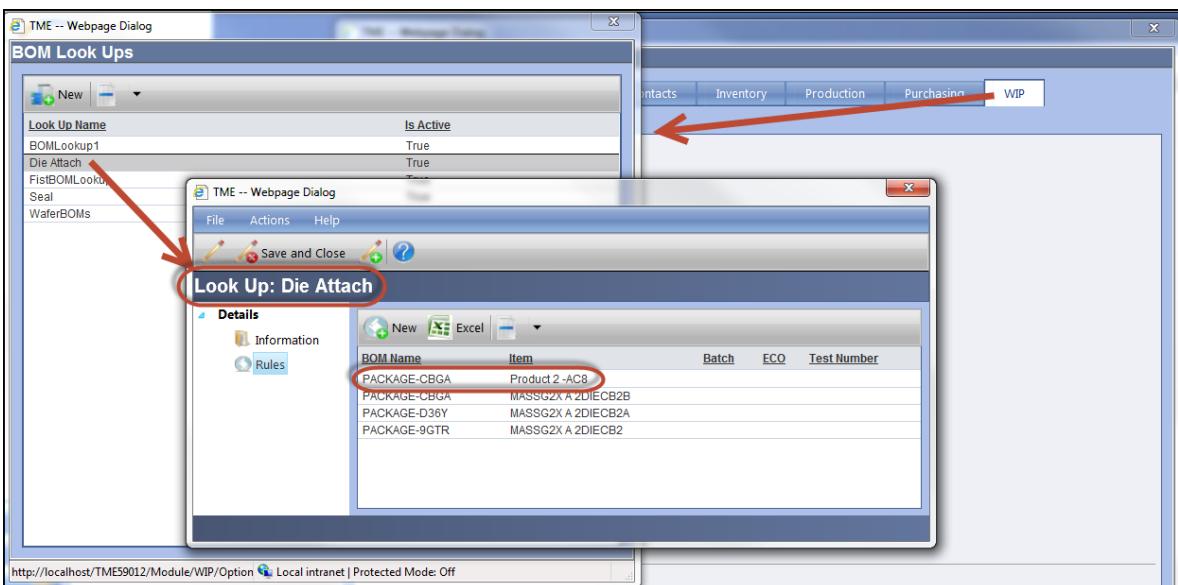


Figure 67 BOM Look Ups Set Up from Tools > Options > WIP

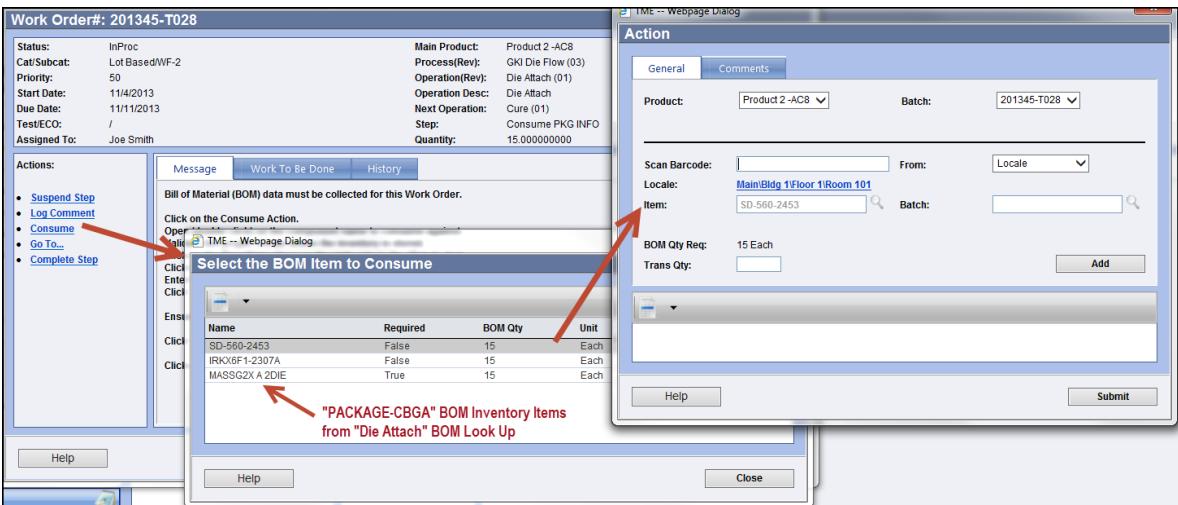


Figure 68 WIP Work Order Consume Screens

## Convert

The Convert feature enables the link to Convert the Product contained in a Work Order into other Products. There is also the option to make the Conversion required.

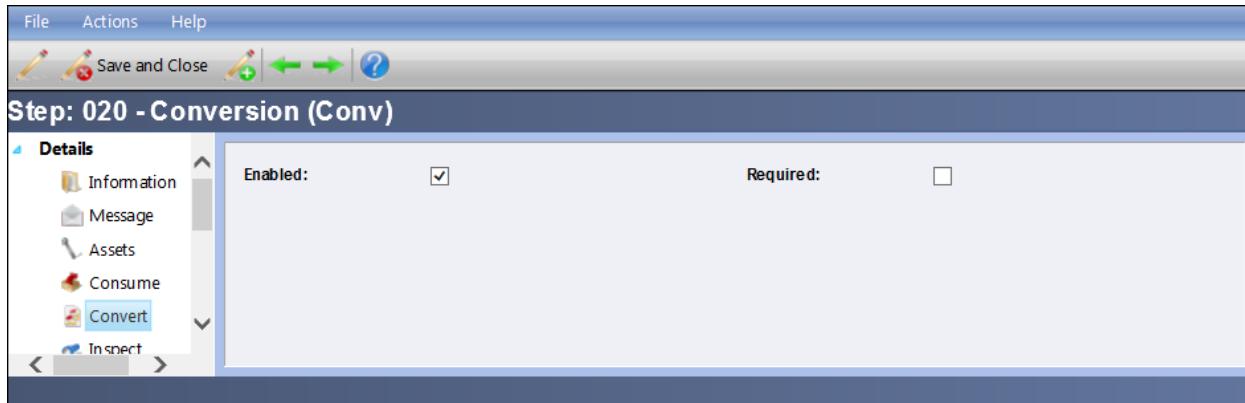


Figure 69 Step Setup: Convert

Any Product that is to be converted into other Products must have those conversions set up on the WIP Setup screen (accessed from the Product's Inventory Item Detail screen as described in the WIP Setup portion of this Chapter).

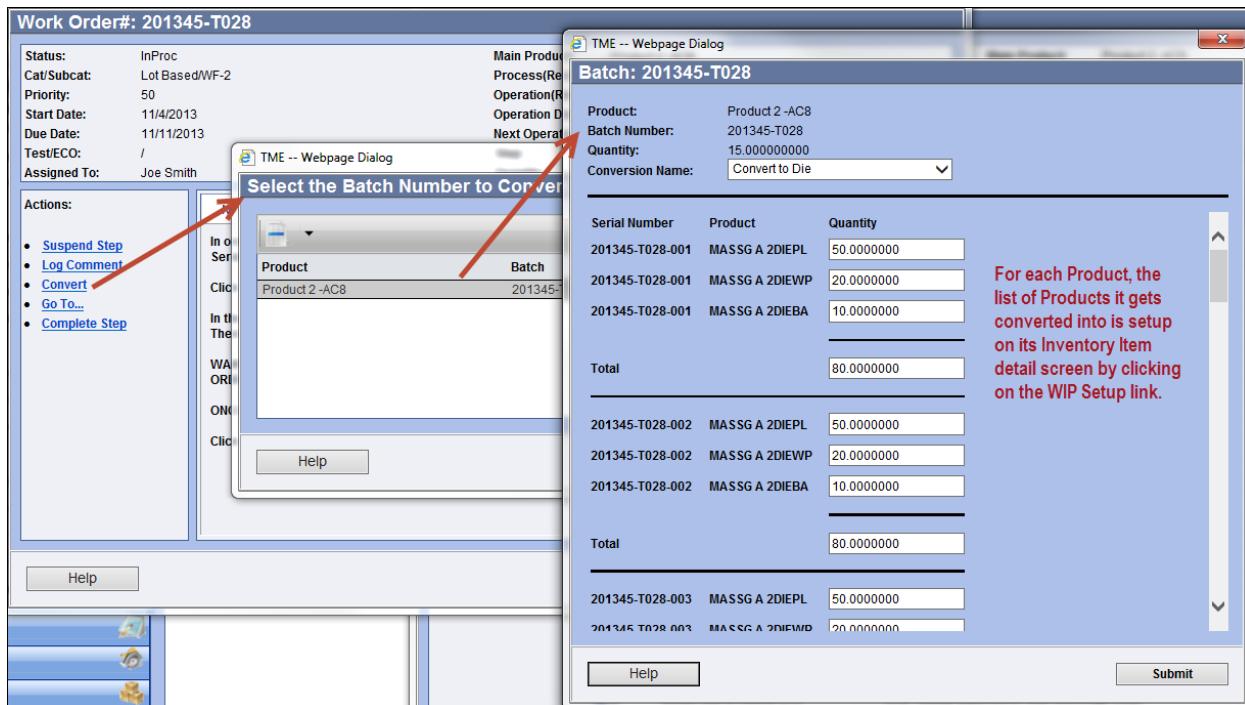


Figure 70 WIP Work Order Convert Screens

## Inspect

The Inspect feature enables the link to Inspect the Product contained in a Work Order. There is also an option to make the Inspection required.



Figure 71 Step Setup: Inspect

This feature works hand in hand with Scrap Groups as described earlier in this Chapter. When a Scrap Group is associated with an Operation and the Product currently in that Operation, the Defects list for the Inspect will use the Scrap Codes of that Scrap Group.

It also uses the Inspection Positions set up in Tools > Options > WIP as described earlier in this Chapter.

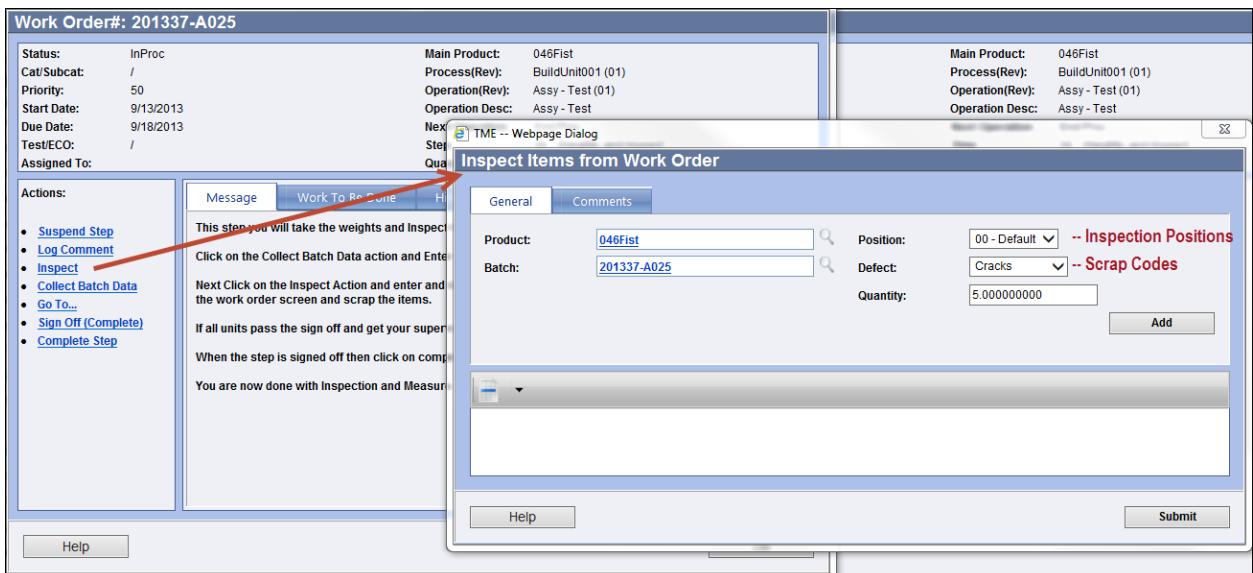


Figure 72 WIP Work Order Inspect Screens

## To Inventory

The To Inventory feature enables the Operator to move the Product(s) out of WIP and into Inventory as quantity that can be moved, consumed, etc.

The checkbox for Copy Attributes to Batch means that the values for the Attributes set to the Work Order during the course of the flow will be transferred over to the Batch Number(s) as well. For those values to be visible on the Batch Number detail screen, the Attribute Setup must include the identical Variable Groups as those of the Work Order. If not, the values are still linked, just not available onscreen.

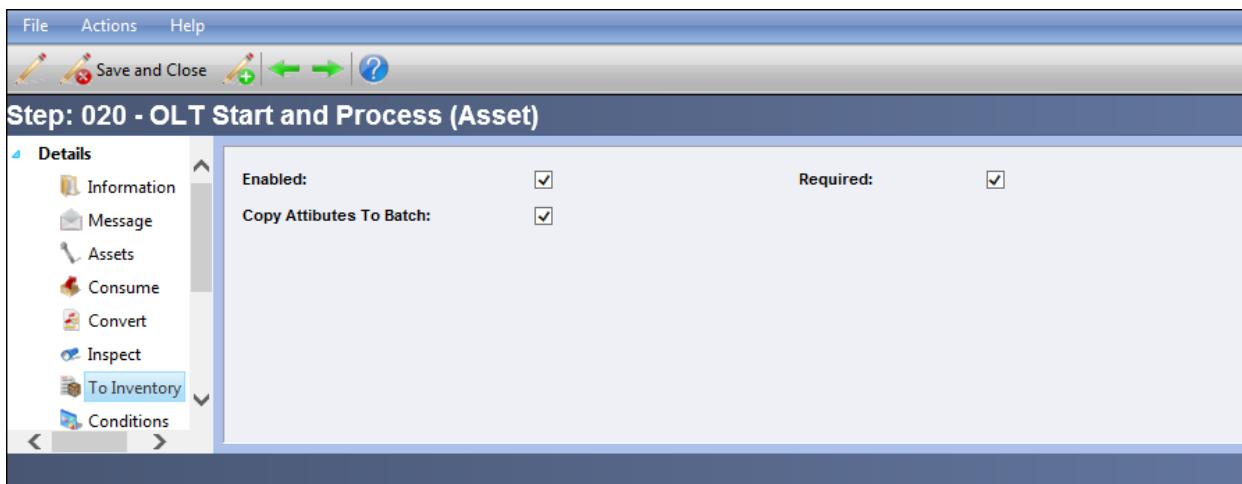


Figure 73 Step Setup: To Inventory

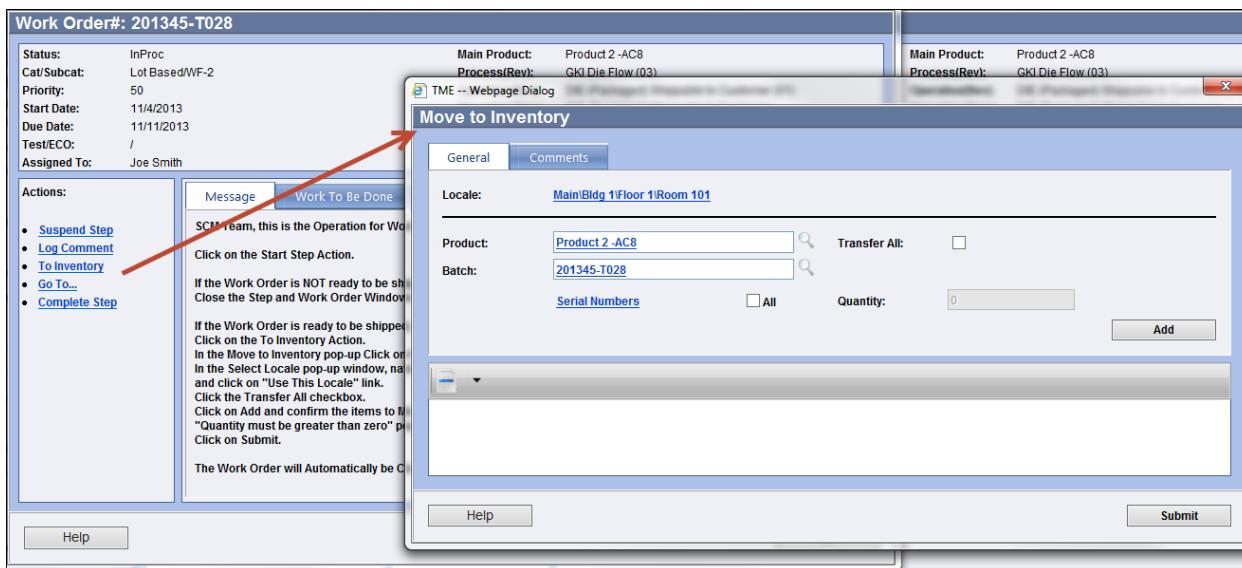


Figure 74 WIP Work Order: Move to Inventory Screen

### Set Attribute, Auto Set Attribute and Conditions

The Set Attribute and Conditions functions work together as a way to direct the flow based on what is going on in the Process, with the Product, equipment, etc.

