AVEVA
Batch Management

Getting Started Guide

July 2019

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CHAPTER 1

Welcome

This guide describes the basic components of Batch Management and provides a tutorial to help you get started using the product.

This guide is written for the individuals who will be configuring and applying the batch control system. Process and control engineers or experienced technicians, who are very knowledgeable about control system programming and process control, are the most obvious individuals.

You can view this document online or you can print it, in part or whole, by using the print feature in Adobe Acrobat Reader.

This guide assumes you know how to use Microsoft Windows, including navigating menus, moving from application to application, and moving objects on the screen. If you need help with these tasks, see the Microsoft online help.

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Documentation Conventions

This documentation uses the following conventions:

Convention	Used for
Initial Capitals	Paths and file names.
Bold	Menus, commands, dialog box names, and dialog box options.
`Monospace`	Code samples and display text.

CHAPTER 2

Batch Management Overview

Batch Management is a flexible batch management system that you can configure quickly and easily after you understand its fundamental concepts. It is extremely important to read this section of the manual before you attempt to use Batch Management.

After you understand Batch Management concepts, you should be able to quickly build and edit configurations without using this manual. You will become more proficient by using the manual as a reference to improve your understanding of Batch Management and how to apply features that may not be obvious.

The Batch Management system does not require programming at the PC. However, control system programming is required. Also, the Batch Management system is a very complex, yet configurable software product that requires a fundamental knowledge of the Windows operating system, computer system networking, programmable logic controllers (PLCs), and process control. Server and client licensing are not discussed in this section.

For more information about installing Batch Management, see the Batch Management Installation Guide.

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System Requirements

Batch Management system requirements are listed in the Batch Management *Readme* file.

Installing Batch Management

You install Batch Management from its product CD-ROM. The installation program provides the capability to install various Batch Management server and client configurations.

For detailed information about installing Batch Management, see the *Batch Management Installation Guide*.

Overview of Capabilities

Batch Management is flexible batch management software designed to automate and provide a complete production history for batch processes. Batch Management is consistent with the ISA-88 standard. Batch Management enables you to quickly and easily create recipes and simulate their execution against a model of the process—all before you write one line of control code. Batch Management also provides complete production history and materials genealogy. The powerful batch engine means that you can reduce the cost and time to implement your batch-related processes by up to 40 to 60% over competitive solutions.

Batch Management provides out of the box batch management functionality that eliminates the need for unsustainable custom code in the PLC or distributed control system (DCS) and dramatically reduces the life-cycle engineering effort. The sophisticated batch engine is responsible for unit-to-unit material tracking, short term scheduling, dynamic batch and equipment management, and batch history and reporting. The Batch Management management system also supports redundancy for mission-critical applications.

Flexible Recipes and Process Lines

In the Batch Management control system, you can easily change recipe procedures and reconfigure new formula and process lines for new product introductions. The Batch Management system is flexible because it lets you model your plant, create new process lines, manage recipes, schedule and execute batches, and keep a history of all batch processing activity.

Flexibility in a batch process makes a plant more competitive. Improvements result because of faster line changeovers, faster time-to-market for new products, quicker response to customer orders, more accurate batch history, and more consistent product quality.

Process Modeling

A batch processing plant is made up of units and connections.

The five main components of the process model are:

- Units
- Process classes (processes)
- Connections
- Transfer classes (transfers)
- Processing capabilities.

Units

A unit is any vessel that can hold or process materials. Some units have no processing capabilities, such as bulk storage vessels, manual add stations, and hold tanks. Other units have significant processing capabilities, such as reactors, blenders, mixers, dryers, retorts, and washers. Examples of processing capabilities are agitating, mixing, heating, cooling, blending, and packaging. Other examples of units are storage tanks, silos, ovens, fillers, washers, retorts, molders, bottlers, wrappers, cartoners, and palletizers.

Connections

Connections are the equipment that is necessary for transferring a product from one unit to another. Examples are pumps, valves, separators, condensers, and flow meters. Many plants have units that are connected to more than one unit and some plants have multiple connections between the same two units.

Process Classes and Transfer Classes

All units that have the same processing capabilities or perform the same function are grouped into one process class. All the connections between the same two process classes are grouped into one transfer class. Process classes and transfer classes define a family of units and connections, respectively. Grouping units and connections into classes allows for a flexible batch system.

Phases

Processing and transferring capabilities are defined by phases. Each phase is an independent action that can contain a unique set of parameters. Parameters configure the phase based on recipe requirements. Phases can be automatically processed by the control system or manually run by an operator.

Process Modeling Work Flow

Defining the plant processing capability is called process modeling and involves the following steps:

1. Identify each unit and its attributes.
2. Group units into process classes.
3. Identify all connections between units.
4. Define all equipment segments and assign to connections.
5. Group connections into transfer classes.
6. Define the processing capabilities of each process class (phases and parameters).
7. Define the transferring capabilities of each transfer class (phases and parameters).
8. Define the status of equipment.
9. Define trains.
10. Develop phase logic.

Tag Creation and Linking

An integral part of process modeling involves defining specific data points, called tags, for units, processes, connections, and transfers. Tags enable data to move between the batch system and the control system. You must define tags before you configure any of the batch system application modules. The number of tags allowed in the batch system is limited only by the amount of mass storage in the system.

When you create the process model, you create tags for units, connections, segments, phases, and phase parameters.

You must link the model and its tags to control system addresses using the Batch Management TagLinker. The TagLinker provides automatic and manual linking of tags to external systems.

Materials Tracking Management

Materials tracking management includes the ability to define materials as ingredients, intermediates, finished goods, by-products, and others. You can define characteristics for each material entered in the system.

You can use the Materials Editor to track the location of materials that are stored in units. This tracking capability pertains to bulk ingredients and work in process materials. The batch management system uses the ingredient location data to determine where to obtain ingredients when a batch is to be produced. This capability allows ingredient locations to be independent of recipes and control programs and permits ingredients to change locations with no effect on recipe processing.

The Materials database is used by the Recipe Editor in the construction of recipes. Only materials in the Materials database can be used in recipes.

When new bulk ingredients are received, plant personnel can enter the unit location into the Materials database. You can also assign a lot identification to the material. You can store multiple lots of the same ingredient in the same vessel. The batch management system updates the database when ingredients are used and when intermediates or finished goods are produced. The database gives you easy access to work-in-progress (WIP) information. You can also use the database to update higher level material management and material resource planning (MRP) systems with ingredient usage information, WIP, and finished goods production. The Materials Editor is not an inventory management system, but you may use it to complement existing systems.

Recipe Management

The batch control system manages and constructs recipes according to the guidelines outlined in the ISA-88 Flexible Batch Specification.

Master Recipes

You can construct and edit master recipes. Master recipes are not specific to process lines, but are independent of equipment. You can assign master recipes to any process line (train) that has units belonging to the classes of process equipment defined in the recipe.

A master recipe is not size specific, but is scalable to the batch size defined by production scheduling. You can enter all formula quantities for ingredients, intermediates, by-products, and finished goods as either actual quantities or as a percent of the total batch size. Quantities expressed in percentages are scaled by the batch management system when the batch runs.

Control Recipes

A master recipe becomes a control recipe as the units defined in the train are dynamically allocated and used in producing a batch.

Recipe Editor

Use the Recipe Editor to construct and alter recipes. You can save, retrieve, and print recipes. A revision control system provides you with an accurate time-stamped history of all changes and revisions that have been made to the recipe.

Recipe Compare

Use the Recipe Compare utility to select two recipes to compare (either different versions of the same recipe or two different recipes) and then view and save a generated report showing the differences between them.

Batch Management

Batch management consists of scheduling batches, initializing batches, coordinating the execution of batches with the control system, interfacing with operators, and storing all batch activities. You perform these tasks using the Batch Manager, Batch Scheduler, and Batch Display programs.

Batch Scheduling

Use Batch Manager to dispatch to plant floor operators the batches that are ready to run. To schedule a batch, you manually enter the batch identification, master recipe, batch size, and train (process line) into the Batch Scheduler. After you enter the batch, you can initialize it.

Batch Initialization

You must initialize each batch before you can run it. The initialization process involves validating the recipe, checking if the train exists, checking if the bulk materials defined in the recipe are available in the train, ensuring that the recipe equipment requirements are satisfied by the train, and verifying that the Process Model database is compatible with the recipe.

Batch and Unit Management

The Batch Manager directs and supervises the processing of each batch. The Batch Manager interprets recipes and enables the control system. Based on the recipe procedure, blocks of control software, referred as phase blocks, are signaled to run by the Batch Manager. Phase block control logic, located in the control system, controls the process. Before enabling each phase block, the Batch Manager verifies that the phase block is ready to be processed. If so, phase parameter values are downloaded to the block, and the block starts.

The Batch Manager also interacts with batch display programs. The batch display programs provide operators with information about all batches that are initialized or running in the system. Through these displays, operators can put a batch or phase on hold, as well as restart and cancel batches or phases. Operators can change phase parameter values, acknowledge the processing of phases, review phase interlock statuses, and enter comments while the batch is running.

The Batch Manager coordinates how process units are used for each batch. The Batch Manager can run a large number of batches simultaneously. Each batch is a separate entity and contends along with other batches to possess the process units it needs. The Batch Manager allocates ownership of units to batches as units become available and releases units when the batch no longer requires the unit.

In flexible batch systems that use controllers, the supervisory workstation becomes an active participant in processing a batch. Unit management is very sophisticated in a flexible batch system. Most controllers do not have the ability to program a unit manager that is capable of interpreting and processing the recipe procedures that are constructed in the batch control system.

A master recipe uses classes of process units, not specific units. Thus, phases pertain to a class of units rather than a specific unit. When the Batch Manager runs a master recipe, each phase encountered is converted into a unit-specific phase. This process is called master recipe to partial control recipe conversion. The train assigned to produce the batch specifies all the units that can be used. The Batch Manager automatically converts the master recipe to a control recipe based on the units found in the train.

History

Batch Manager captures and stores all processing and operator activities when a batch runs.

Batch History

Batch Management uses Microsoft SQL Server for its historical database.

The batch management system logs all information related to the production of a batch to the history database. This data includes all the events, process data, production information, material usage, operator comments, operator actions, equipment used to produce the associated batch, and all batch-related process alarms.

Batch Reports

When you install the reporting components on an SSRS platform, they enable you to configure, schedule, and view reports. You can define schedules for the reports or interactively request a report on an as-needed basis.

Batch Management Integration

Batch Management integrates with a number of other applications.

Tag Management

Batch Management interfaces to other components like InControl™, I/O servers, DAServers, and InTouch® software through tags. Also, you can integrate Batch Management with the Application Server and leverage the full capabilities of both components to extend the boundaries of the implementation.

Model Editor

Use the Model Editor to construct the plant model consisting of units, connections, phases, phase parameters, and segments. Tags are automatically created using these names and are used by Batch Management to communicate with PLC or DCS systems.

TagLinker

Use the Batch Management TagLinker to link the tags you create in the Model Editor to control system addresses. The TagLinker provides capabilities to link tags automatically using default links, manually through the graphical user interface, or by external interfaces using a comma separated variable format import or export file. The TagLinker also validates model tags.

Tag Communications

Batch Management communicates with other applications or components through OPC, Suitelink or Message Exchange (MX). Tag communications are used to interface to unit control logic, phase logic, and operator displays. The Phase Logic and TagView tools are available to diagnose, troubleshoot, and exercise tags communications.

Phase Logic Testing Tool (PhaseLogic)

Use the Phase Logic tool to test and exercise the handshake interface between the Batch Manager and the control system phase logic. PhaseLogic is a testing tool and should not be used during normal operation.

TagView Tool

Use the TagView tool to monitor Batch Management tags at run time.

Batch Alarms

Batch alarms are captured, associated with a batch, and stored in the history database. The Unit or Connection Name parameter of the tag is the key in accomplishing this. All alarms from a designated InTouch application are monitored by the batch control system. If the first portion of the tag name corresponds to a unit, connection, or segment name in the Batch Management model, the alarm is automatically logged to the Batch Management history and associated to the batch that was active in the named equipment at the time of the alarm.

Terminal Services Support

Batch Management supports Terminal Services. Terminal Services allow Batch Management Development Clients and Batch Management Runtime Client applications to run on a terminal server in such a way that the client computers themselves function as terminals rather than independent systems. The server provides a multi-session environment that runs the Batch Management applications and other Windows-based programs on the clients.

Because all the Batch Management software is resident on the terminal server, you do not need to install Batch Management client software on remote systems. For any application that requires upgrade or modification, Terminal Services is an efficient, highly manageable way to provide user workstations with the most current version of the application.

Extensibility

Batch Management provides you with a rich set of ActiveX objects and API functions for integrating external applications such as enterprise resource planning (ERP) or scheduling systems and allowing exchange of formulas and recipes, materials, and production results.

Batch Management uses Microsoft SQL Server as its historical database.

These features make it easy for you to integrate with ERP and Advanced Planning Systems by allowing Batch Management to be a key link in a successful supply chain management initiative.

Managing Batch Management Configurations

When you install the Batch Management server software, a default folder structure is created. We recommend that you do not modify this structure except for the configuration folder.

The Batch Management configuration that you create is stored in the following folder: **…\Wonderware\Batch Management\cfg\config_A**.

When Batch Management runs, it must find your configuration in the config_A folder. If you intend to develop other configurations, you should create a different folder and move the contents of the configuration into it. For example, create a folder named AnotherConfig, and then move the configuration files from config_A into it. You can then copy an empty set of default database files from the dflt_cfg folder into the config_A folder.

Batch Management Application Modules

The following section is a summary of the applications that are available within the Environment Editor.

Configuration Modules

You can use the following modules to develop and manage your batch system:

Environment Editor (EnvEdit)

(Required) Use the Environment Editor to define the batch configuration and run-time applications that are to be run.

Process Model Editor (ModelEdit)

(Required) Use the Process Model Editor to create a Process Model database. Only one Process Model Editor can run in a system at a time.

Tag Linker Editor (TagLinker)

(Required) Use the Tag Linker Editor to associate Batch Management tags with a control system. You can also use the Tag Linker Editor to associate Batch Management tags with InTouch tags. The Tag Linker also exports Batch Management tags to a comma-separated variable file that populates the InTouch tag dictionary with memory and I/O tags.

Train Editor (TrainEdit)

(Required) Use the Train Editor to create production lines on which batches are scheduled.

Materials Editor (MaterialEdit)

(Required) Use the Materials Editor to create and edit a Materials database both online or offline. You can run multiple Materials Editors in a system to enable multiple users to edit the same database simultaneously.

Recipe Editor

Use the Recipe Editor to construct and alter recipes. You can save, retrieve, and print recipes. A revision control system provides you with an accurate time-stamped history of all changes and revisions that have been made to the recipe.

Process Log Editor (LogEdit)

(Optional) Use the Process Log Editor to create, edit, and print batch-related data logging configurations.

Batch Reporting (BatchReport)

(Optional) Use the BatchReport icon to open a web browser that provides access to the Batch Management web-based reporting system.

Security Editor (SecEdit)

(Optional) Use the Security Editor to define Batch Management system users, user security roles, user access, and recipe access for each user and to enable or disable applications and functions that require security.

Import Export utility (ImpExpUtil)

(Optional) Use the Import Export Utility to export and import the Process Model used in the Batch Management system to/from the memory or to/from a file.

Run-Time Modules

The following run-time programs are used by the Batch Management system during batch processing.

Environment Manager (EnvMngr)

(Required) The Environment Manager manages the processing of the Batch Management run-time applications defined with the Environment Editor.

Environment Display (EnvDspl)

(Required) The Environment Display is a client of the Environment Manager and provides a single interface for starting and stopping all Batch Management system GUI applications.

Log Viewer

(Optional) The Log Viewer displays messages for all system activities, including the Batch Management server, run-time clients and development clients such as startup, shutdown, warnings and errors, as well as time and date stamps.

Unilink Manager (UnilinkMngr)

(Required) The Unilink Manager manages inter-process communications among all the batch system applications.

InBatch Client (IBCli)

(Required) The InBatch Client (IBCli) is the link to I/O servers that communicate with plant-floor systems, including programmable logic controllers (PLC) and distributed control systems (DCS). IBCli communicates with tag server components using OPC, or SuiteLink protocols.

Note: The latest Windows operating systems do not support the NetDDE protocol.

InBatch Message Exchange (IBMX)

(Required if using Galaxy data) The InBatch Message Exchange (IBMX) is the link to Galaxy data using Application Server. It enables mapping Batch Management Tags with Galaxy attributes to transfer data between both environments. The communication between Batch Management and Application Server uses the Message Exchange protocol.

Memory Tag Manager (MemTagMngr)

(Required) The Memory Tag Manager generates all Batch Management memory tags, including the system tags, for all the equipment in the process model.

Simulation Manager (SimMngr)

(Required for Simulation) The Simulation Manager replaces the communication drivers for a Batch Management system and enables the system to be run without the presence of control system hardware.

Information Manager (InfoMngr)

(Required) The Information Manager provides general Batch Management server information to client applications.

Batch Management Server (IBServ)

(Required) This run-time server application enables SuiteLink client applications (such as InTouch) to use control system tags.

InBatch Function Server (IBFServ)

Note: InBatch 8.1 is the last release to support batch function tags. We strongly suggest you use the BatchHook Active X automation server interface for customizing the batch engine.

Batch Manager (BatchMngr)

(Required) The Batch Manager interacts with the Process Model, Recipe, and Materials databases. The Batch Manager works in conjunction with the Batch Scheduler and Batch Display programs. The Batch Manager processes all recipes, manages unit allocation, moves batch information to the history database queue, and triggers reports.

Batch Scheduler (BatchSched)

(Optional) The Batch Scheduler interacts with the Batch Manager. Use the Batch Scheduler to construct a schedule of batches to be run. Multiple Batch Schedulers can run in a system.

Batch Display (BatchDspl)

(Optional) The Batch Display is a client of the Batch Manager and provides all the run-time information concerning the processing of a single batch. Multiple batch displays can run in a system.

Process Log Manager (LogMngr)

(Optional) The Process Log Manager controls the data logging of any tag in the system according to the logging configuration.

Security Manager (SecMngr)

(Optional) The Security Manager is used in batch and external applications to evaluate and respond to requests for security clearance.

Recipe Automation Server (RecipeEdit)

The Recipe Automation Server is an integral part of Recipe Editor and is installed on the Batch Management Server and the Batch Management Development Client. For more information, see the *Batch Management COM Technical Reference Guide*.

Batch Talk ActiveX Control (OCXBATCH.OCX)

The OCXBATCH.OCX is a background server supporting ActiveX technology that includes all functionality provided by the Batch Talk API. This server is installed in the Batch Management server, run-time client and development client. For more information, see the Batch Management COM Technical Reference Guide.

Recipe Procedure SFC Active X Control (INBATCHSFC.OCX)

The SFC ActiveX Control is a GUI-based control for the recipe procedure. This control is installed in the Batch Management server, run-time client, and development client. For more information, see the Batch Management COM Technical Reference Guide.

Material Automation Server (MATERIALSVR.EXE)

The Material Automation Server provides access to the Material database using ActiveX technology. This server is installed in the Batch Management server, run-time client, and development client. For more information, see the Batch Management COM Technical Reference Guide.

Batch Function Interface Type Libraries (BATCHOBJSRV.DLL & BATCHVBSERVER.DLL)

You can use the Batch Function Interface Type libraries to construct a Batch Manager in-process server. The libraries provide access to the key events during batch execution. For more information, see the Batch Management COM Technical Reference Guide.