The basic premise is that an Attribute is set up to collect data in one step. In a following step (does not need to be immediate), a Condition is set up that looks at the data collected and determines if the flow should simply continue in the current Step, Go To another Step, place the Work Order on Hold or have the flow Change To another Process/Operation.

#### Set Attribute

The Attributes to collect the data first need to be set up as a Variable Group in the Settings Module (see the Variable Groups section of the Settings Chapter for more information). The Set Attribute Step can associate and collect data against one Variable Group for the Work Order, one for Batch(es) of Product and one for Serial Number(s) of Product. If more data is needed, add more variables to the Variable Group or add additional Steps with Set Attribute. Check the corresponding “Required” checkbox to make the collection required.



Conditions only check Work Order Attributes, and Product Attributes (set on the Inventory Item detail screen), they do not check against the Batch or Serial Numbers Attributes.

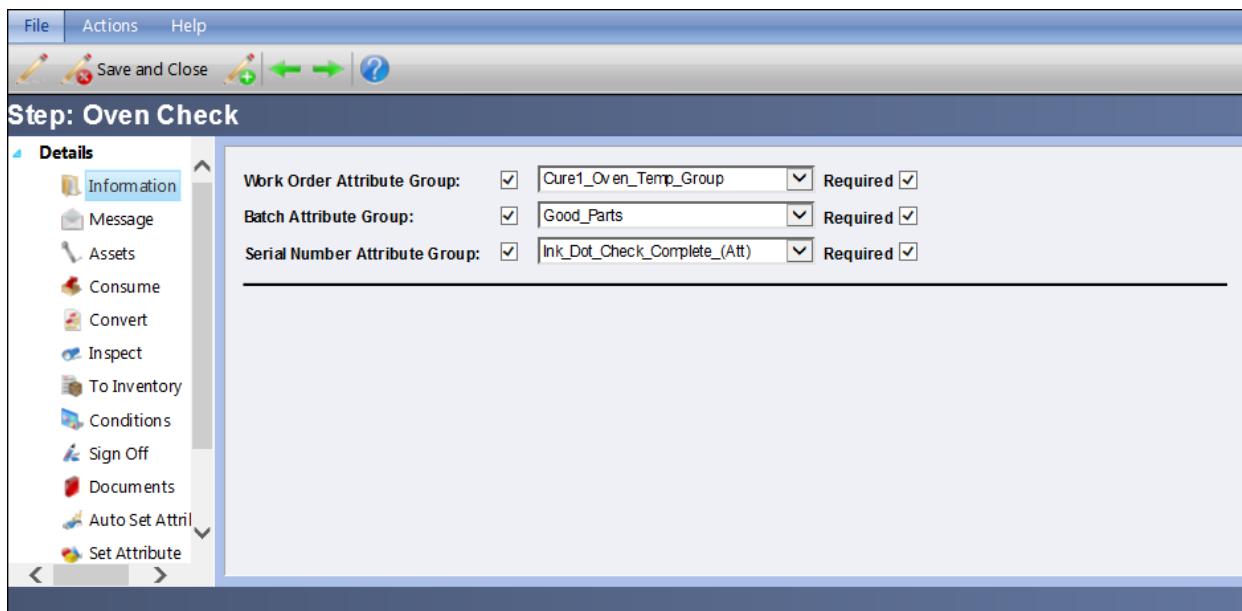
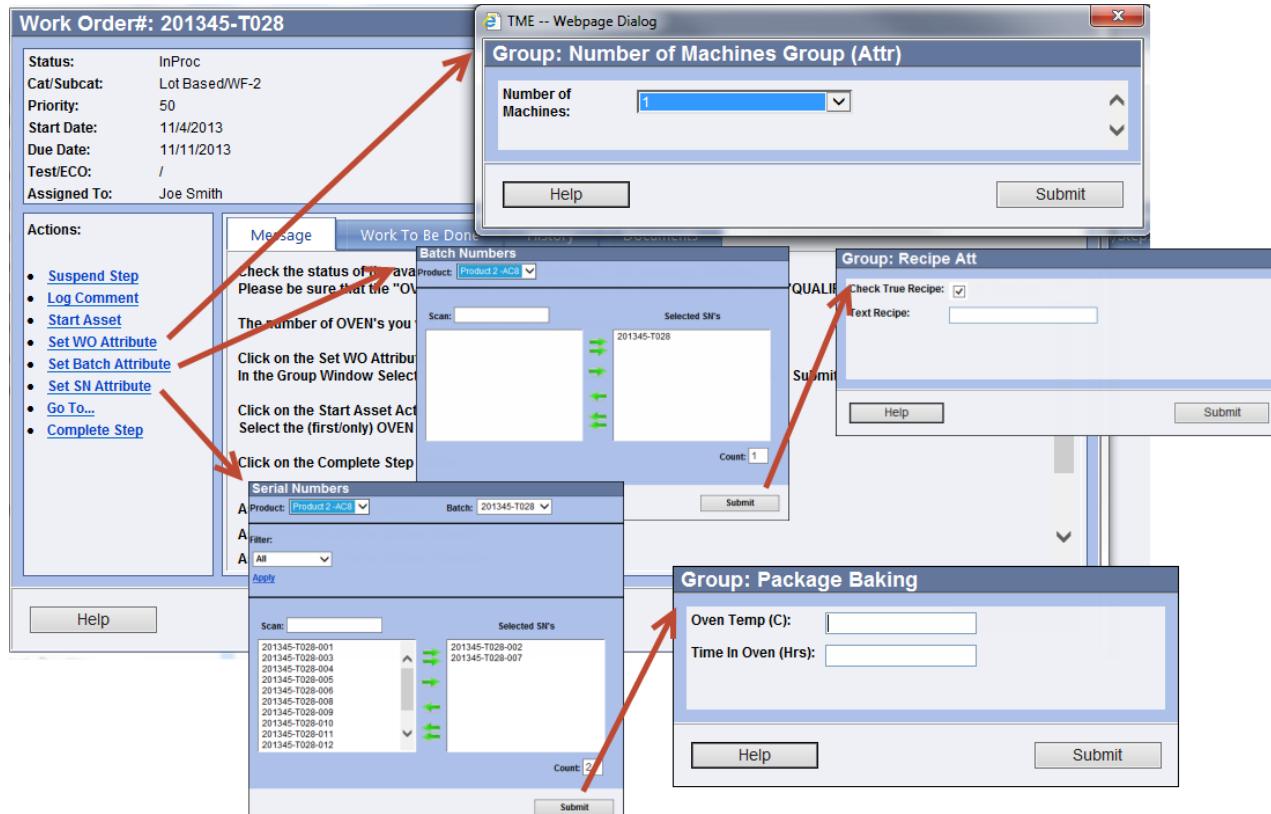


Figure 75 Step Setup: Set Attribute

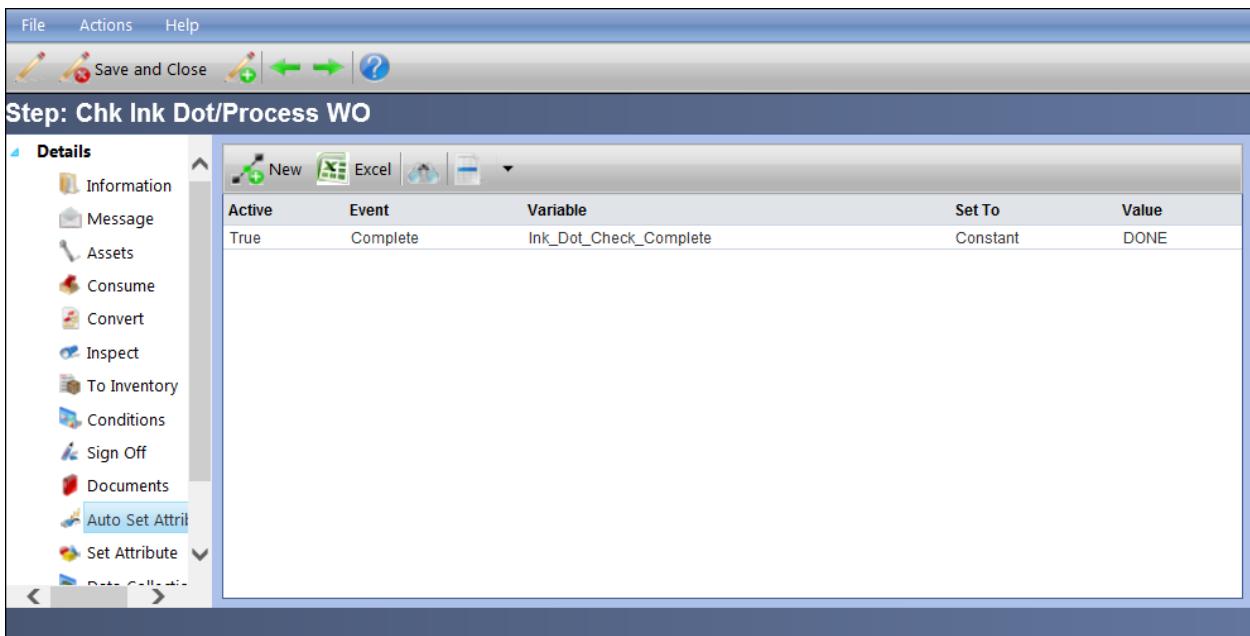


**Figure 76 WIP Work Order: Set Attribute Screens**

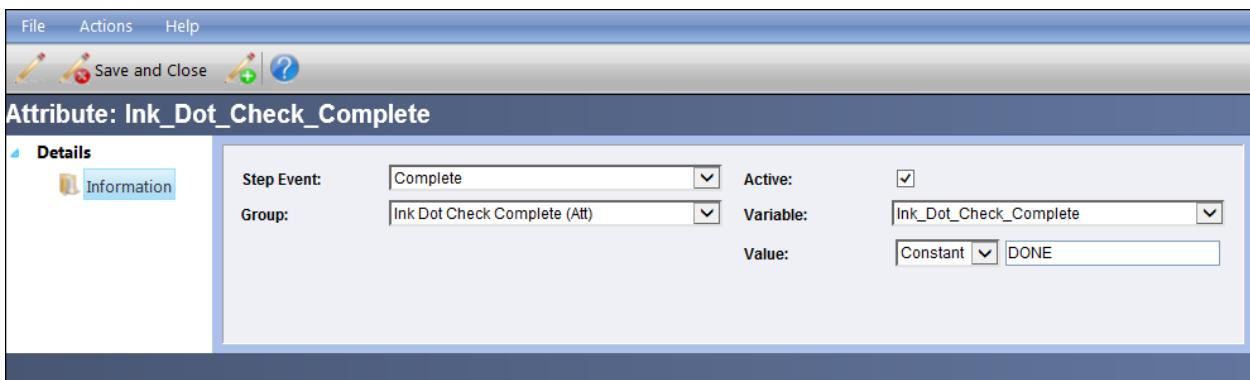
### Auto Set Attributes

The Auto Set Attribute automatically associates and sets a Work Order Attribute to a predetermined value upon the Start or Complete event of a Step.

The purpose of having an Attribute automatically set instead of manually is to capture data such as whether or not a particular test or inspection has been completed. As a Product moves through WIP, it can be useful to view the Work Order Attributes to determine if something was done instead of searching through lengthy history; especially since the Product can jump around within a Process—or even to another Process and Operation entirely.



**Figure 77 Step Setup: Auto Set Attributes Viewer**



**Figure 78 Step Setup: Auto Set Attributes Detail Screen**

The Step Event can either be Start or Complete. If it's set for Start, the Attribute will be set the moment the Step is started; if Complete, then when the Step is Completed.



**Be careful when setting the Value. If the Variable is set up with a drop-down list, make sure the Value entered in for the Auto Attribute is one of the ones from the drop-down list.**

An additional feature with the Auto Set Attribute is the ability to add or subtract values from numerical variables. Upon start/completion of a Step, the Work Order Attribute will increment accordingly.

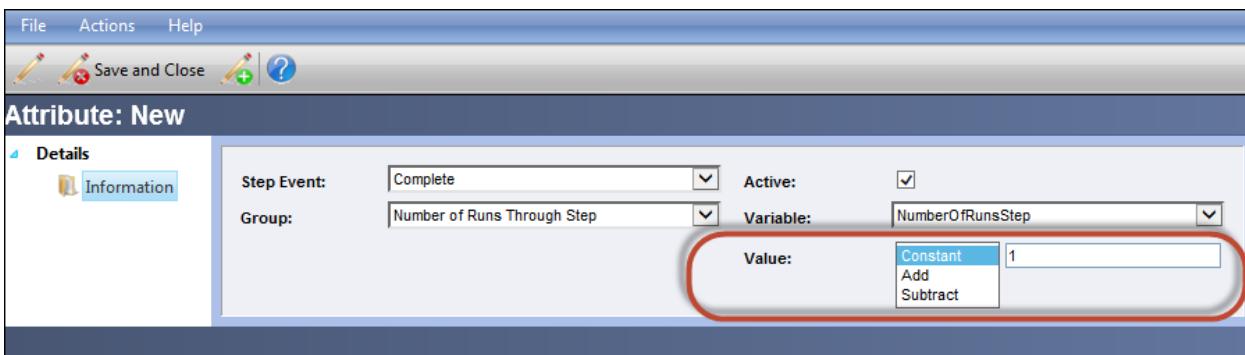


Figure 79 Step Setup: Auto Set Attribute with Incrementation

## Conditions

The Operator does not see or do anything with regards to the Conditions. These are logic tests that perform an action based on Attributes set to the WIP Work Order, Main Product, and Main Batch # as well as on the start of a specific Asset in a previous Step, what the Main Product of the Work Order is, and the result of a query as defined in the Condition.

The Condition function of a Step will be the **first action that takes place once a Step is started**. Additional functions may be applied to the Step, but if the Condition contains a Go To that takes the Operator to another Step or a Change To that takes the Operator to another Process/Operation, those functions will be skipped.

Multiple Conditions may be placed onto a single Step. The logic will run from top to bottom as listed on the Conditions Viewer. As soon as the logic hits a Condition whereby an action is to take place, that action will occur and the rest of the Conditions are ignored. So the order of the Conditions is critical.



**Attribute Conditions only check Work Order, Main Batch #, and Product Attributes (set on the Inventory Item detail screen), they do not check against the various Batch or Serial Numbers Attributes.**

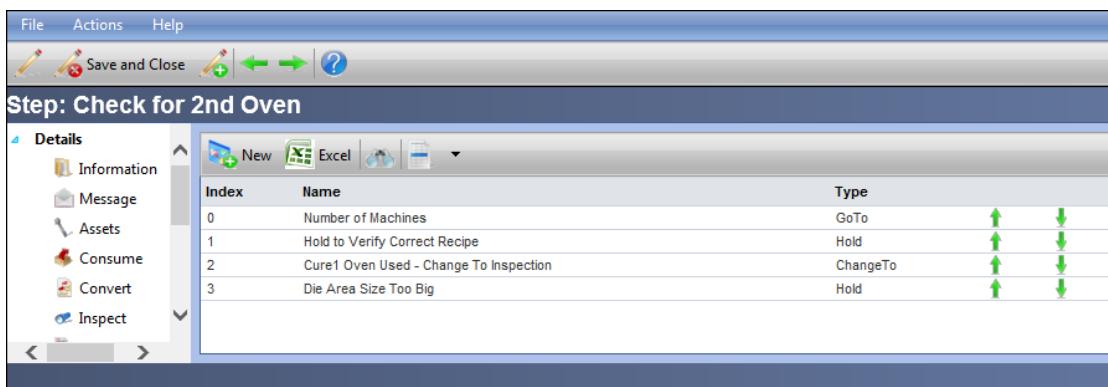


Figure 80 Step Setup: Conditions Viewer

When setting up the Condition, make sure there is a collection of the data to the Variable Group at some point prior to this step. For a Work Order, it can be at the creation of the Work Order or during a prior step. For a Product, it must be set on the Inventory Item's detail screen (not a function within WIP, go to Inventory > Items > Attributes) at some point in time prior to reaching the Step.

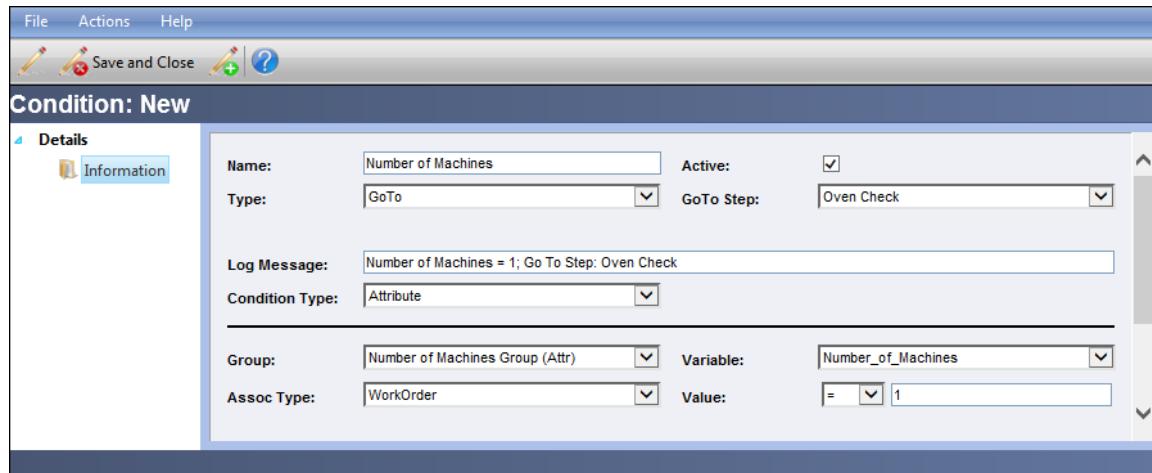
The Condition has three active Types (Actions) that determine what happens if the Condition is met/not met as well as the passive Action of continuing with the other functions of the current Step.