Tools

Use the following tools to assist your development and run-time processes.

Phase Logic Testing Tool (PhaseLogic)

Use the Phase Logic tool to test and exercise the handshake interface between the Batch Manager and the control system phase logic. PhaseLogic is a testing tool and should not be used during normal operation.

Change Password (ChgPwd)

(Optional) Use the Change Password tool to interact with the security system from the command line to change an employee's password. The Change Password utility is part of the security system.

TagView Utility (TagView)

(Optional) The TagView application permits you to monitor and change any of the Batch Management equipment.

CHAPTER 3

Batch Management Tutorial

This chapter guides you through the process of developing actual Batch Management server and client applications using a generic breading plant process as a reference. The purpose of the tutorial is to show you the ease with which you can configure Batch Management and the power that Batch Management provides as a design, engineering, and simulation tool. Additionally, it familiarizes you with all other Batch Management capabilities associated with configuration and control system logic, material management, recipe management, history, reporting, and operator interface. As you work through this tutorial, you will develop a complete understanding of what Batch Management is and how it is configured.

This tutorial assumes that you have a properly configured, operational hardware system and strong working knowledge of InTouch.

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Tutorial Overview

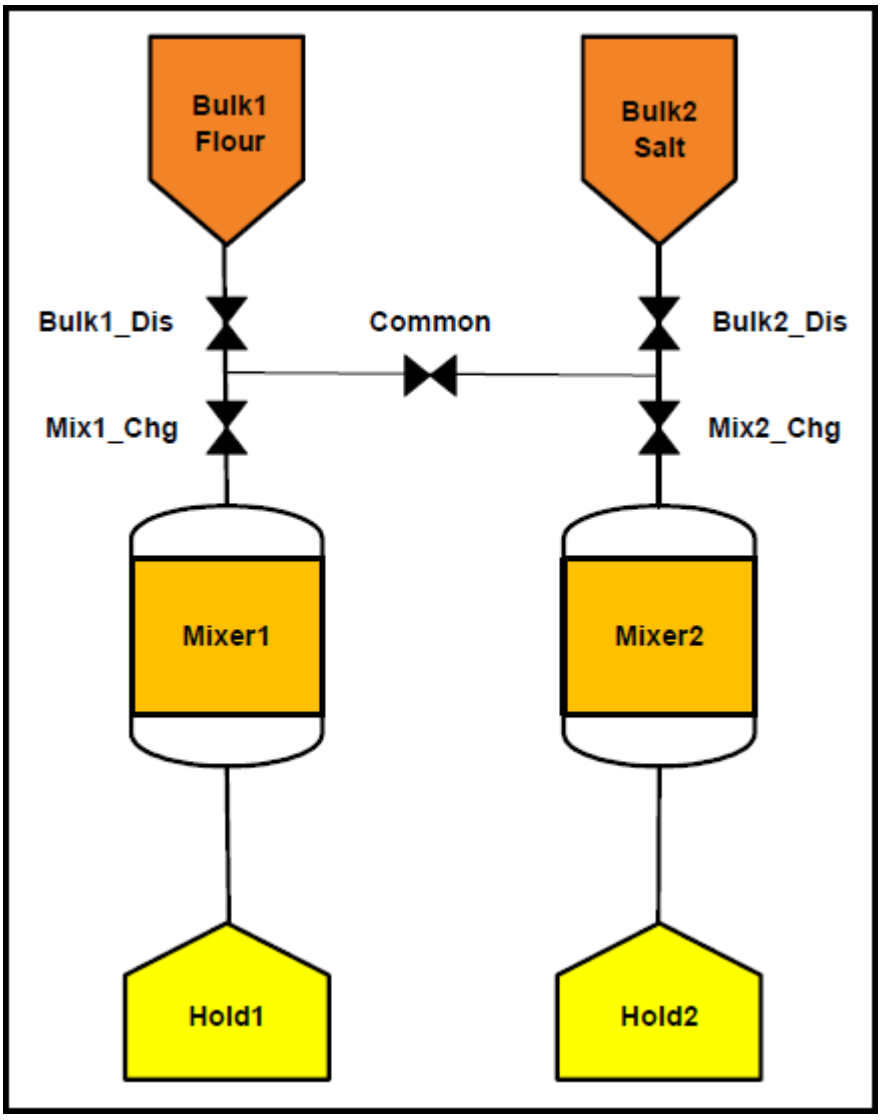
This tutorial guides you through the following topics:

- *The Breading Plant Process Area*
- *Hardware Architecture*
- *Install the Batch Management Software*
- *Start the Batch Management Environment Display*
- *Configuration Steps*
- *Model the Process*
- *Defining Equipment Status*
- *Updating the Runtime Databases*
- *Defining the Process Trains*

- *Defining the Materials and Material Locations*
- Building a Recipe
- Creating a Batch Management Run-Time Client (InTouch) Application
- Configure and Schedule a Report
- Viewing the Reports

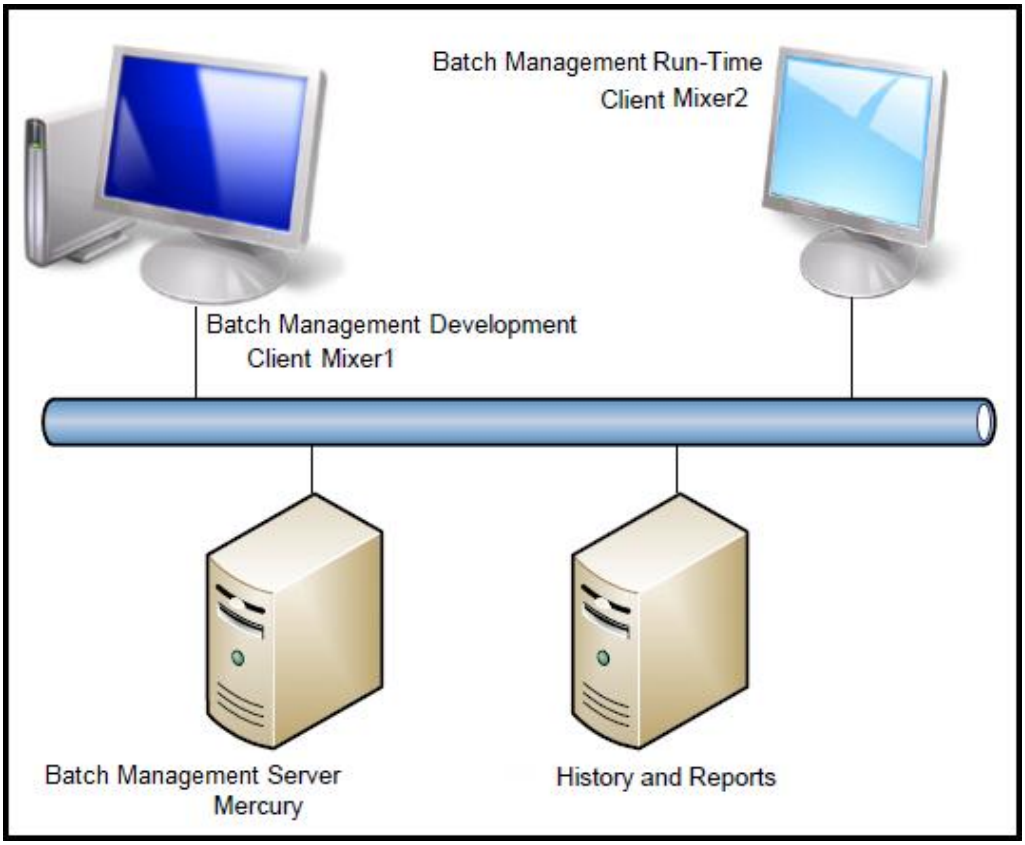
The Breading Plant Process Area

The following figure shows the process area of the breading plant.



Hardware Architecture

The example architecture is shown in the following figure. Mercury is the node name of the Batch Management server. Mixer1 is the node name of the Batch Management run-time client.



Install the Batch Management Software

Follow these steps to install the Batch Management software:

1. Install the Batch Management Server software on Mercury.
2. Install and configure Microsoft SQL Server on Mercury. You can do this by installing Information Server.
3. Install the Batch Management Development Client software on Mixer1.
4. Install the Batch Management Runtime Client software on Mixer2.

For detailed information about installation and history configuration, see the *Batch Management Installation Guide*.

Note: The Mixer1 node is used for illustration purposes only. This node is portrayed as a Batch Management Development Client. You can perform all configuration information presented here from the Batch Management Server or the Batch Management Development Client. This example refers to the server.

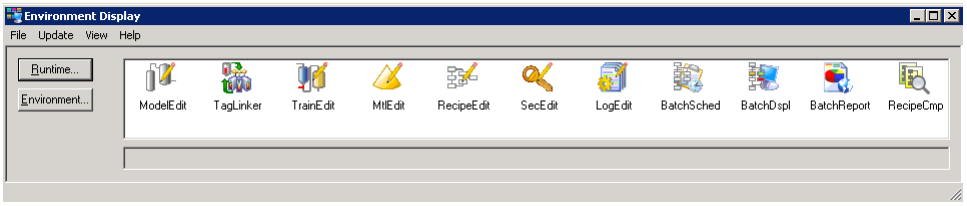
Start the Batch Management Environment Display

- On the Windows **Start** menu, click **Programs > Wonderware > Batch Management Server > Environment Display**.

Or

On the Windows **Start** menu, click **Apps > Wonderware > Environment Display**.

The Batch Management **Environment Display** dialog box appears. From this dialog box, you can start the Batch Management configuration and run-time applications.



Configuration Steps

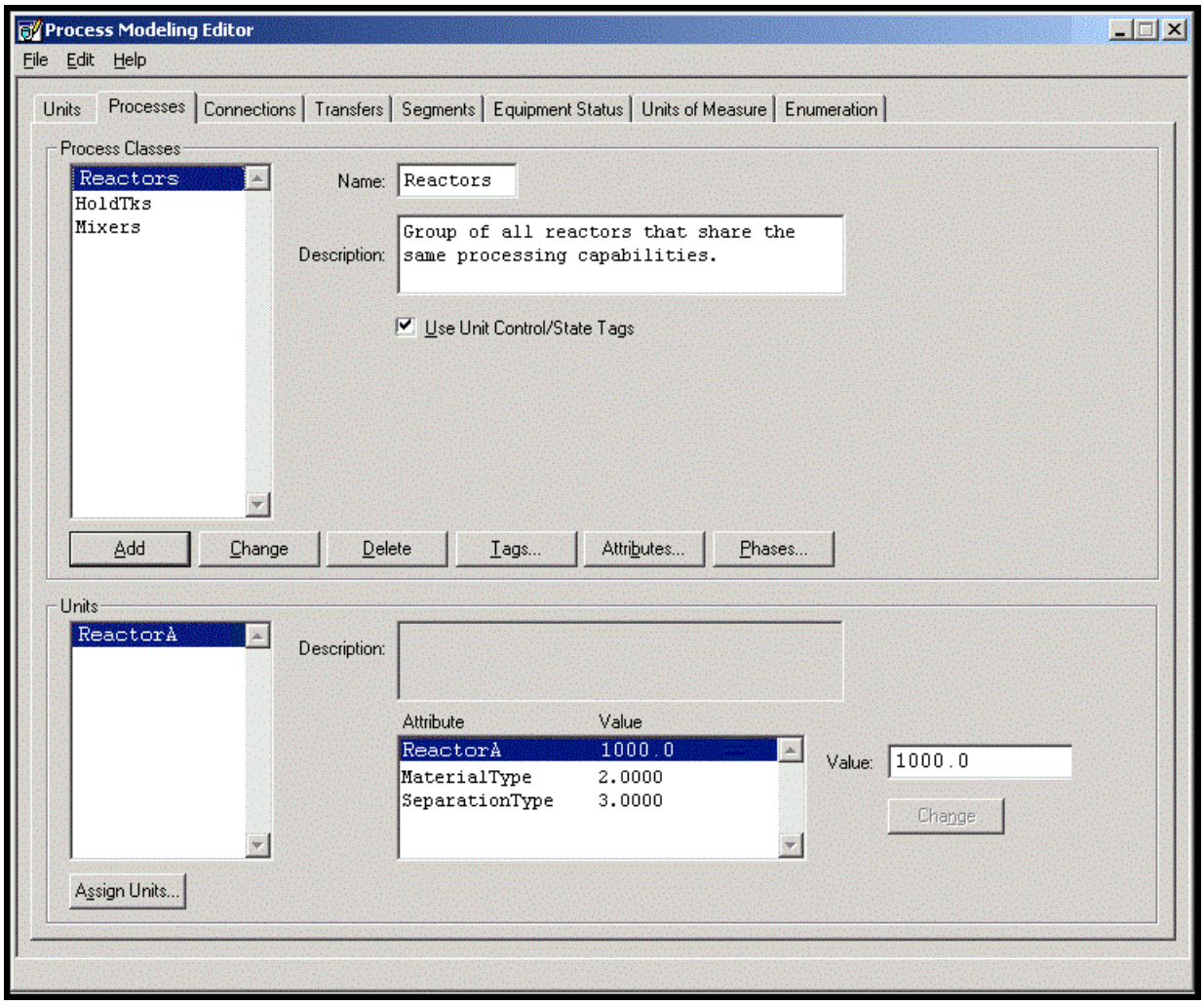
Use the following steps to configure the Batch Management Server:

1. Model the process
2. Use the Tag Linker
3. Update the run-time databases
4. Define the process trains
5. Define the materials and material locations
6. Build a recipe
7. Create a Batch Management run-time client (InTouch) application
8. Start the Batch Management runtime system
9. Schedule and execute batches
10. Execute an end-of-batch report

Model the Process

- On the **Environment Display** dialog box, double-click the **ModelEdit** icon.

The **Process Modeling Editor** dialog box appears.



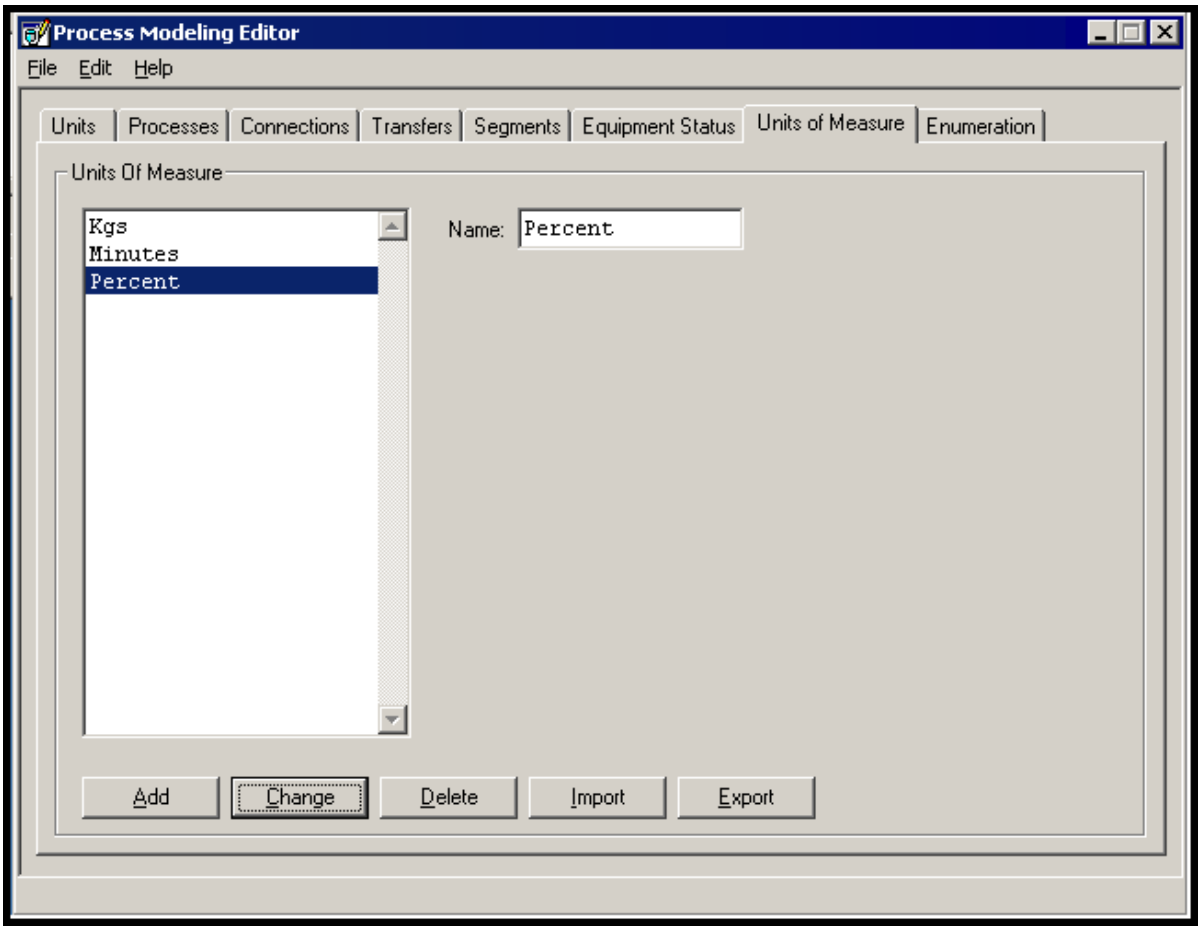
Defining Units of Measure

Start by defining the Units of Measure that you will need for the tutorial example.

To define units of measure

1. Click the **Units of Measure** tab to open the Units of Measure Editor.
2. In the **Name** box, type Percent.
3. Click **Add**.
4. Use the same process to add the following two units of measure:
   - Minutes
   - Kgs

The following figure shows the result of entering the units of measure.



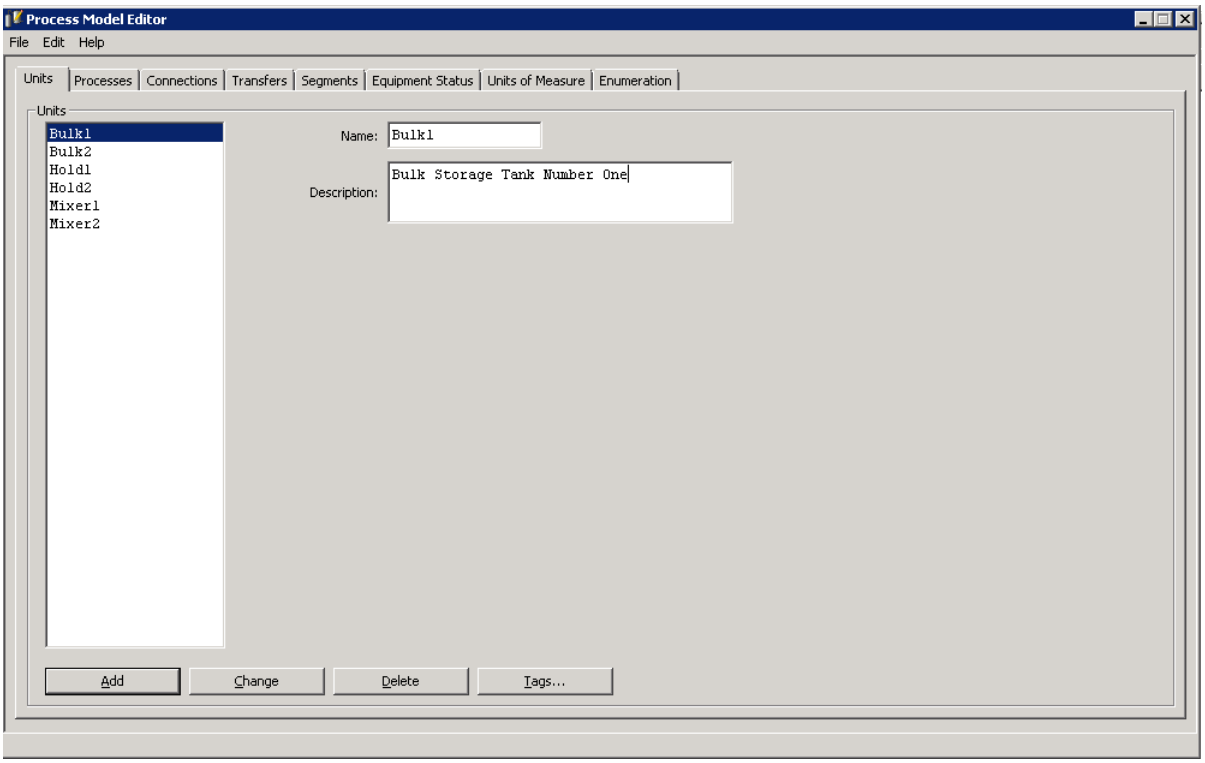
Defining Units

Units are equipment entities that hold, process, or package materials.