1. GoTo: If the Condition is met, the Operator is taken automatically to another Step within the Operaton
2. Hold: If the Condition is met, the Work Order is placed on hold until a User with the proper authority (is a member of an Access Group with permission to release WIP Work Orders) releases it
3. ChangeTo: If the Condition is met, the Operator is taken automatically to the first Step in another Process and Operation

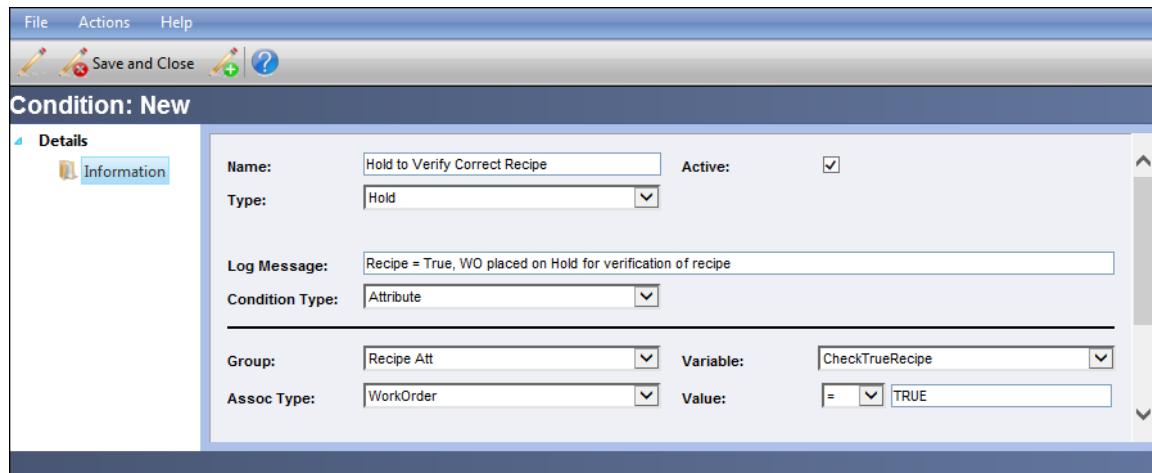
The Condition also has five Condition Types:

1. Attribute: Condition rules are validated against a value set for an Attribute associated either to the Work Order, Product or Main Batch #
2. Main Product: The condition is set up based on what the Main Product for the Work Order is
3. AssetStart: The rules are dependent on what Asset was started in a specified Step (must have occurred prior to reaching this Condition)
4. Query: A query that provides a single value as a result is compared to a specific value to determine the behavior of the condition
5. Process: the Condition looks at what the current Process of the Work Order is

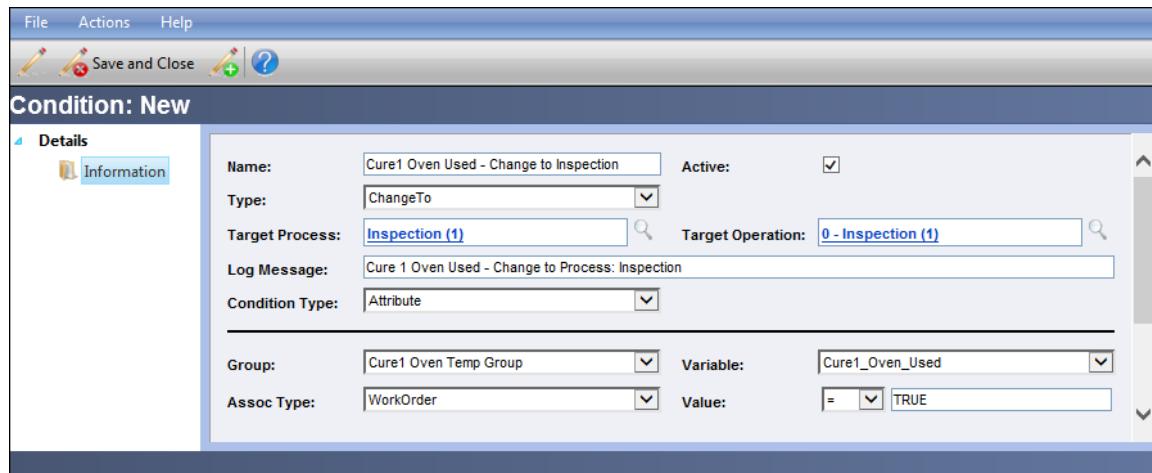
The Log Message field contains the message to be recorded in the message field of the History record once the Condition has been triggered by the Operator.

**Attribute Type:**


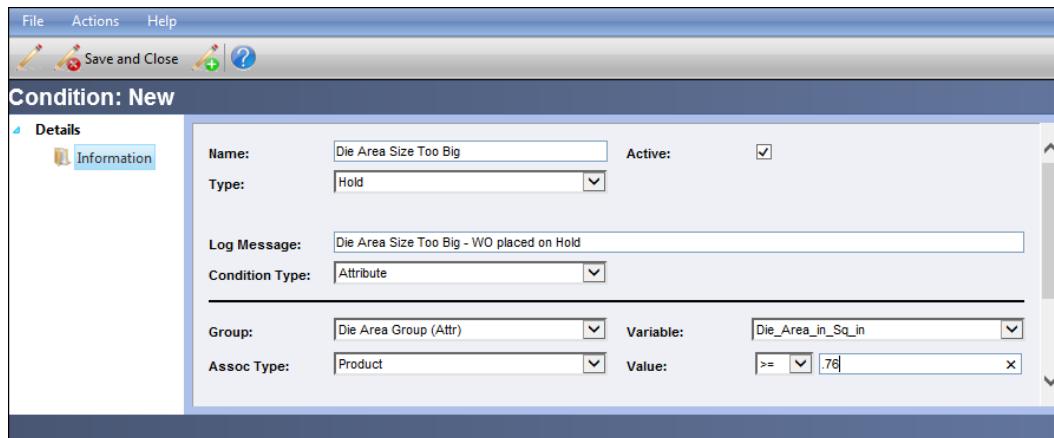
**Figure 81 Step Setup: Conditions - GoTo Detail Screen for Work Order Attribute**



**Figure 82 Step Setup: Conditions - Hold Detail Screen**



**Figure 83 Step Setup: Conditions - ChangeTo Detail Screen**



**Figure 84 Step Setup: Conditions - Product Attribute Detail Screen**

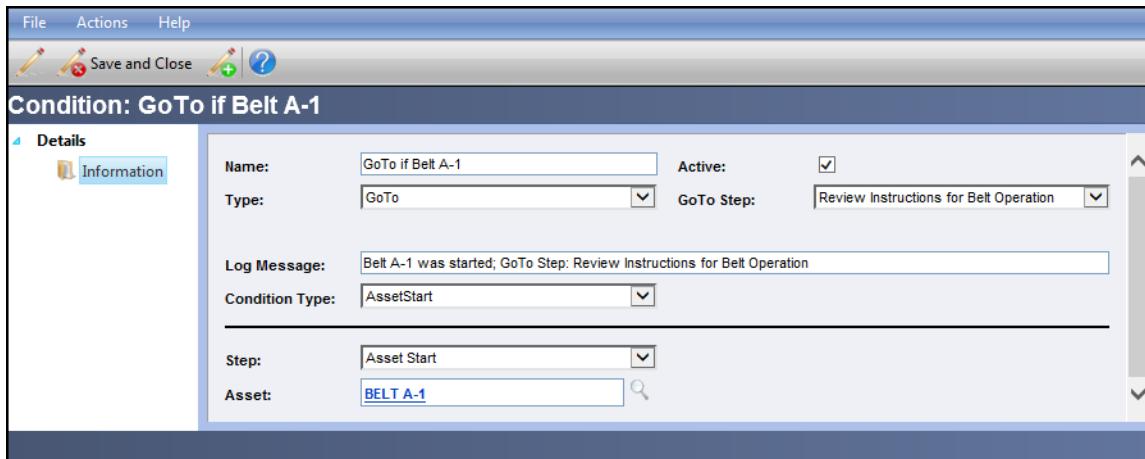
For the set of screenshots above, the Condition logic is based on Attributes only.

1. If the Number of Machines is “1,” GoTo the “Process WO on Oven(s) Step; if not, check the next Condition.
2. If the CheckTrueRecipe is set to “True,” place the Work Order on Hold, if not, check the next Condition. If the Work Order is placed on Hold as a result and then released, the Step is already started. The Operator will need to work on the other functions within the Step or if there aren’t any, Complete the Step to continue. If the Work Order does not get placed on Hold, check the next Condition.
3. If Cure1\_Oven\_Used is set to “True,” ChangeTo the first Step at the “0 – Inspection (Revision 1) Operation in the “Inspection (Revision 1)” Process; if not, check the next Condition.
4. If the Die\_Area\_in\_Sq\_in is > .75, place the Work Order on Hold; if not, keep Operator at this Step to work other functions or Complete the Step as there are no other Conditions.

Setting up Conditions can be tricky. If the Step is to be invisible, the Conditions must be set up to always direct the Operator to another Step—whether it’s the very next Step or one down the line (or even previous). For example, an Operator sets an Attribute value equal to “True” or “False” in Step 2. Set up a Condition in Step 3 where if the value = “True,” the Action is Go To: Step 4. Set the next Condition on Step 3 where if the same value = “False,” the Action is Go To: Step 6. So, no matter what, the Operator will be directed to another step automatically and never sees Step 3.

If the Step is not invisible, then be clear on the Message portion of the Step as to what the Operator must do to finish the work and Complete the Step. For example, an Operator sets an Attribute value equal to “True” or “False” in Step 2. Set up a Condition in Step 3 where if the value = “True,” the Action is Go To: Step 4. Do not add additional Conditions. If the Operator sets the value = “True,” he/she will bypass Step 3 and be taken directly to Step 4. If the value is set = “False,” he/she will remain on Step 3 and will need directions/tasks to accomplish.

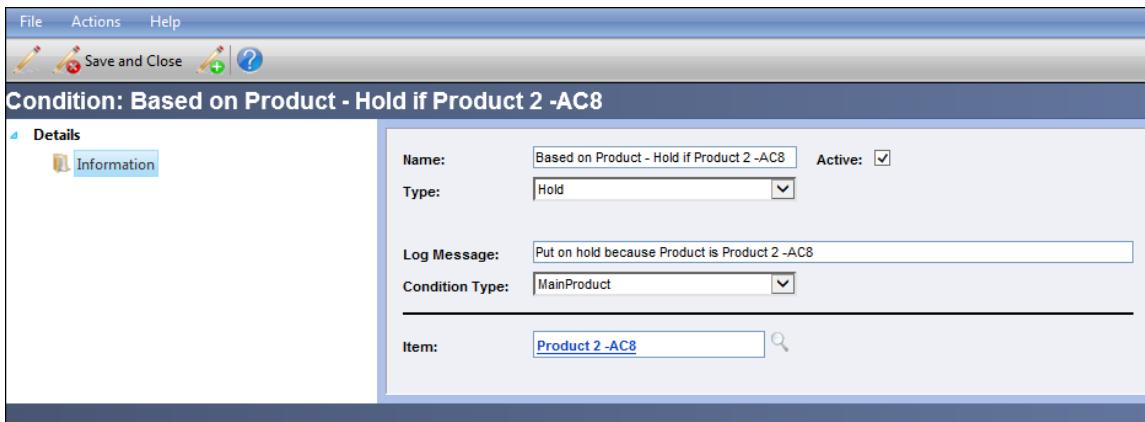
## Asset Start Type:



**Figure 85 Step Setup: Conditions - Asset Start Detail Screen**

For the screenshot above, the Condition logic is based on Asset Start. The User chooses the Step at which an Asset is to be started and then the Asset which if started, forces the Action of the Condition. In this case, if Belt A-1 is started in the step: Asset Start; the Condition will force the Operator to skip the current Step and jump to the Step: Review Instructions for Belt Operation (which can be before or after the current Step).

## Main Product Type:



**Figure 86 Step Setup: Conditions - Main Product Detail Screen**

For the screenshot above, the Condition logic is based on the Main Product associated with the Work Order. In this case, if the Main Product is “Product 2 –AC8,” the Work Order is immediately put on Hold. Once the Work Order is released, the Operator can continue working on the rest of the Actions set up for the current Step.

### Query Type:

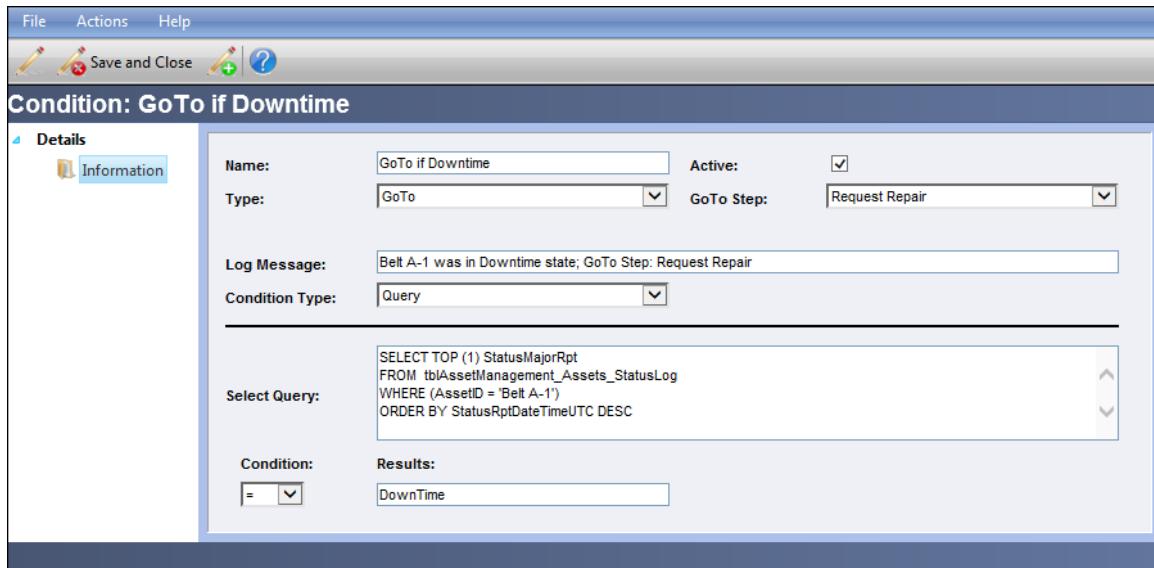


Figure 87 Step Setup: Conditions - Query Detail Screen

For the screenshot above, the Condition logic is based on a query that pulls a result from any table in the TME database. In this case, the query provides the Major Status of a specific Asset at the time the Operator reaches the Condition. If it's Downtime, then the GoTo feature takes the Operator to the Step: Request Repair. For information regarding how to set up a query, contact MASS Group or any database administrator familiar with SQL and the TME database structure.

### Process Type:

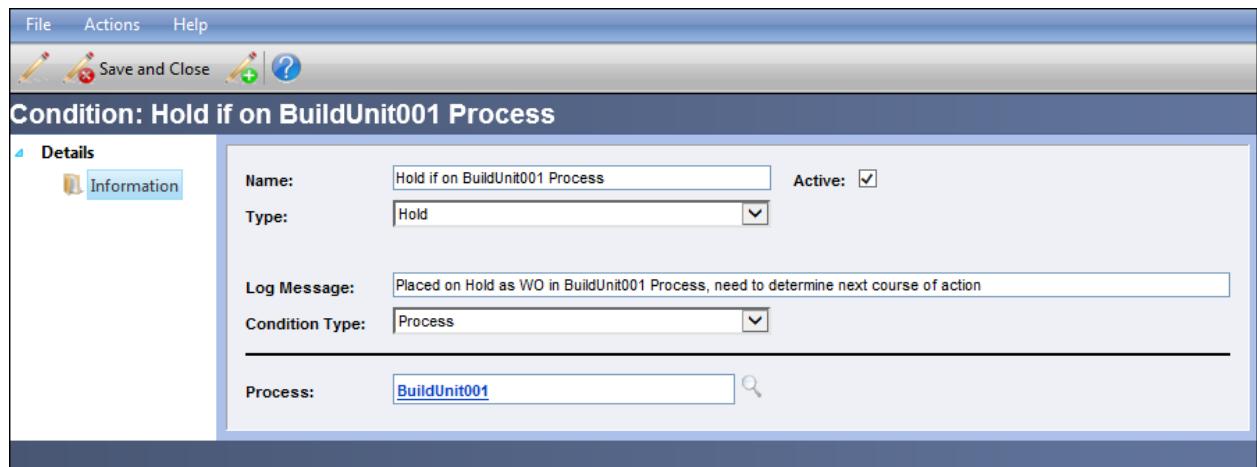


Figure 88 Step Setup: Conditions - Process Detail Screen

For the screenshot above, the Condition logic is based on checking if the Work Order is on a certain Process.