To define units

1. Click the **Units** tab.
2. In the **Name** box, type Bulk1.
3. Click **Add**.
4. Use the same process to enter the following units:
   - Bulk2
   - Hold1
   - Hold2
   - Mixer1
   - Mixer2

The following figure shows the result of adding the units.



Defining Connections

Connections are defined by a source unit and a destination unit. If materials can move between two units, you must define the connection. The way in which materials move is not important at this time.

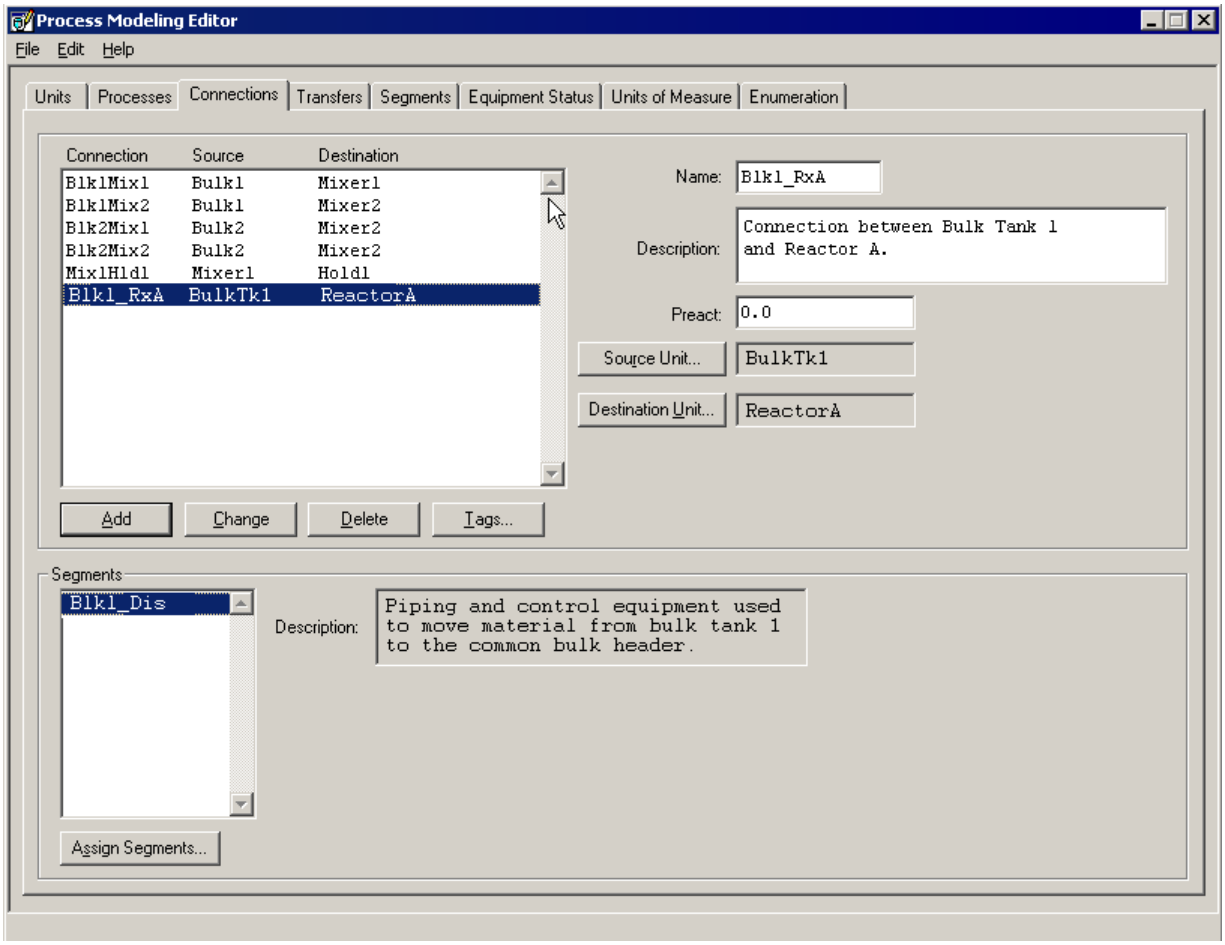
To define connections

1. Click the **Connections** tab.
2. In the **Name** box, type Blk1Mix1.
3. Click **Source Unit**.
4. In the **Select Source Unit** dialog box, click **Bulk1**.
5. Click **Apply**.
6. Click **Destination Unit**.
7. In the **Select Destination Unit** dialog box, click **Mixer1**.
8. Click **Apply**.
9. In the **Connections** tabbed dialog box, click **Add**.
10. Repeat steps 1 through 8 for the items shown in the following table.

Connection	Source Unit	Destination Unit
Blk1Mix2	Bulk1	Mixer2
Blk2Mix1	Bulk2	Mixer1

Connection	Source Unit	Destination Unit
Blk2Mix2	Bulk2	Mixer2
Mix1Hld1	Mixer1	Hold1
Mix2Hld2	Mixer2	Hold2

The following image shows an example of the completed task.



Defining Process Classes

A process class is a group of one or more units that perform the same functions.

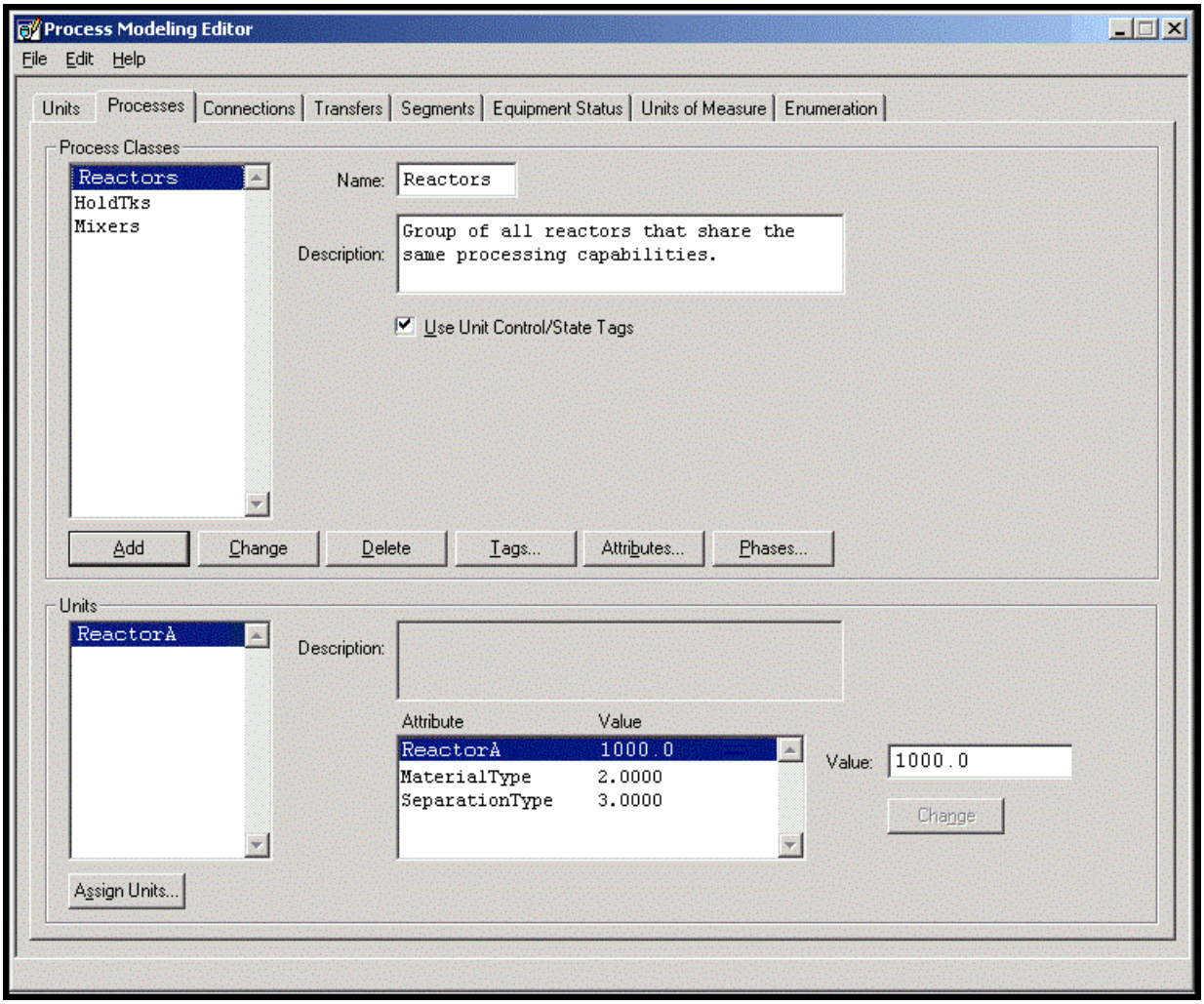
To define process classes

1. Select the **Processes** tab to display the Processes editor.
2. In the **Name** box, type BulkTks.
3. Click **Add**.
4. In the lower area of the editor, click **Assign Units**.
5. In the **Assign Units to Process** dialog box, select **Bulk1** and **Bulk 2**.
6. Click **Apply**. Leave the dialog box open so that you can add other items.