## Sign Off

The Sign Off functions as a collection of signatures for a Step. It can be set up to require Sign Off by the current User only, another User or the current User and an additional User. The Other or Additional Users do not need to be logged in to TME in order to complete the Sign Off, they can complete the Sign Off from the screen regardless of who is logged in (i.e., the Current User opens the Sign Off screen and steps aside to allow the other User to complete the Sign Off).

For example, if an Operator must check the expiration date of glue prior to consuming it, a sign off for just the current Operator may be set.

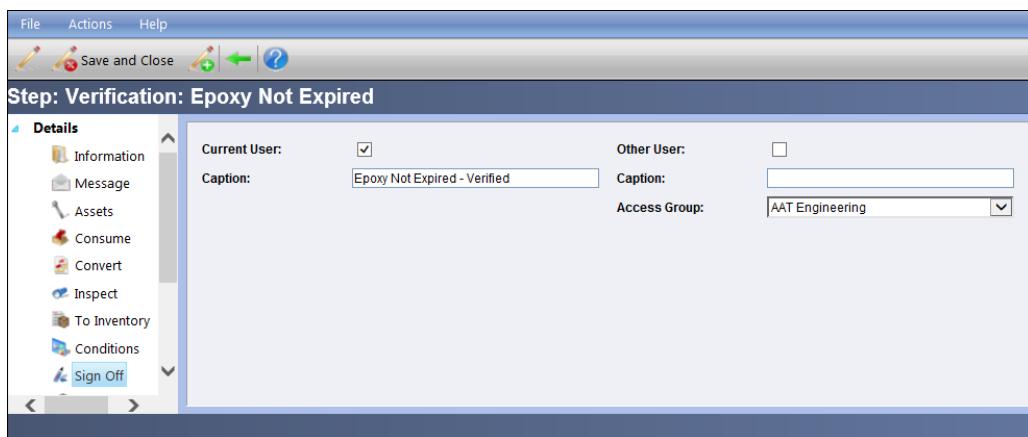


Figure 89 Step Setup: Sign Off - Current User Only

When a first part has been marked, a Mark specialist may be required to sign off so that the Operator can proceed with marking the rest of the parts. The current Operator doesn't need to do a Sign Off.

The Sign Off is set up to only allow the member of the specified Access Group to perform the Sign Off as an Other User. If a User who is not a member of the Group tries to do the Sign Off, it will not be accepted and the Step cannot be Completed.

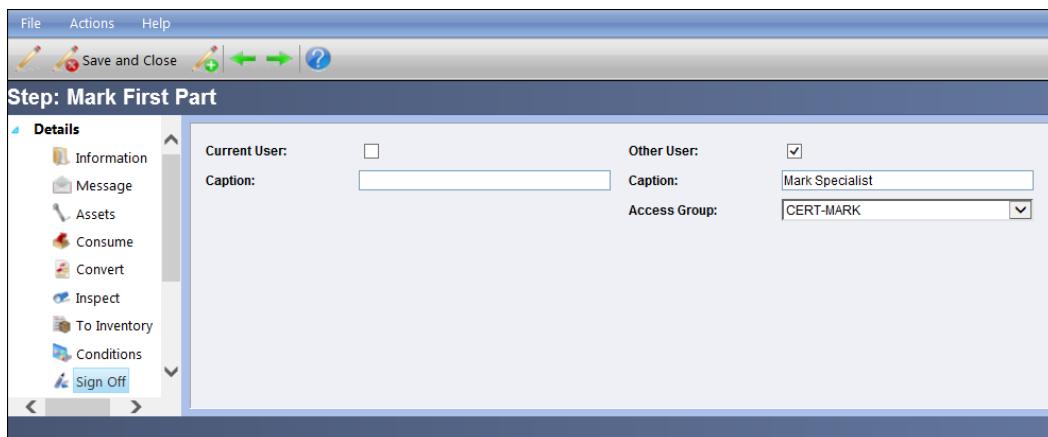


Figure 90 Step Setup: Sign Off - Other User Only

In the case of verifying the counts of a large lot, the Sign Off might require that of the current Operator as well as a second Operator—two sets of eyes guaranteeing the counts.

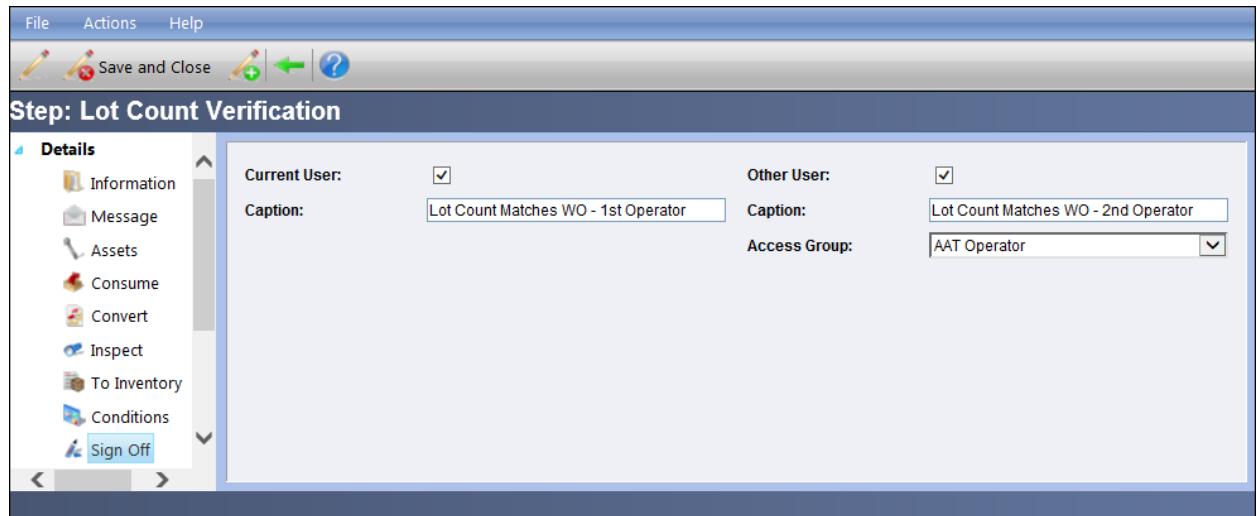


Figure 91 Step Setup: Sign Off - Both Users

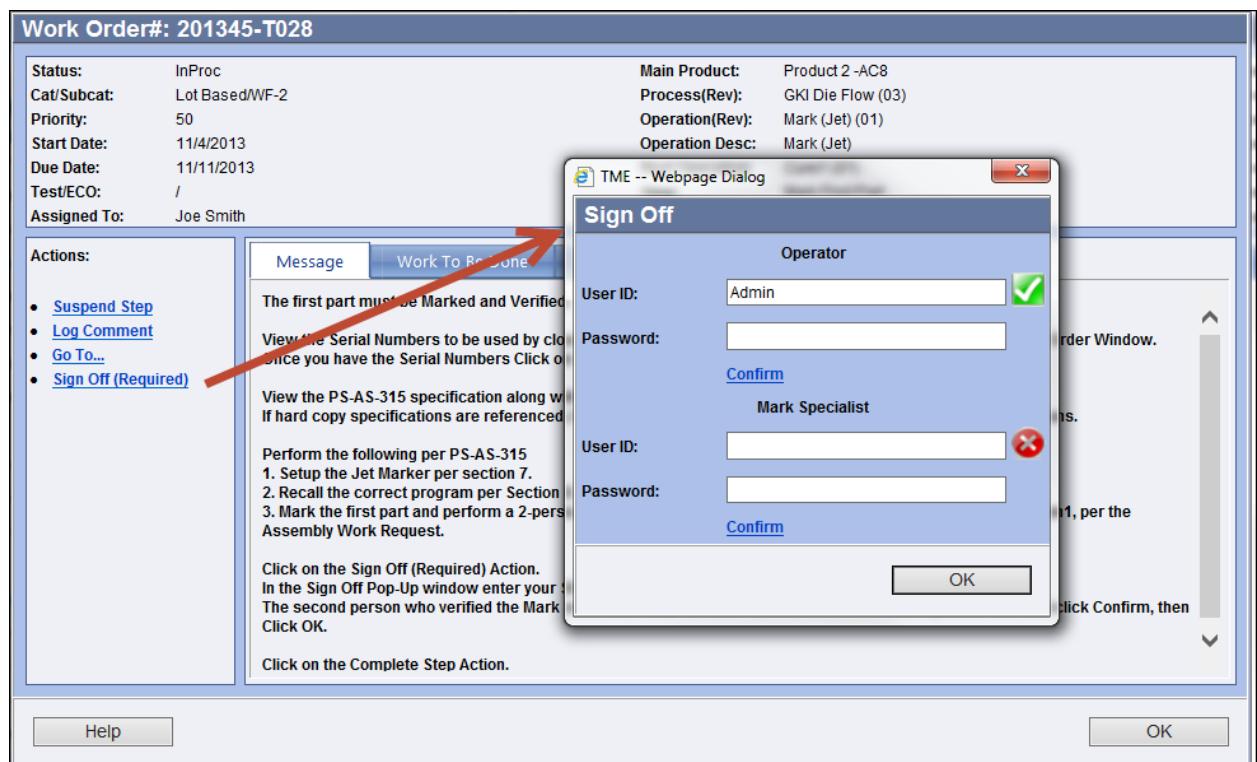


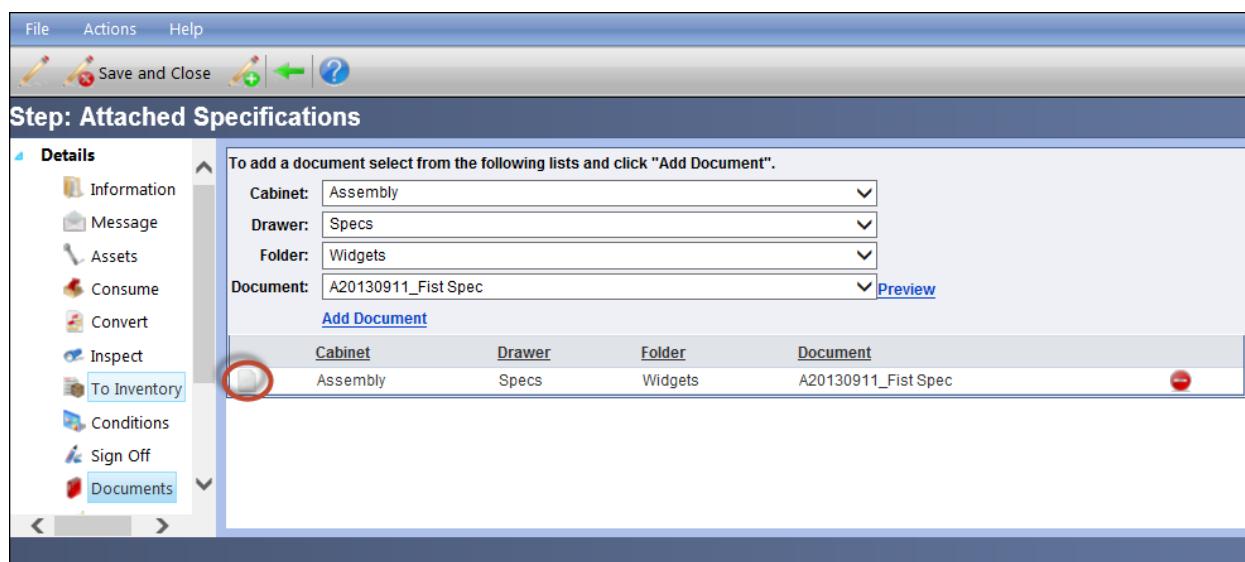
Figure 92 WIP Work Order: Sign Off Screen

## Documents (Steps)

Documents can be attached at the Process, Operation and Step levels. If a document is attached at the Step level, it will only be accessible from that Step. Those attached to an Operation will be available on the Step screen for all Steps in the Operation. Those attached to the Process will be available on the Work Order screen.

Documents will need to be uploaded or linked within the Documents Module (see the Contacts and Documents Chapter for more information) prior to attaching.

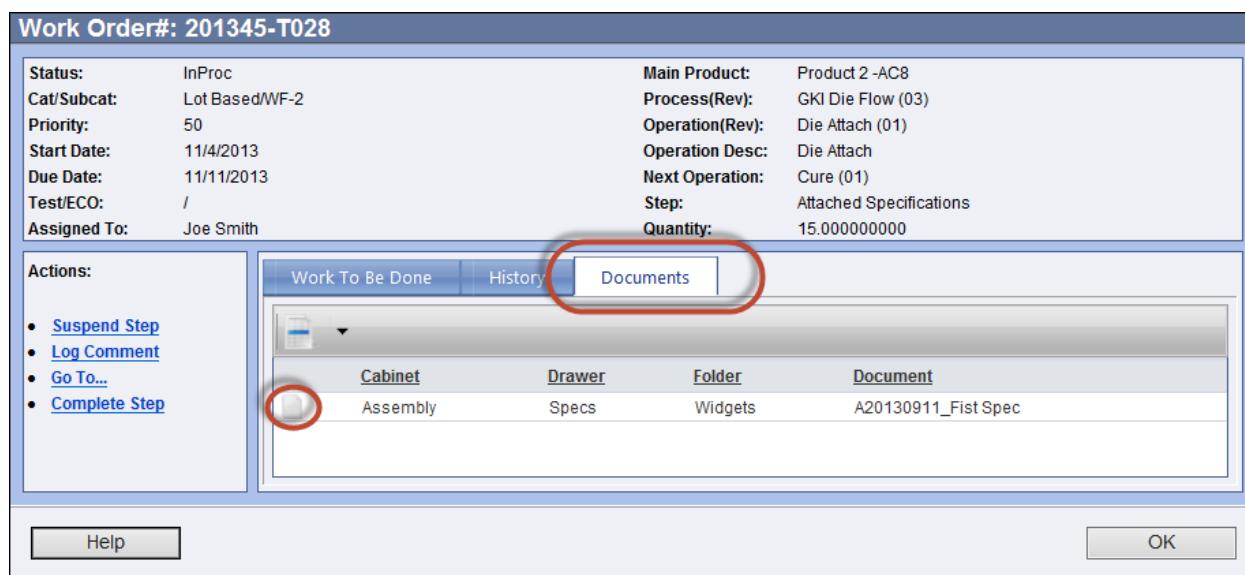
The Document can be viewed by clicking on the  icon on the left side of the record.



This screenshot shows the 'Step: Attached Specifications' screen. The left sidebar has a 'Details' section with various icons, one of which is 'Documents' (highlighted with a red circle). The main area displays a table for managing documents:

Cabinet	Drawer	Folder	Document
Assembly	Specs	Widgets	A20130911_Fist Spec

Figure 93 Step Setup: Documents



This screenshot shows the 'Work Order#': 201345-T028 screen. The left sidebar has an 'Actions' section with several options, one of which is 'Documents' (highlighted with a red circle). The main area displays a table for managing documents:

Cabinet	Drawer	Folder	Document
Assembly	Specs	Widgets	A20130911_Fist Spec

Figure 94 WIP Work Order: Documents

## Data Collection

The Data Collections to collect the multi-instance data first need to be set up as Variable Groups set up as Data Collections in the Settings Module (see the Variable Groups and Data Collection sections of the Settings Chapter for more information). The Data Collections Step can associate and collect multi-instance data against one Variable Group for the Work Order, one for Batch(es) of Product and one for Serial Number(s) of Product. If more data is needed, add more variables to the Variable Group or add additional Steps with Data Collections.

The term multi-instance means that the data can be collected more than one time and each time will be saved as a record with a time/date stamp and User ID.

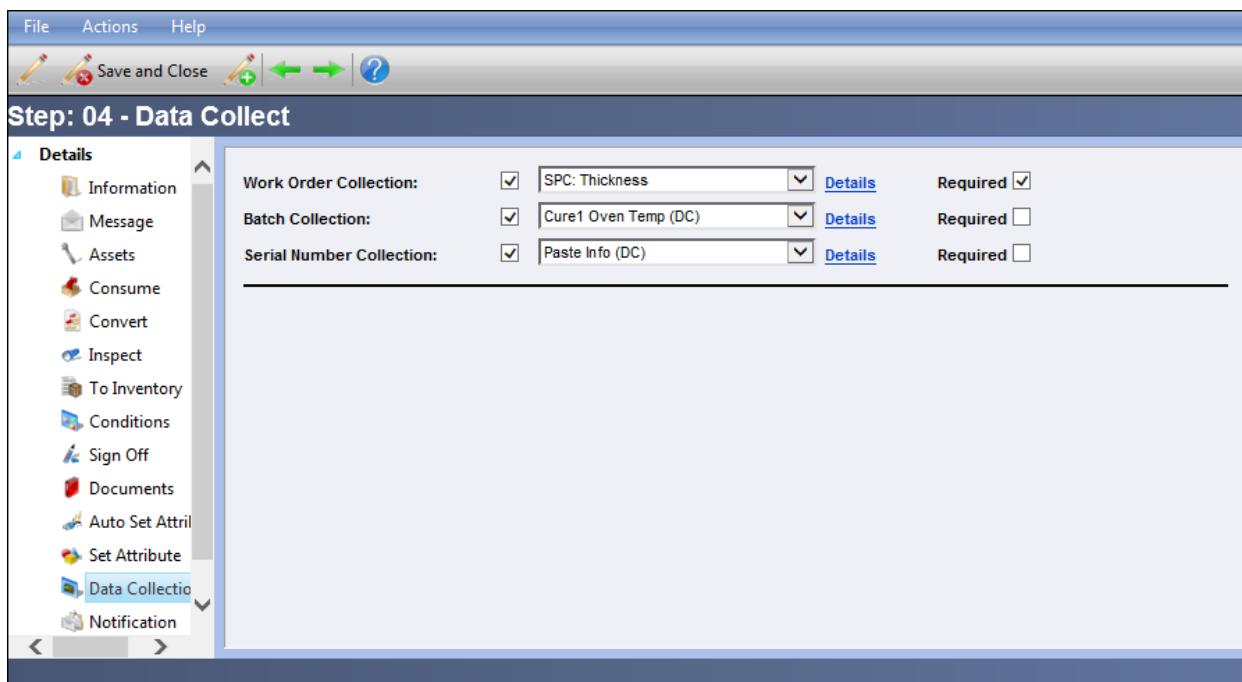


Figure 95 Step Setup: Data Collection

Clicking on the Details link will open up the Collection screen for setting up the Run Rules. These define the limits and rules by which if the collected data does not follow them, there is a violation and one or more actions take place as a result. See Chapter 10: Settings for details on setting up Run Rules.

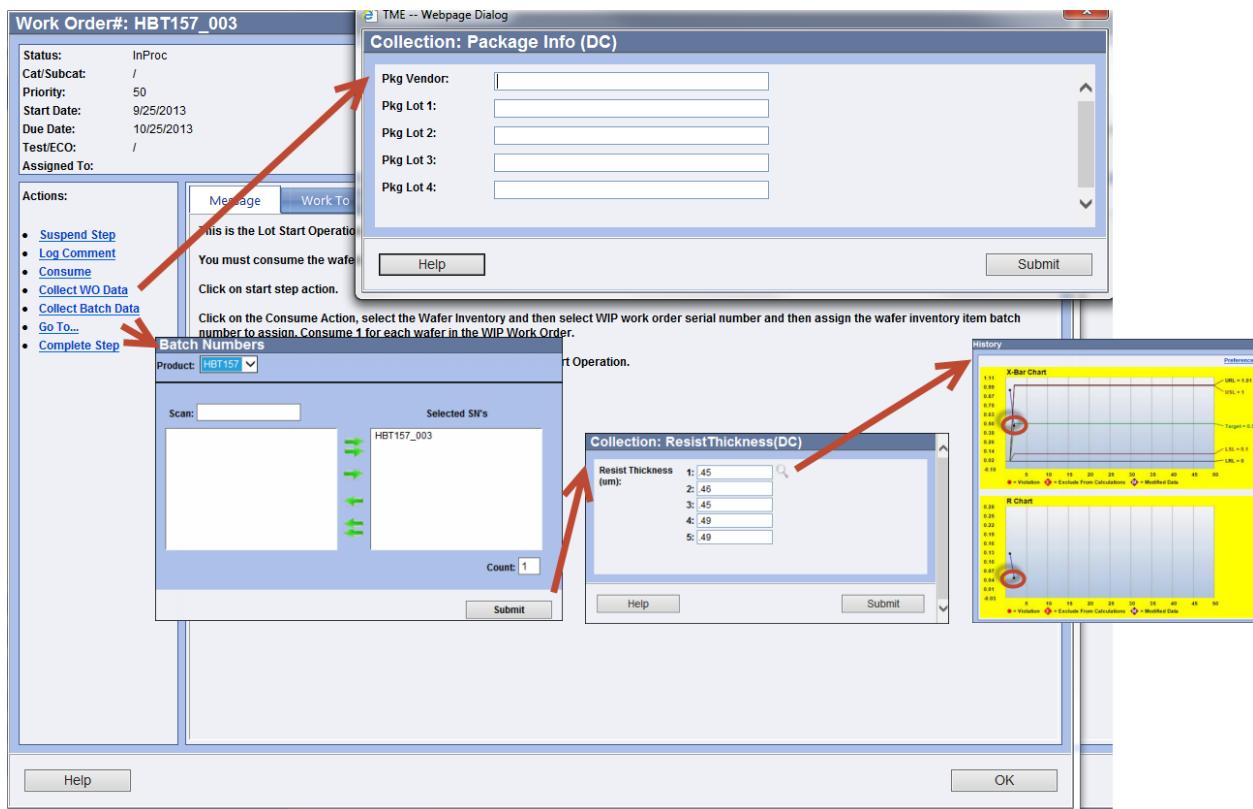


Figure 96 WIP Work Order: Data Collection Screens

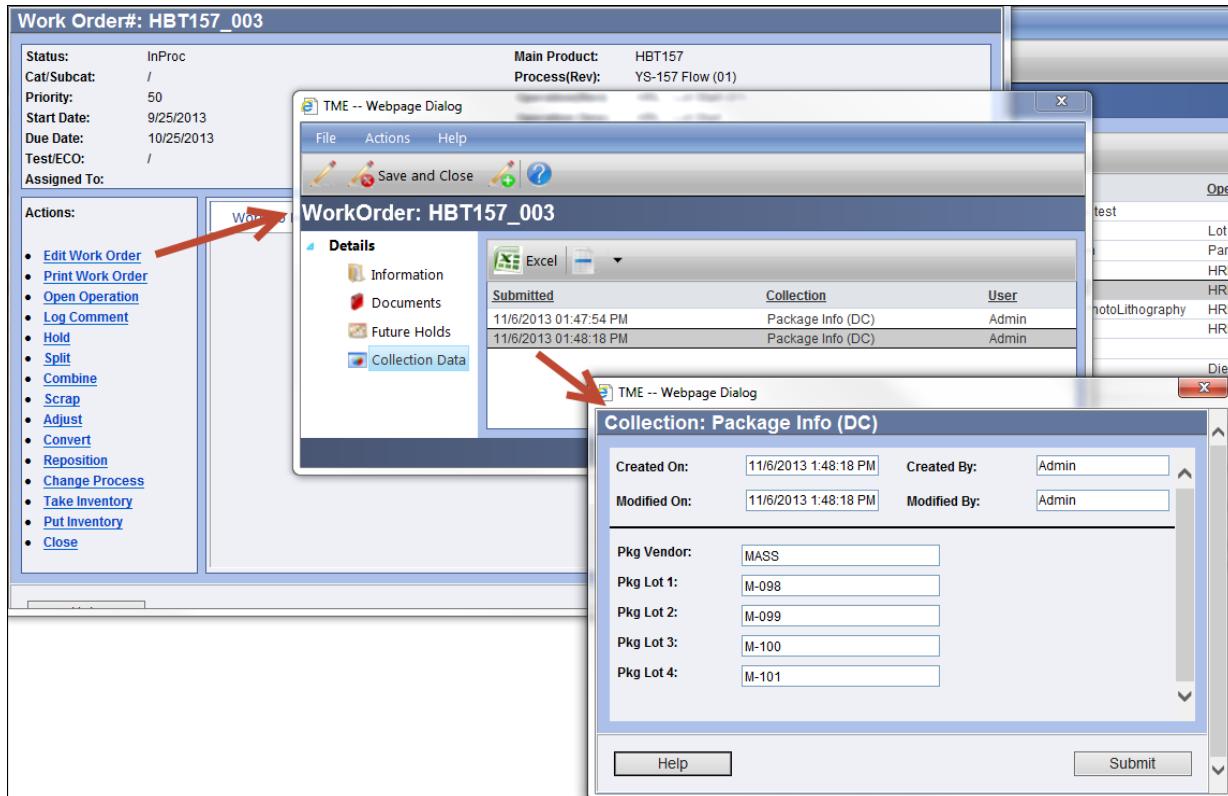


Figure 97 WIP Work Order: Viewing Records from Work Order Data Collections

## **Notification**

TME contains the setup of Notifications throughout TME including WIP. These can be set up at the Step level. The triggers that will send out a Notification are:

1. Work Order Step Complete
2. Work Order Step Resume
3. Work Order Step Started
4. Work Order Step Suspend

Any, all or none of them can be set up for any given Step. Please see the Notifications section of the Settings and Tools Chapter).

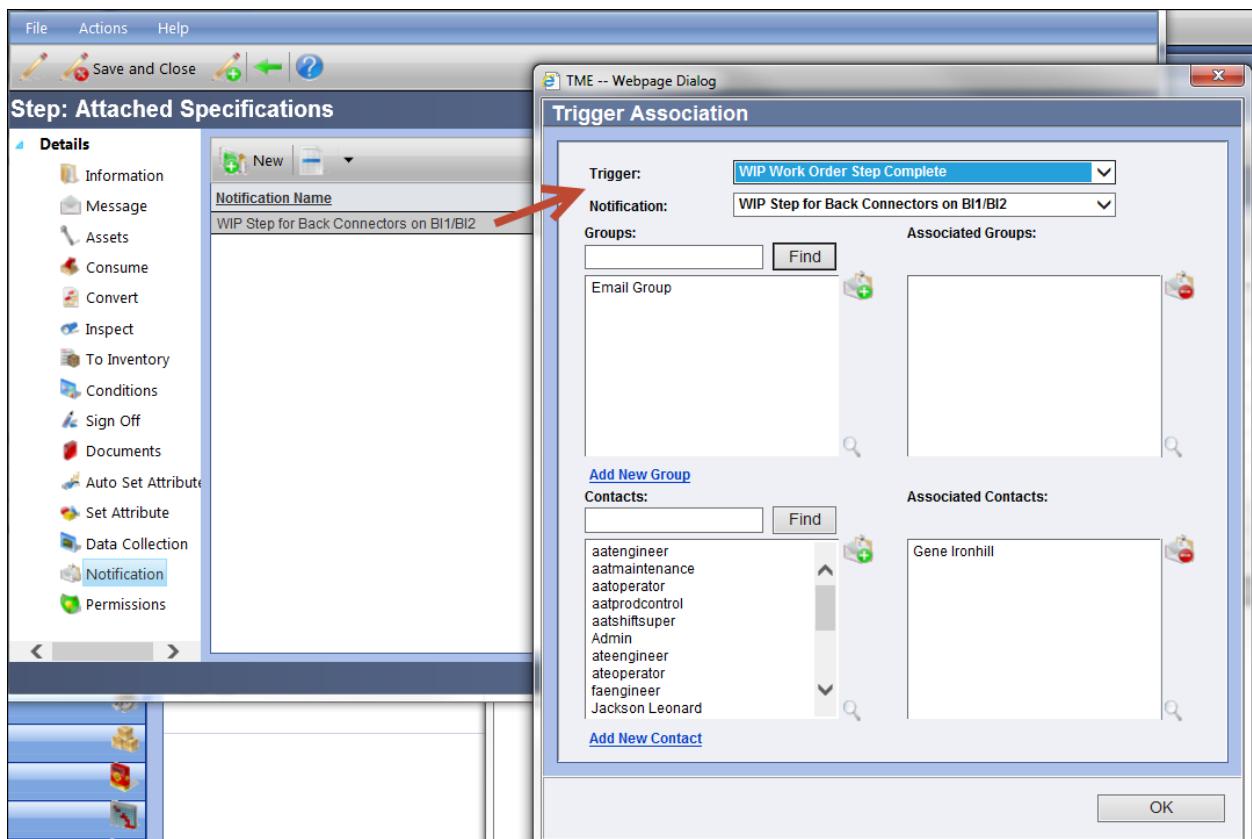


Figure 98 Step Setup: Notification



**Make sure that the Contacts have email addresses associated with their profiles!**

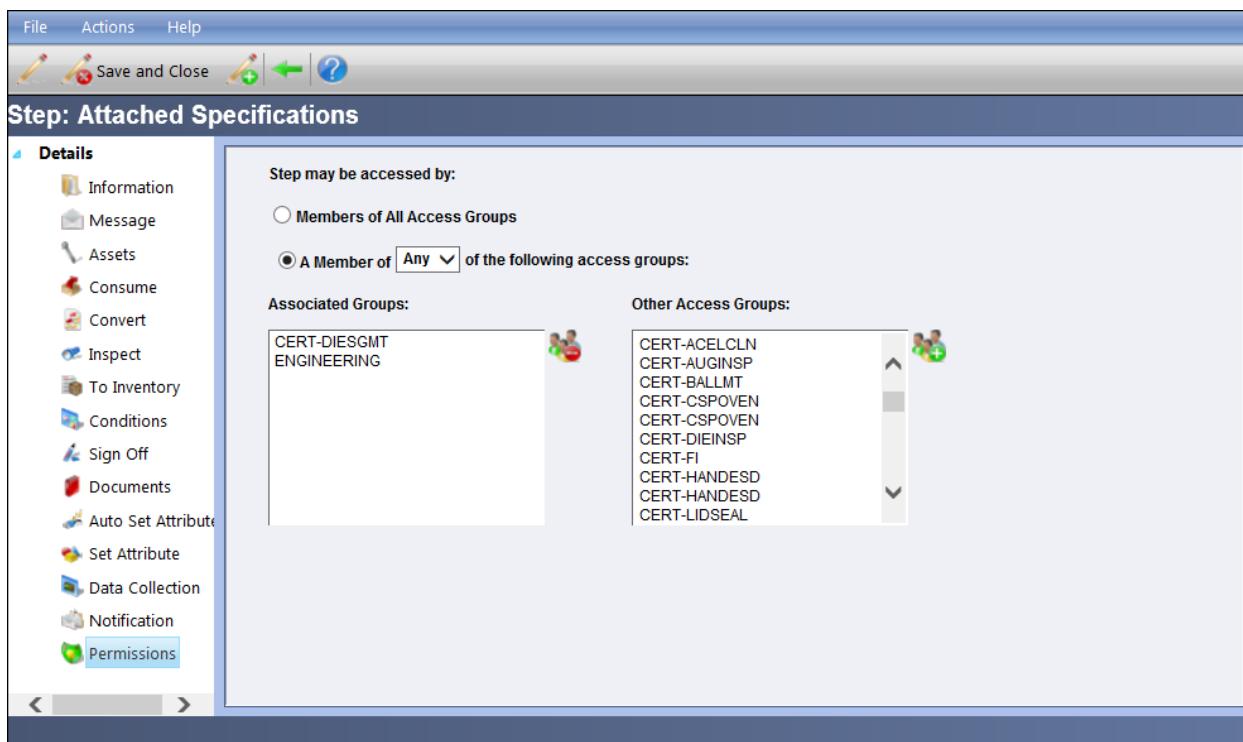
## Permissions

Permissions to access and work on a Step within a Work Order is based on Access Groups. It is set up in the same manner as Permissions in other Modules with one exception.



**The Permissions can be set for “Any” or “All” of the Associated Groups.**

If the expiration date has passed for a member of a Group, that User will not be able to access the Step until the expiration date has been renewed by the TME Administrator or designated personnel.



**Figure 99 Step Setup: Permissions**

## Documents (Operations)

Documents can be attached at the Process, Operation and Step levels. If a document is attached at the Operation level, it will be accessible from any Steps contained in that Operation. Documents will need to be uploaded or linked within the Documents Module (see the Contacts and Documents Chapter for more information) prior to attaching.

The Document can be viewed by clicking on the  icon on the left side of the record.