7. Repeat steps 1 through 5 to define process classes for the items listed in the following table. For the last item, click **OK** instead of **Apply**.

Process Class Name	Assigned Units
Mixers	Mixer1, Mixer2
HoldTks	Hold1, Hold2

The following image shows an example of the completed task.



Defining Process Phases

Define process phases only for the classes of equipment that actually process material. In our example, only the Mixers process class processes material. The BulkTks and HoldTks process classes do not.

To define process phases

1. With the **Processes** tab active, select the **Mixers** process class and click **Phases.**

   The **Edit Phases** dialog box appears.

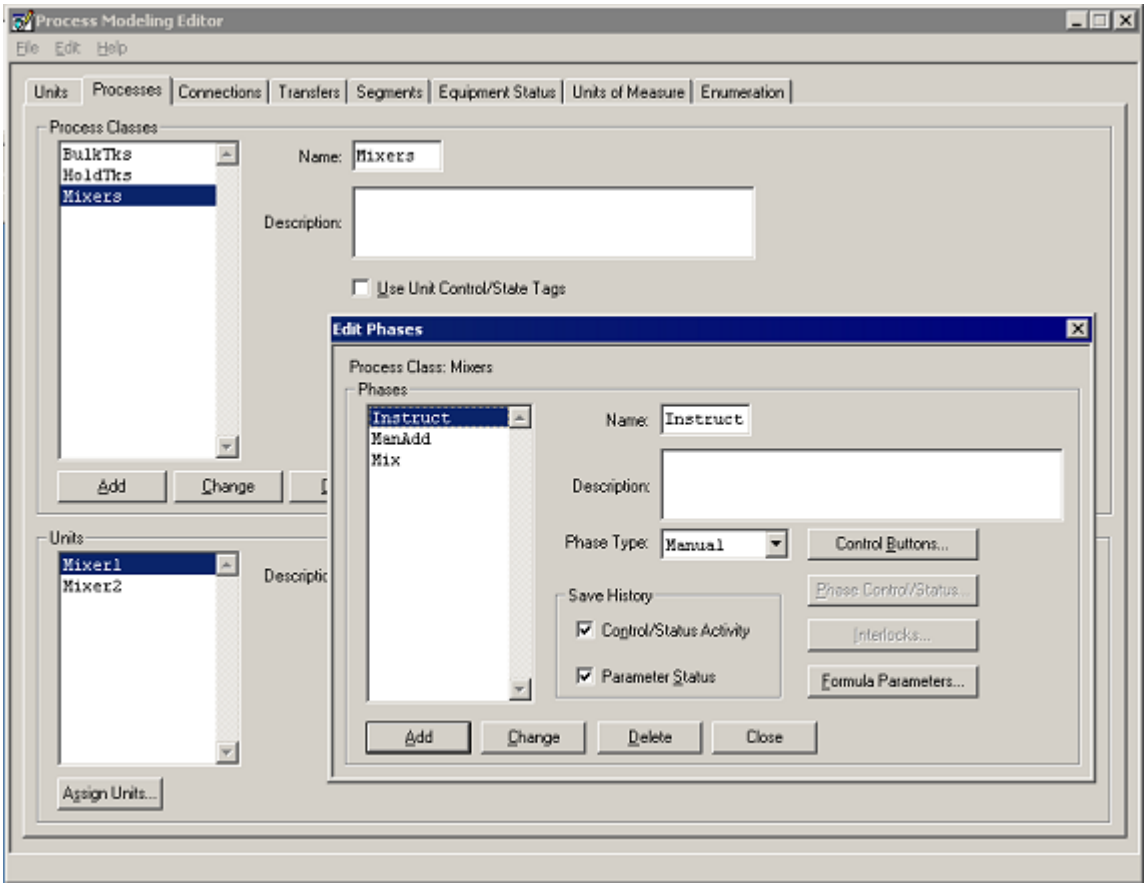
2. In the **Name** box, type Mix.
3. Accept the **Phase Type** Automatic.
4. In the **Save History** area, select the **Control/Status Activity** and **Parameter Status** check boxes.

   If you do not select these check boxes, phase events and parameters are not stored in the history database.
5. Click **Add**.
6. On the **Edit Phases** dialog box, repeat steps 1 through 6 for the phases listed in the following table.

Phase Name	Phase Type
ManAdd	Manual
Instruct	Manual

Note: You must click the **Change** button following any phase modifications.

The following image shows an example of the completed task.



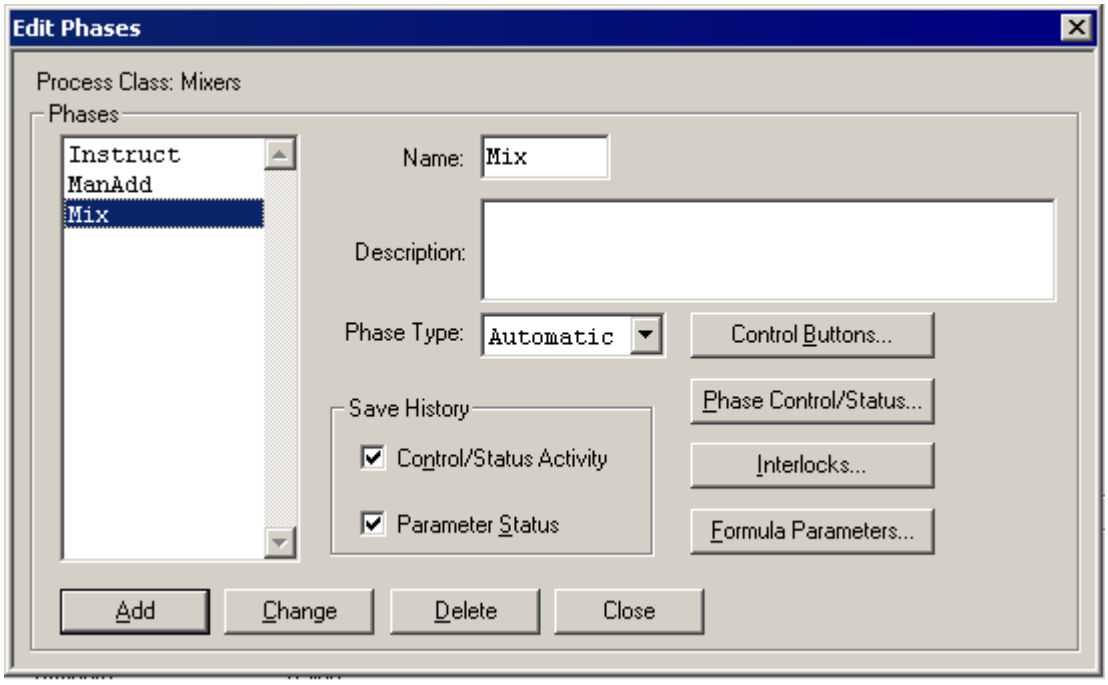
Creating Phase Control and Status Tags

All automatic phases must have phase control and status tags. These are the tags that are ultimately linked to the control system memory and register addresses.

The Mixers class has only one automatic phase.

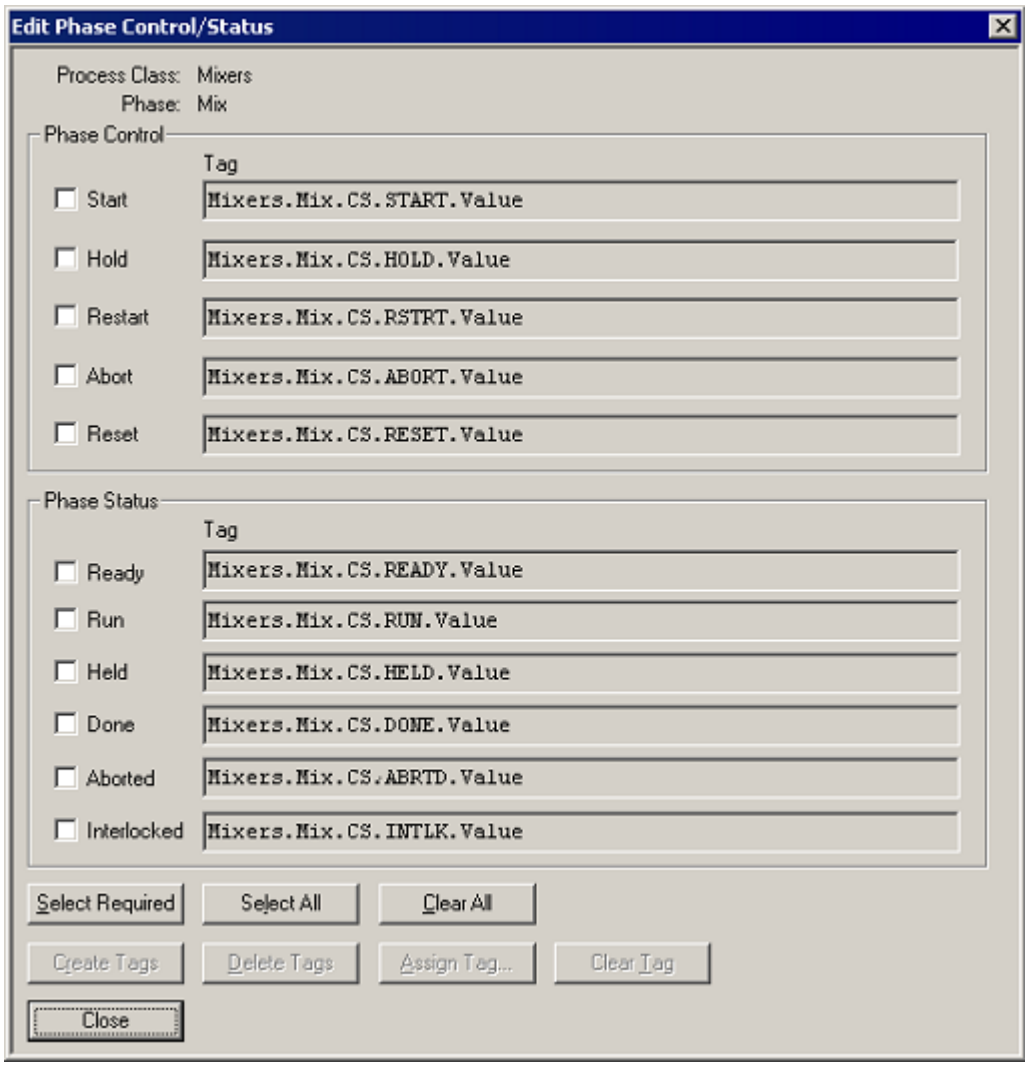
To create phase control and status tags

1. With the **Processes** tab active, select **Mixers** from the list of **Process Classes**.
2. Click **Phases**.The **Edit Phases** dialog box opens.