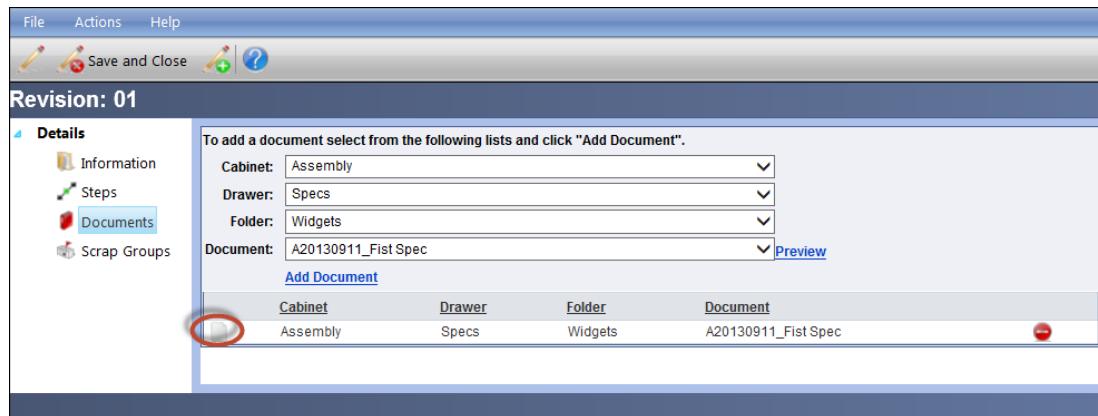


Figure 100 Operation Revision Setup: Documents

## Scrap/Defect Groups

The Scrap/Defect Group is a named Group that sets up different Scrap/Defect codes (basic reasons) that a User can select when scrapping or inspecting from a WIP Work Order. As part of the WIP Setup, a Scrap/Defect Group must be associated to a Product (Inventory Item) as well as any Operation in WIP whereby the Product can be scrapped or inspected. This allows for different codes to be available for a Product based on the Operation it's in.

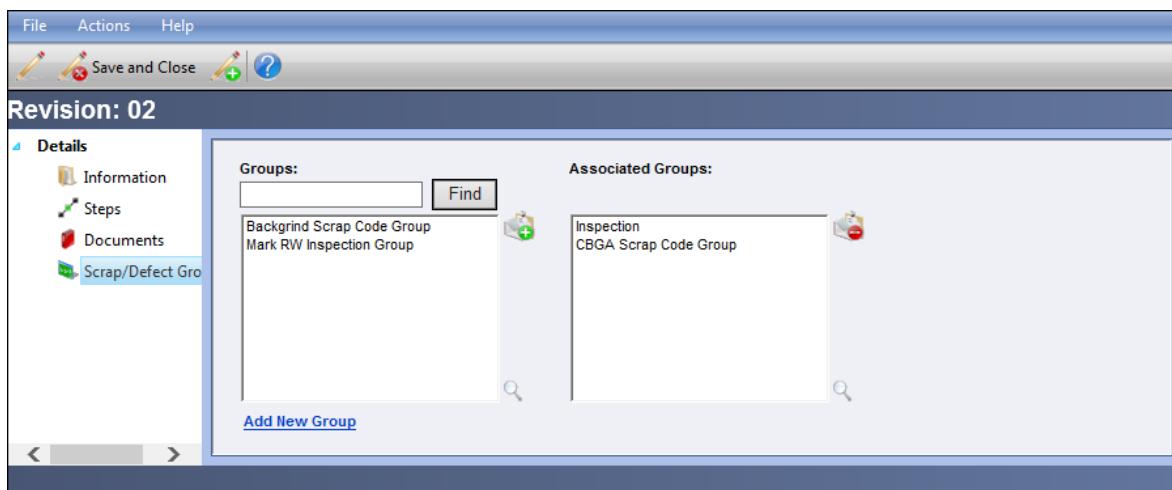


Figure 101 Operation Revision Setup: Scrap Groups

In the screenshot above, if the CBGA Scrap Code Group is associated to Product 201337-A025 as well as the Operation Die Attach (Revision 2), then when the Scrap transaction is taking place, then the Associated Codes below will be available in the Scrap Code drop-down list for the User to select.

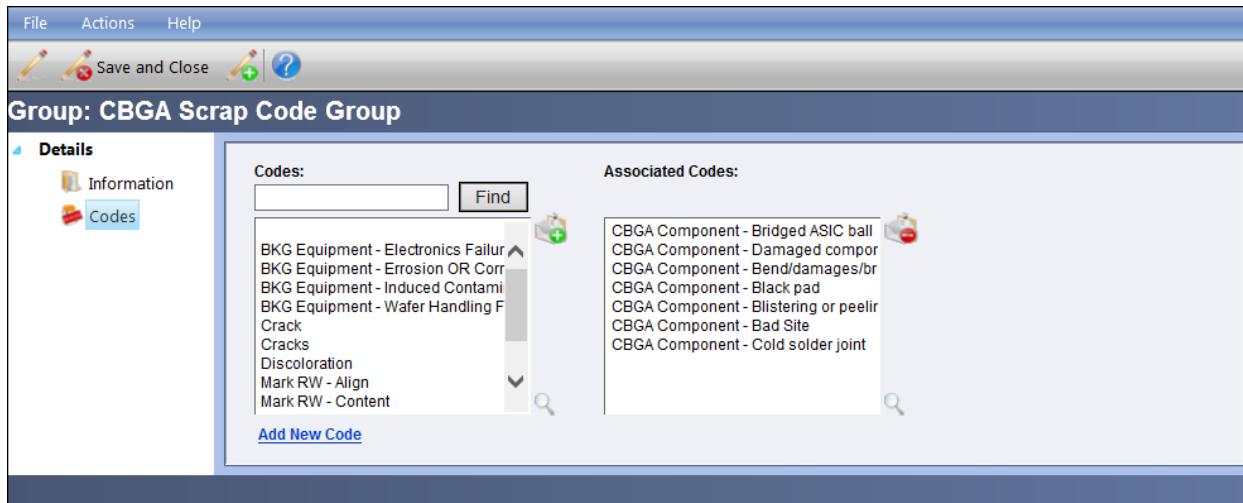


Figure 102 Operation Revision Setup: Scrap Groups - Scrap Codes

If a different Product runs through the same Operation and both are associated with Mark RW Inspection Group, then the Codes set up for Mark RW Inspection Group will populate the drop-down list.



**Basically, in order to use Scrap Groups/Codes, they need to be created and associated to the appropriate Product as well as to any Operation that is set up to allow the Scrap transaction to take place.**

## Copy Revision or Entire Operation

To copy a Revision or an entire Operation, double-click on the Revision/Operation to be copied. Click on Action on the Detail Taskbar and then Generate Copy. The Revision/Operation that was originally opened to be copied will close and the copy's Detail screen remains open. Edit the Name on the Information screen and set to Active. Make further adjustments as required.

If applicable, go to the Information screen for the Operation and make the newly created Revision, the Current Revision.

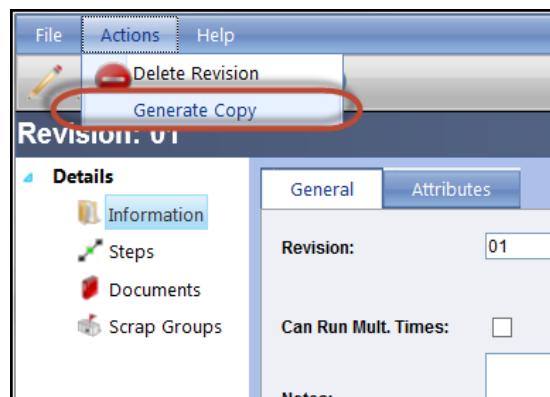


Figure 103 Generate Copy Feature

## Operation Permissions

Permissions to Manage an Operation and be able to view within the viewer and open the detail screen are based on Access Groups. It is listed onscreen as Permission to Manage and is set up in the same manner as Permissions in other Modules.

Permissions to Process an Operation and work on its Steps within a Work Order are also based on Access Groups. It is listed onscreen as Permission to Process and is set up in the same manner as Permissions in other Modules with one exception.



The Permissions can be set for "Any" or "All" of the Associated Groups.

If the expiration date has passed for a member of a Group, that User will not be able to access the Operation until the expiration date has been renewed by the TME Administrator or designated personnel.

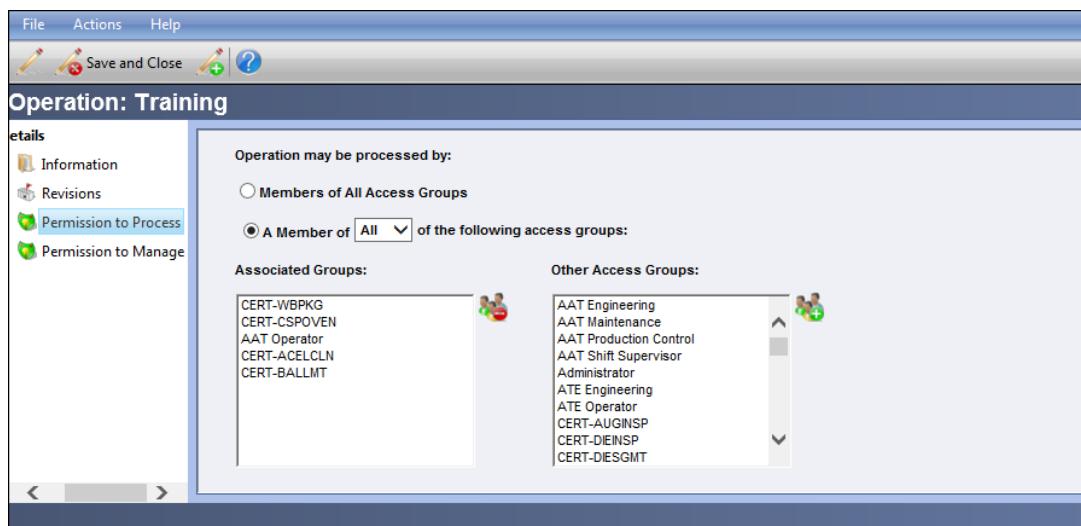


Figure 104 Operation Permissions to Process Screen

## Attributes (Operations)

To collect or view Attribute information on an Operation, it must first be set up at Tools > Options > WIP (see the Operations and Process Attributes section described earlier in this Chapter). The Attribute tab will be available on the Revision detail screen of any given Operation.

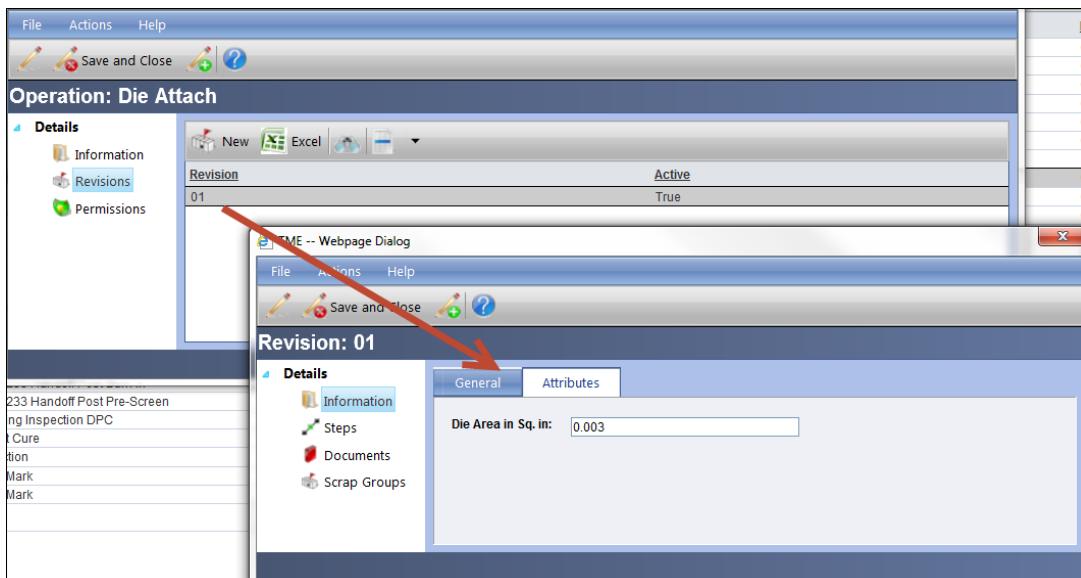


Figure 105 Operations Setup: Attributes Tab

## Processes

Processes are the templates off of which the WIP Work Orders are created. They are created by putting together Operations into Operation Flows. Operations can be utilized by a single Process in a one-to-one relationship or used over and over again in a one-to-many relationship.

The Processes Submodule is accessed via the WIP Module.

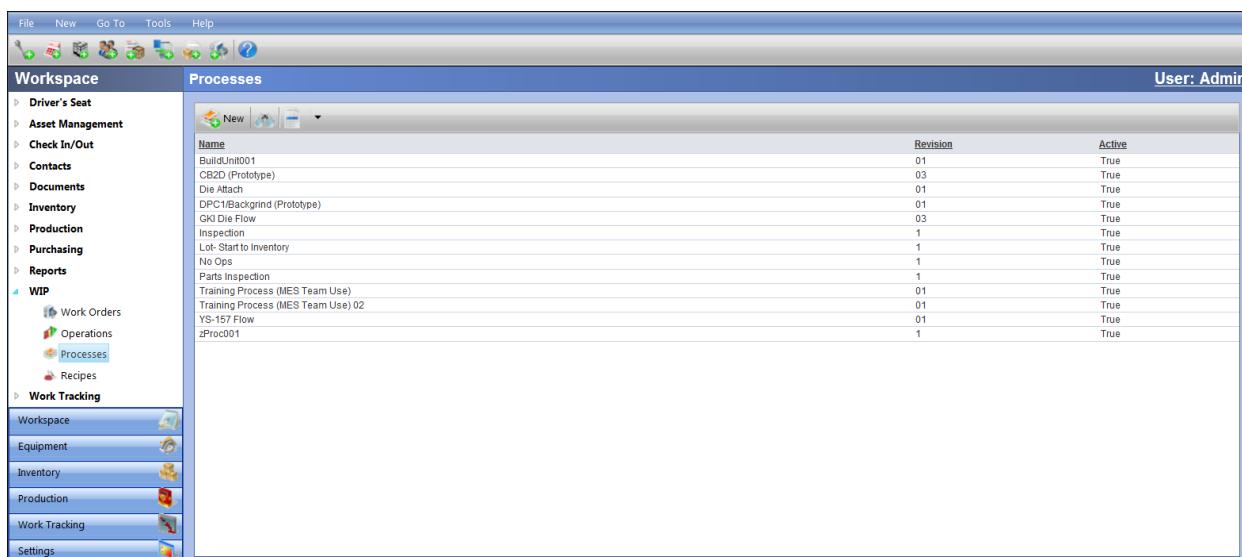


Figure 106 Processes Viewer

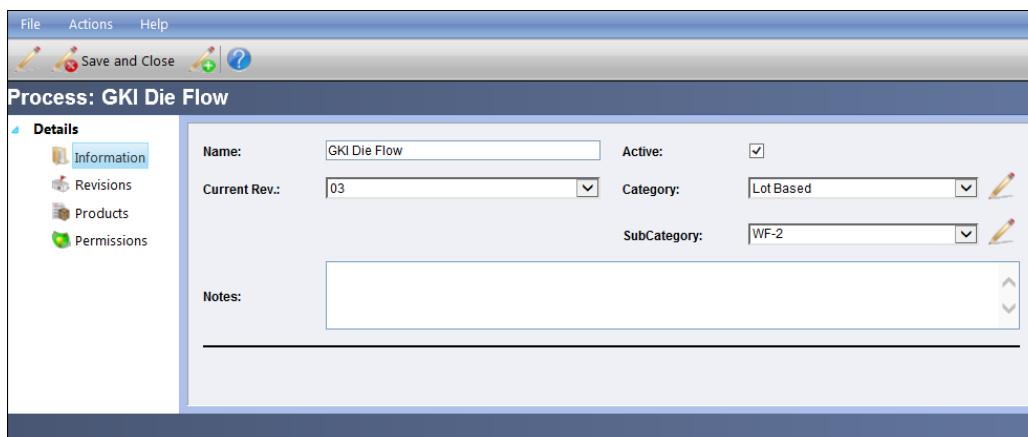


Figure 107 Process Detail Screen

When creating a new Process, type in the name of the Process. This is what will be visible when selecting a Process for a WIP Work Order. Click on the Active checkbox in order for the Process to be available for selection. Select a Category and SubCategory and enter any Notes if applicable.

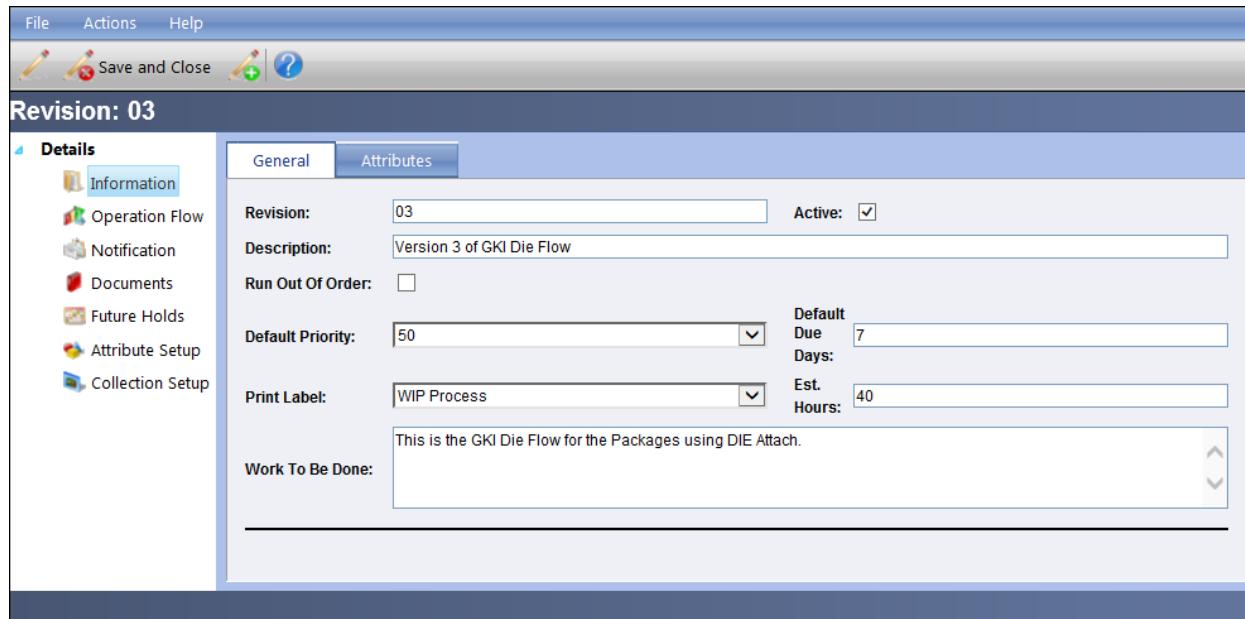
The Current Rev. drop-down list will be empty for now.

## Process Revisions

A Process can have multiple Revisions. There are two basic reasons for this:

1. Once a WIP Work Order has been triggered off of a Revision of a Process, it's good practice to maintain a history of how the Process had been set up. A new Revision will need to be made and the older Revision(s) made Inactive when changes are needed.
2. More than one Revision may be active within a Process in order to keep the overall template of a Work Order, but have slightly different Steps by choosing a different Operation or two in order to accommodate the needs of different Products (i.e., different Bills of Materials, Data Collections, etc.).

To set up a Revision, click on the Revisions link on the Process Detail screen. Click the  icon. Once the Revision has been saved, it needs to then be selected as the Current Revision on the Information screen. As a new Revision is added, change the Current Revision selection accordingly.



The screenshot shows a software application window titled "Revision: 03". The left sidebar contains a tree view with nodes: Details, Information (selected), Operation Flow, Notification, Documents, Future Holds, Attribute Setup, and Collection Setup. The main panel has tabs for General and Attributes. Under the General tab, there are fields for Revision (03), Description (Version 3 of GKI Die Flow), Run Out Of Order (unchecked), Default Priority (50), Print Label (WIP Process), and a note about the GKI Die Flow for Packages using DIE Attach. The Attributes tab is visible but empty. At the bottom, there is a "Work To Be Done:" text area.

Figure 108 Process Revision Detail Screen

Type in the name of the Revision. This is what will be on the Process LookUp screen along with the Process Name when making a selection for a Work Order.

Check the Active checkbox so that the Revision will be available on the LookUp screen. If applicable, check the Run Out of Order checkbox. This will allow the Operations to be run out of order by the Operator.

The Default Priority is what will be set for the Work Order when created. The range is 1 – 100 with either the lowest or highest number having priority as defined by the TME Administrator. It can be changed on the Work Order by designated personnel, either at its Creation, Release, or during WIP (by editing the Work Order).

Default Due Days will automatically calculate the due date based on the date of Release of the Work Order. In the screenshot above, if a Work Order is released on November 1, the due date will be November 8.

The Print Label drop-down list is for the selection of the label/form that is to be rendered from the Work Order. It can be designed as needed for all WIP or for certain flows. Labels are designed in an outside application and uploaded to TME, see the Print section of the Settings Chapter for more information.

Est. Hours is the estimate of how long it will take to complete the Work Order. This number can then be compared to the actual amount of time from the start of the first step to the closing of the Work Order (accomplished via Reports).

The Work To Be Done will appear on the first tab visible on the WIP Work Order and can include basic instructions, background information, etc.

The screenshot shows the 'Work Order#' field set to '201345-T028'. Below it, several fields are circled in red: 'Cat/Subcat' (Lot Based/WF-2), 'Priority' (50), 'Start Date' (11/4/2013), 'Due Date' (11/11/2013), and 'Assigned To' (Joe Smith). On the right, another group of fields is circled: 'Main Product' (Product 2 -AC8), 'Process(Rev)' (GKI Die Flow (03)), 'Operation(Rev)' (Die Attach (01)), 'Operation Desc' (Die Attach), 'Next Operation' (Cure (01)), 'Step' (Attached Specifications), and 'Quantity' (15.000000000). A large button labeled 'Work To Be Done' is also circled in red. The 'Actions' sidebar on the left includes links like 'Edit Work Order', 'Print Work Order' (which is highlighted in blue), and 'Open Operation'. At the bottom, there are 'Help' and 'OK' buttons.

Figure 109 WIP Work Order: Main Screen with Process Information

## Operation Flow

The Operation Flow is where the heart of the Process is set up. Operations are added to a list in order of how the Operator should be guided through WIP.

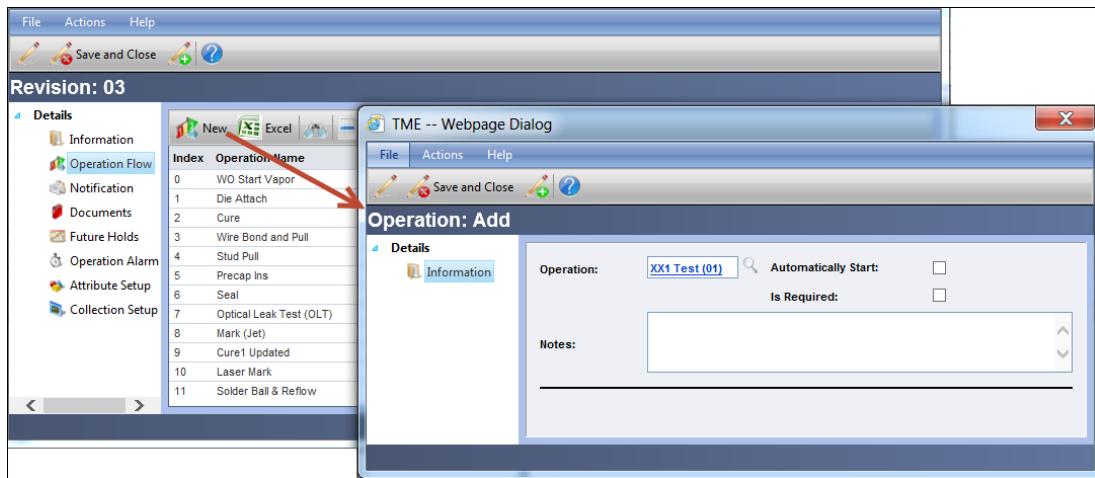


Figure 110 Process Setup: Operation Flow Viewer and Detail Screen

- Check Automatically Start if the Start Step link is not to appear when the User gets to the Operation, the first Step will automatically start.
- Check the “Is Required” checkbox if Operation must be completed before the Work Order can be closed. Also, if the User has permission for Optional Reposition (User uses the same Reposition link on the Work Order, but this is separate from the full Reposition in that it only works within a grouping of non-required Operations), he/she will be able to Reposition within the group of sequential non-required Operations or be able to skip any number of them. They will not be able to reposition out of the grouping except to the next Required Operation. Anytime the User is working on a Required Operation, the Reposition link will not be available (unless full Reposition permission has been turned on).



If it is necessary for Operations to be completed in order, then make them Required and do not provide permission to the Access Group for the Operators to Reposition at all.

If the Operations are required, but can be run in any order, check the “Run Out of Order” checkbox on the Revision detail screen and make sure the Access Group for the Operators has the permission to Reposition turned on.

## Prerequisites

An Operation can be set up to have a prerequisite Operation that must be completed prior to its own start. Click on the Prerequisites link (not available on the first Operation in the list) on the Operation detail screen available from the Operation Flow (not from the Operations submodule).

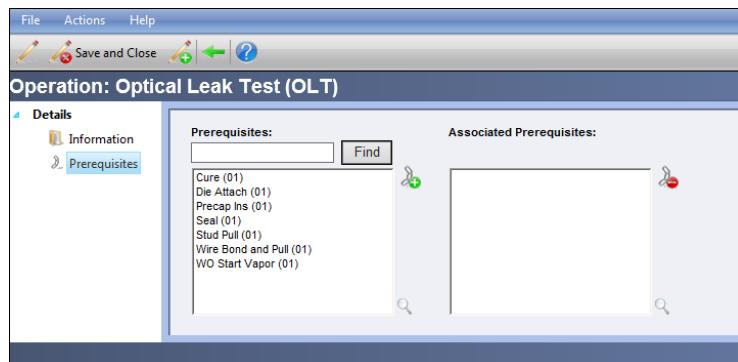


Figure 111 Operation Flow Prerequisites Screen

Choose the Operation(s) and click on the Move Prerequisite icon  so that it/they appear in the Associated Prerequisites list.

## Operation Flow Viewer

To move an Operation lower or higher on the list, click on the appropriate arrows:



5	PreCap Ins	PreCap Ins	01		
6	Seal	Seal	01		
7	Optical Leak Test (OLT)	Optical Leak Test (OLT)	01		
8	Mark (Jet)	Mark (Jet)	01		
9	Cure1	Cure1	01		
10	Laser Mark	Laser Mark	01		
11	Solder Ball & Reflow	Solder Ball & Reflow	01		
12	Transport To RD3	Transport To RD3	01		
13	Aqua Clean - 02	Aqua Clean - 02	01		
14	Final Inspection	Final Inspection	01		

Figure 112 Operation Flow - Changing of the Order

Work Order#: 201345-T029

Status: InProc	Main Product: Product 2 -AC8
Cat/Subcat: Lot Based/WF-2	Process(Rev): GK Die Flow (03)
Priority: 63	Operation(Rev): Die Attach (01)
Start Date: 11/7/2013	Operation Desc: Die Attach
Due Date: 11/14/2013	Next Operation: Cure (01)
Test/ECO: /	Step: CE DIE Attach Start
Assigned To: Gene Ironhill	Quantity: 15.00000000

**Actions:**

- [Edit Work Order](#)
- [Print Work Order](#)
- [Open Operation](#)
- [Log Comment](#)
- [Hold](#)
- [Split](#)
- [Combine](#)
- [Scrap](#)
- [Adjust](#)
- [Convert](#)
- [Reposition](#)
- [Change Process](#)
- [Take Inventory](#)
- [Put Inventory](#)
- [Close](#)

**Operations/Steps**

Operation(Rev)	Step	Qty In	Qty Out	Operator
WO Start Vapor (01)	010 - Collect WO Start Attributes (Attr)	15.000000000	15.000000000	Admin
Die Attach (01)	CE DIE Attach Start			
Die Attach (01)	Manual BOM Collect			
Die Attach (01)	Consume PKG INFO			
Die Attach (01)	UV Cure			
Die Attach (01)	Oven Check			
Die Attach (01)	Start DIE MT Tool			
Die Attach (01)	Collect Paste Info			
Die Attach (01)	Process Test Die			
Die Attach (01)	Confirm Paste Thk-Process WO			
Die Attach (01)	Split Any Remaining DIE			
Die Attach (01)	Check for Child w/PROD DIE			
Die Attach (01)	Return to Process or Move Out			
Die Attach (01)	Attached Specifications			
Cure (01)	010 - CE Cure Start (Message Only)			
Cure (01)	020 - Start Oven (AssetStatus&Asset)			
Cure (01)	030 - Process Lot-Stop Oven (Asset&DC)			
Wire Bond and Pull (01)	010 - Bond Pull Start (Message Only)			
Wire Bond and Pull (01)	020 - Check & Start Wire Bond (AssetStatus&Asset)			
Wire Bond and Pull (01)	030 - Check&Start Plasma Clean (AssetStatus&Asset)			
Wire Bond and Pull (01)	040 - Verify Wire Bond Setup (Signoff)			
Wire Bond and Pull (01)	050 - Collected Wire ID (DC)			
Wire Bond and Pull (01)	060 - Perform Wire Pull (Asset&Asset&DC)			
Wire Bond and Pull (01)	070 - Confirm Pull Measurements (Attr)			
Wire Bond and Pull (01)	080 - Process or Return for RVV (Cord&Asset)			

1 2 3 4 5 6 ⌂

Help OK

Figure 113 WIP Work Order: Operation Flow

## Notification

TME contains the setup of Notifications throughout TME including WIP. These can be set up at the Process level for Notifications regarding any WIP Work Order generated off of that Process. The triggers that will send out a Notification are:

1. WIP Work Order Closed
2. WIP Work Order Created
3. WIP Work Order Hold
4. WIP Work Order Rejected
5. WIP Work Order Released
6. WIP Work Order Scrapped
7. WIP Work Order To Inventory

Any, all or none of them can be set up for any given Process/Work Order. Please see the Notifications section of the Settings and Tools Chapter for set up.

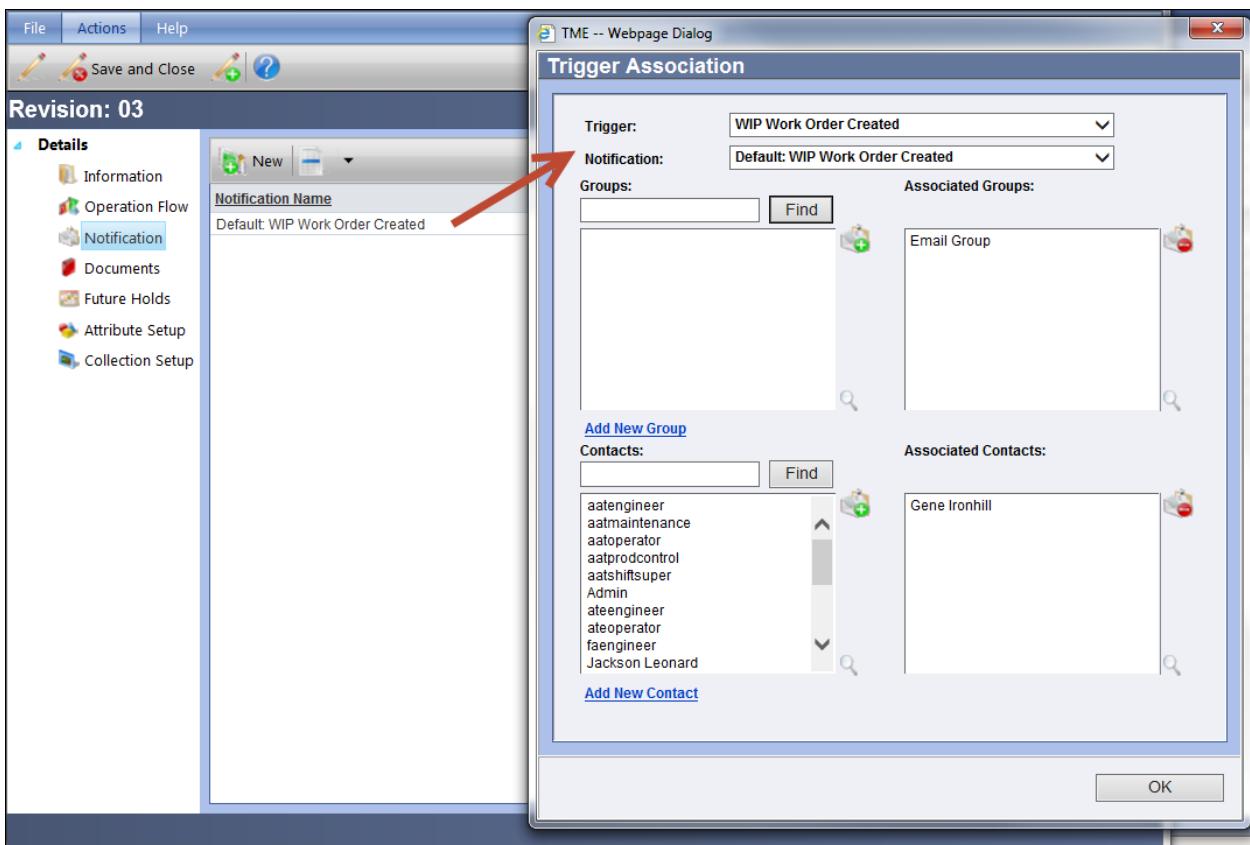


Figure 114 Process Setup: Notification



**Make sure that the Contacts have email addresses associated with their profiles!**

## Documents (Processes)

Documents can be attached at the Process, Operation and Step levels. If a document is attached at the Process level, it will be accessible from the main Work Order screen only. If the Operator is in a Step, the Step screen will need to be closed in order to get to the Document on the Work Order screen.

Documents will need to be uploaded or linked within the Documents Module (see the Contacts and Documents Chapter for more information) prior to attaching.

The Document can be viewed by clicking on the icon on the left side of the record.