3. From the **Phases** list, select **Mix**.
4. Click **Phase Control/Status**. The **Edit Phase Control/Status** dialog box appears.
5. Click **Select All**.

6. Click **Create Tags**. All tags needed to control and monitor the status of the Mix phase are created.



7. Click **Close**.

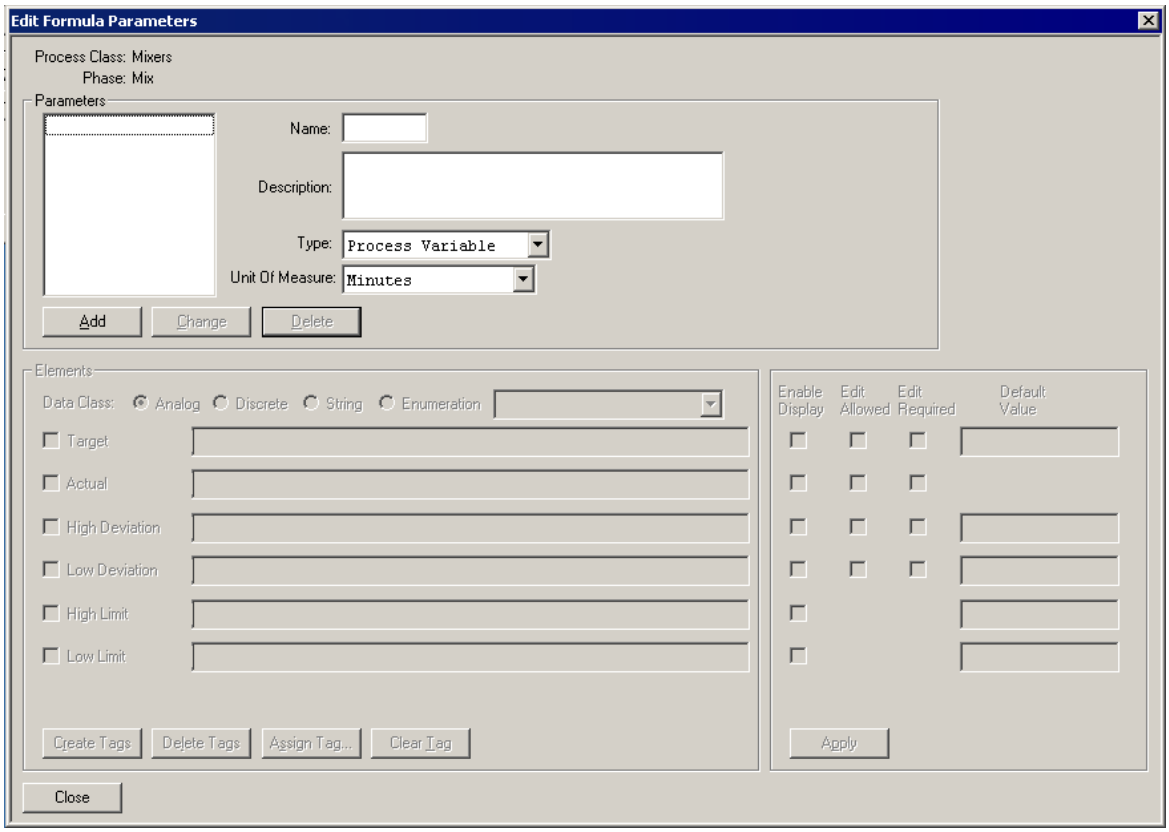
Defining Formula Parameters

Formula parameters are used to provide phases with information that they need to do their job. Parameter values are defined in the recipe and written to the control system when the phase is processed. The recipe procedure determines when each phase is processed.

To define formula parameters

1. With the **Edit Phases** dialog box active, select **Mix**.

2. Click the **Formula Parameters** button. The **Edit Formula Parameters** dialog box appears.



3. In the **Name** box, type **Speed**.
4. From the **Type** list, select **Process Variable**.
5. From the **Unit of Measure** list, select **Percent**.
6. Click **Add**.
7. Follow steps 1 through 6 to add the information in the following table. Notice that the type for the ManAdd phase is Input.

Phase	Name	Type	Unit of Measure
Mix	Time	Process Variable	Minutes
ManAdd	Qty	Input	Not applicable

Configuring Mix Formula Parameters

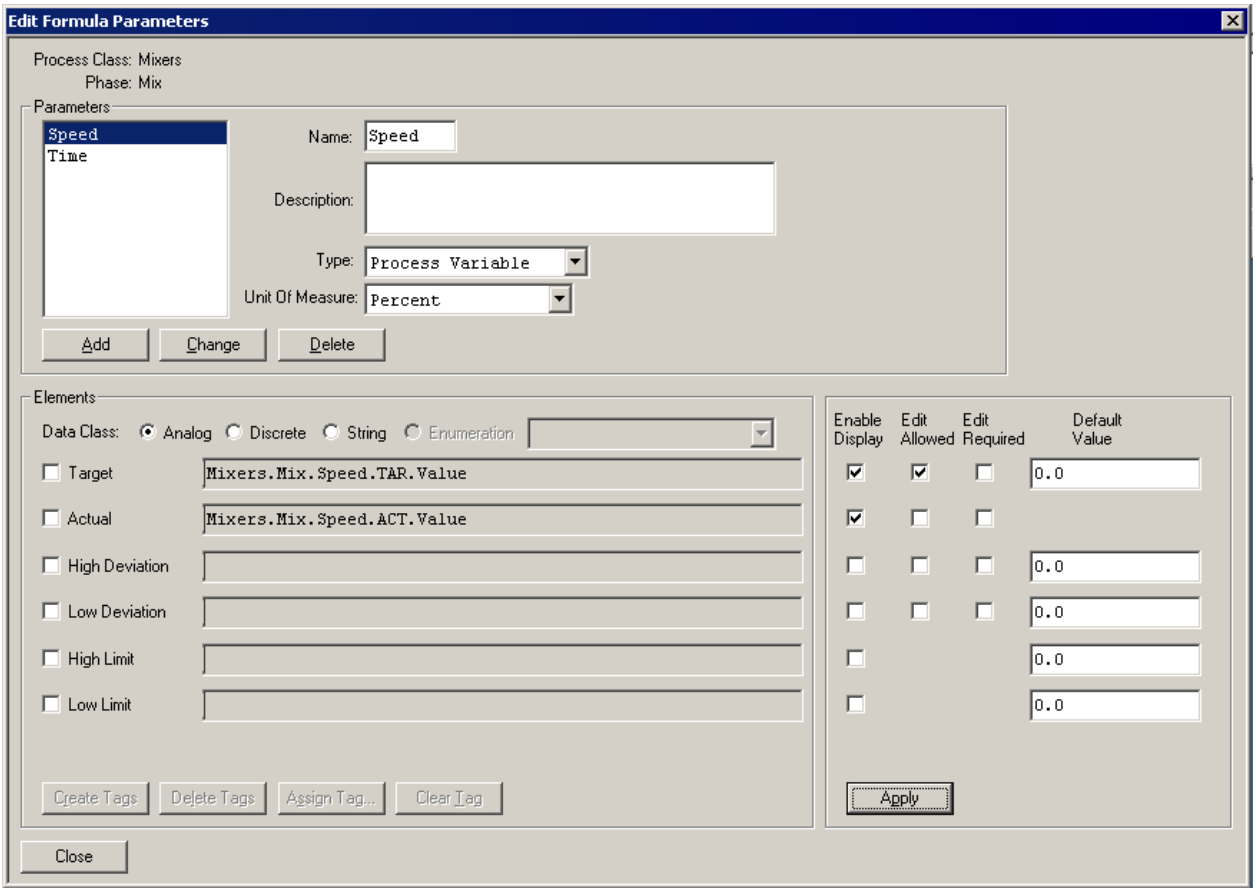
After you have created mix formula parameters, you must configure both Mix formula parameters.

To configure mix formula parameters

1. In the **Edit Phases** dialog box, select the Mix phase.
2. Click the **Formula Parameters** button.
3. In the **Formula Parameters** dialog box, select the **Speed** parameter.

4. In the **Elements** area, select the **Target** and **Actual** check boxes.
5. Click **Create Tags**.
6. For the **Target** element, select the **Edit Allowed** check box.
7. For the **Actual** element, select the **Enable Display** check box.
8. Click **Apply**.
9. Repeat steps 4 through 8 for the Time parameter.

   The following image shows completed instructions for the Speed parameter.