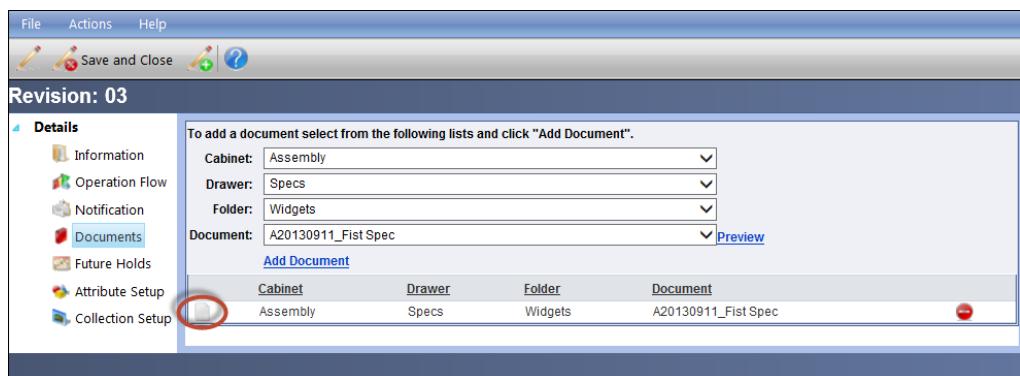


Figure 115 Operation Revision Setup: Documents

## Future Holds

A Future Hold is set up to automatically place a Work Order on Hold at the start of a specified Operation. There is no Condition that does a logic test on Attributes, it's simply a required Hold over which the Operator has no control. The Work Order will stay on Hold until a User with the appropriate Permission (see the Groups – Setting Up Global Permissions section of the Settings Chapter) releases it.

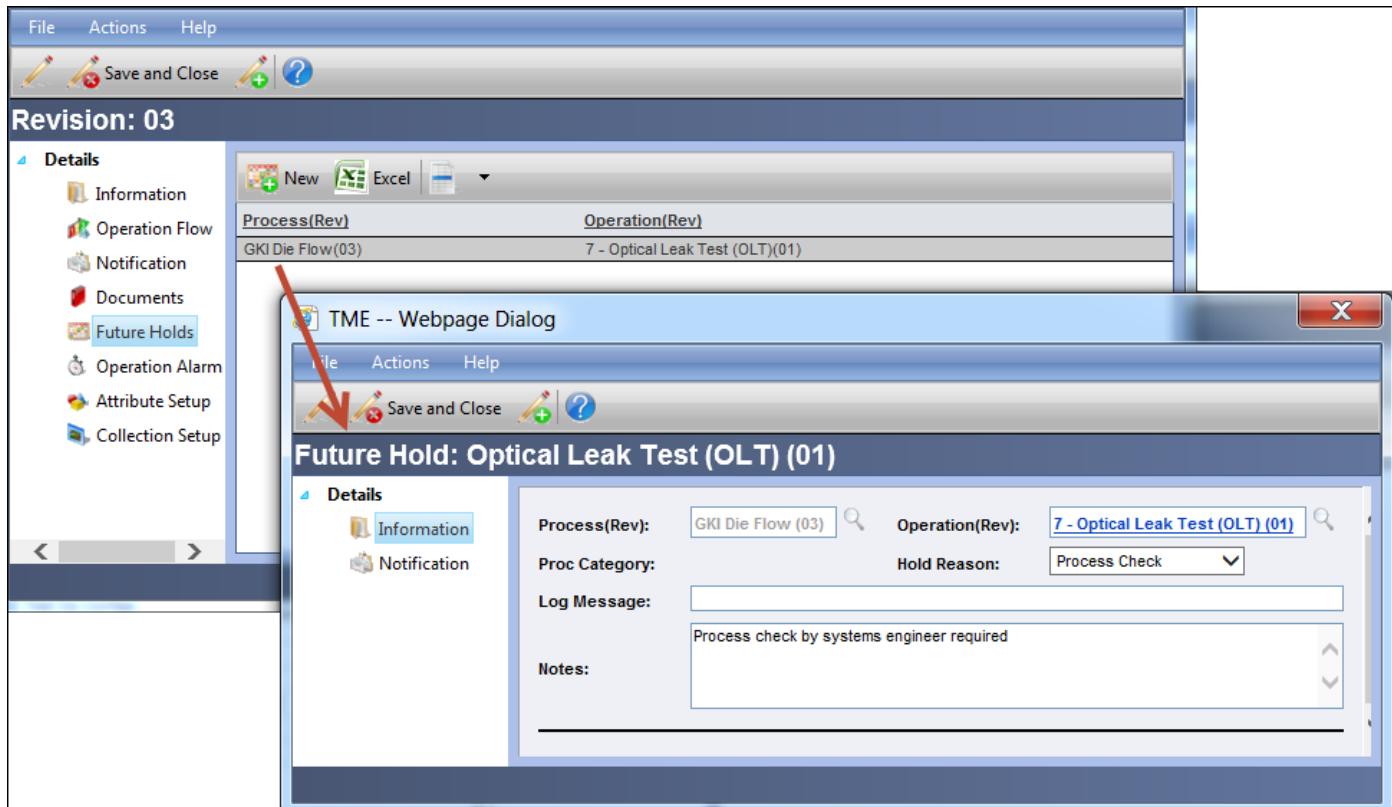


Figure 116 Process Setup: Future Hold Screens

## Operation Alarm

An Operation Alarm is set up to prevent the starting of a future Operation if too much time or not enough time has elapsed since the Operation Alarm was triggered at the completion of the last Step of the originating Operation.

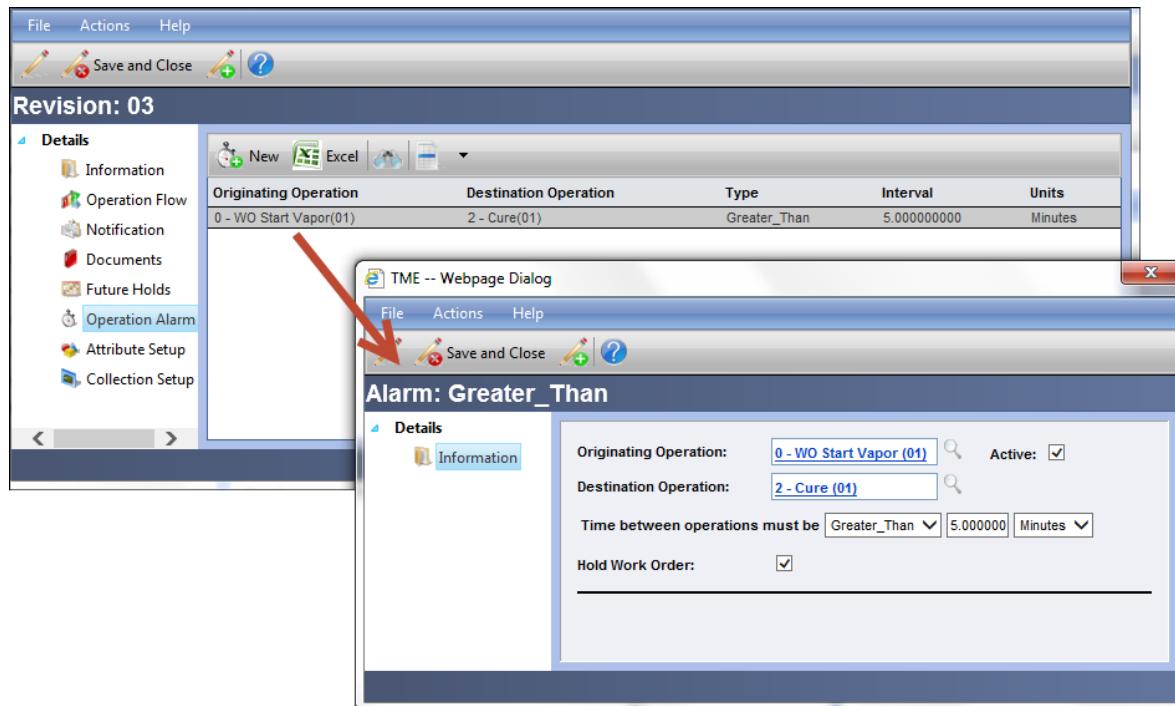


Figure 117 Operation Alarm Setup

## Attribute Setup

In addition to having the Attributes set up for the Processes themselves at Tools > Options > WIP (see Operations and Processes Attributes described earlier in this Chapter), they can be set up for the Work Orders generated off of this Process at the Revision level.

They have Run Rules and Notification settings just as with the Attribute and Data Collection setups for other objects in TME. For more information, see the Attributes, Data Collections, Notifications and Run Rule Violations sections of the Settings Chapter.



**Data collected on the Attributes tab are against the Process itself; it does not flow to any WIP Work Order itself. An example would be an Attribute for the Lead Flow Designer of the Process or for a Data Collection, Design Specification Numbers over time (along with revision dates). Attribute Setup on the Revision screen is for setting up Work Order attributes for Work Orders generated against this Process.**

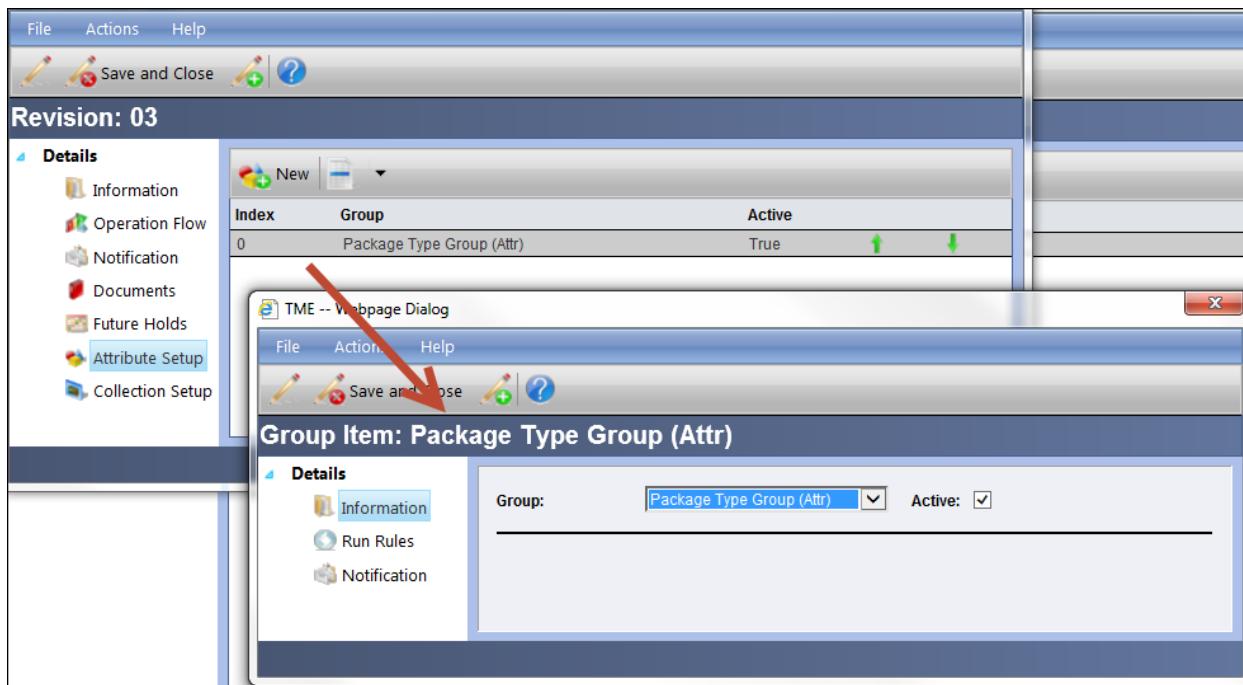


Figure 118 Process Setup: Attribute Setup

## Associating Processes to Products

In order to create a WIP Work Order for any given Product, it must be associated with at least one Process. This can be done on the detail screen of the Product or via the Process detail screen.

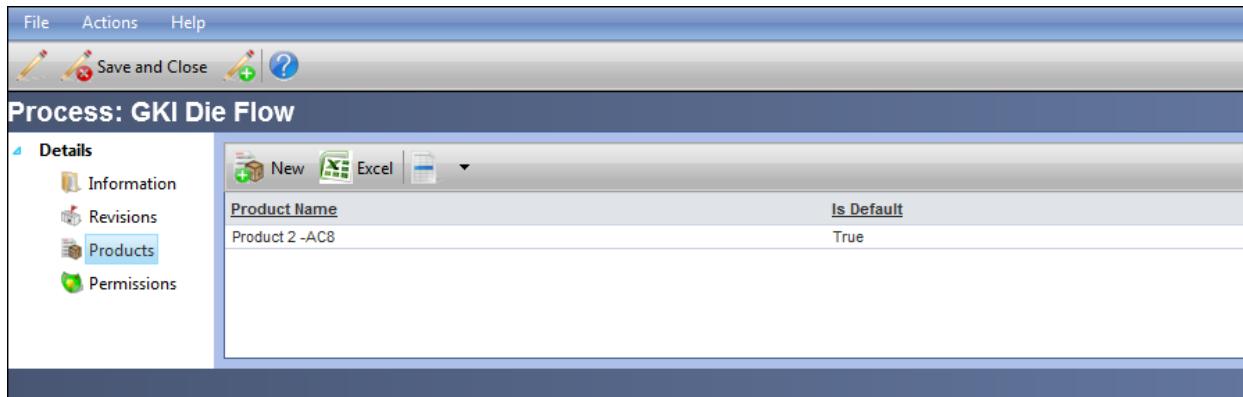


Figure 119 Process Setup: Product Association Viewer

Anytime a Product is selected for a Work Order, the drop-down list for Processes will populate accordingly. It will be originally set with the Default Process, but can be changed to any associated Process.

To add Products, click on the New icon and select the Products one by one. If the Product has not been associated with a Process before, it will have the current Process

automatically set up as the Default Process. To change the default setting, go to the Product's detail screen and click on WIP Setup and then WIP Processes.

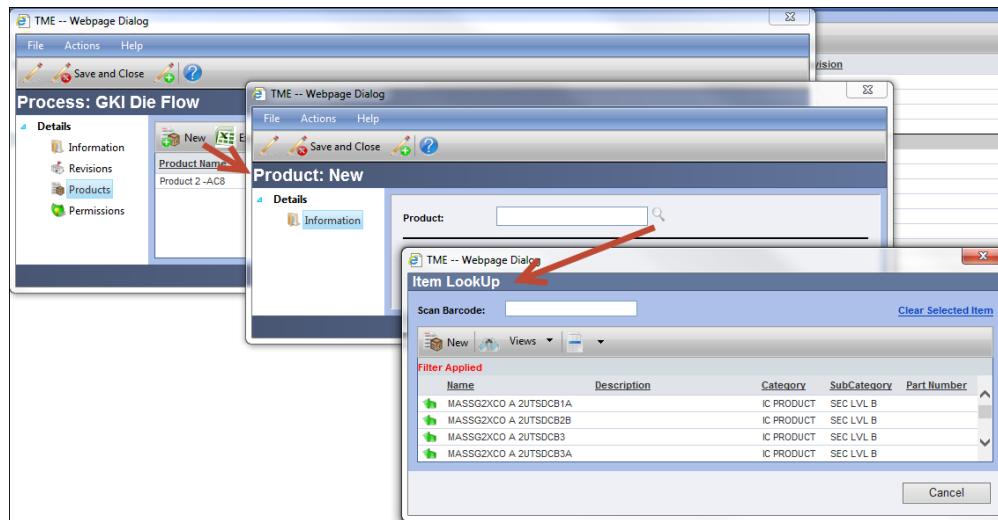


Figure 120 Process Setup: Selecting Products to Associate

## Process Permissions

- Permissions to Manage a Process and be able to view within the viewer and open the detail screen are based on Access Groups. It is listed onscreen as Permission to Manage and is set up in the same manner as Permissions in other Modules.
- Permissions to Process a WIP Work Order in its entirety is also based on Access Groups. It is listed onscreen as Permission to Process and is set up in the same manner as Permissions in other Modules as well.

If the expiration date has passed for a member of a Group, that User will not be able to access the Process or WIP Work Order until the expiration date has been renewed by the TME Administrator or designated personnel.

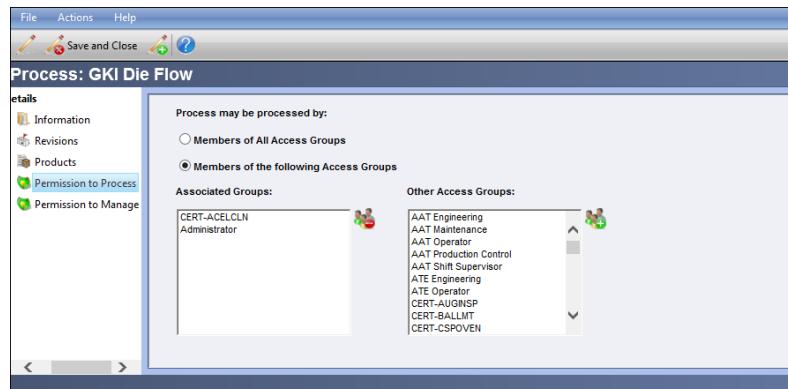


Figure 121 Process Permissions Screen