Configuring the ManAdd Formula Parameter

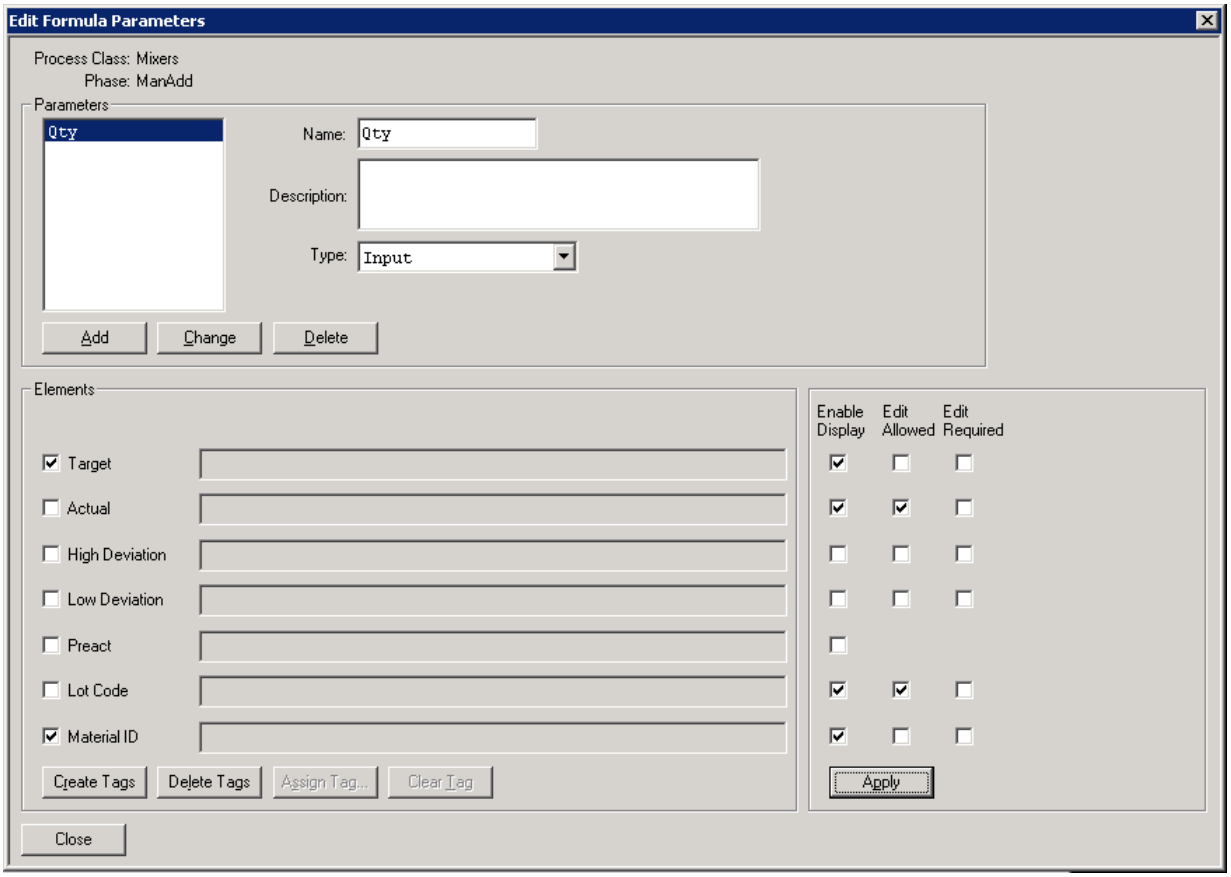
The next step is to configure the ManAdd formula parameter.

To configure the ManAdd formula parameter

1. In the **Edit Phases** dialog box, select the ManAdd phase.
2. Click the **Formula Parameters** button.
3. In the **Formula Parameters** dialog box, select the **Qty** parameter.
4. In the **Elements** area, select the **Target** and **Material ID check** boxes.
5. For the **Target** and **Material ID** elements, select the **Enable Display** check box.
6. For the **Actual** and **Lot Code** elements, select the **Edit Required** check box.
7. Click **Apply**.

Note: You do not have to create tags for the ManAdd phase.

The following image shows completed instructions for the Qty parameter.



Defining Transfer Classes

A transfer class is a group of one or more connections that perform the same functions. Within a transfer class, all the source units are in the same process class and all the destination units are in the same process class. The source and destination process classes can be the same.

To define transfer classes

1. Select the **Transfers** tab.
2. Create the transfer class names shown in the following table.

Transfer Class Name	Source Process	Destination Process
Bulk_Mix	BulkTks	Mixers
Mix_Hold	Mixers	HoldTks

3. Select the Bulk_Mix transfer class.
4. On the lower area of the dialog box, click **Assign Connections**.

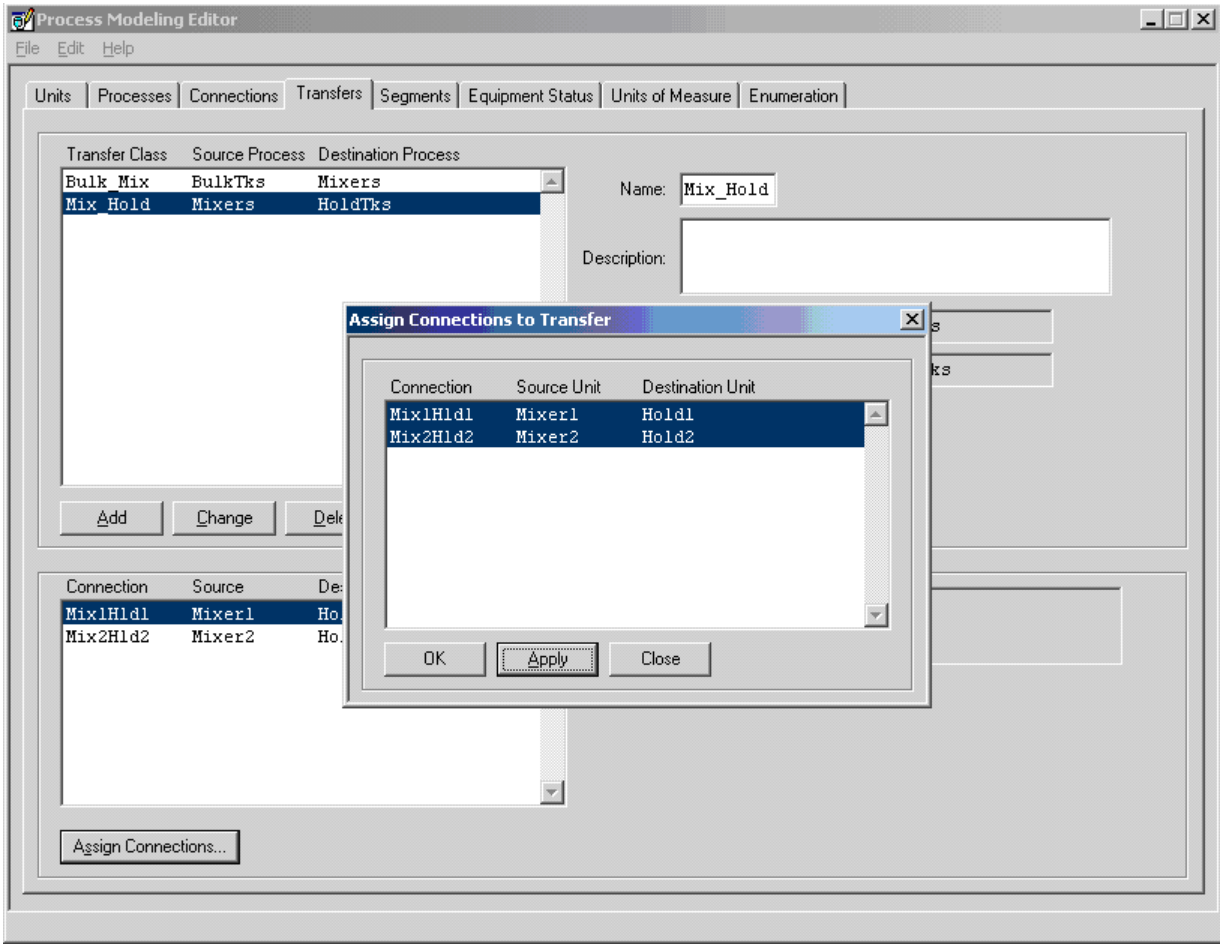
The **Assign Connections to Transfer** dialog box appears.

5. Select all the items in the dialog box and click **OK**.
6. Select the Mix_Hold transfer class.
7. Repeat steps 2 through 4.

The following table summarizes the transfer class names and their assigned connections.

Transfer Class Name	Assigned Connections
Bulk_Mix	Blk1Mix1, Blk1Mix2, Blk2Mix1, Blk2Mix2
Mix_Hold	Mix1Hld1, Mix2Hld2

The following figure shows the result of assigning connections to the Mix_Hold Transfer Class.



Defining Transfer Phases

Each transfer class should have at least one transfer phase defined. The phase is responsible for moving material from a source unit to a destination unit.

To define transfer phases

1. With the **Transfers** tab active, select the **Bulk_Mix** transfer class.

2. Click **Phases**.

   The **Edit Phases** dialog box appears.
3. In the **Name** box, type **BulkAdd**.
4. Accept the Automatic **Phase Type**.
5. In the **Save History** area, select the **Control/Status Activity** and **Parameter Status** check boxes.

   If you do not select these check boxes, phase events and parameters are not stored in the history database.
6. Click **Add**.
7. Repeat steps 2 through 6 for the **Mix_Hold** transfer phase, but type Transfer in the **Name** box.
8. Click **Close**.

Note: You must click the **Change** button following any phase modifications.

Creating Phase Control and Status Tags

As previously discussed for Process Phases, all automatic phases require control and status tags. These are the tags that are ultimately be linked to the control system memory and register addresses.

To create phase control and status tags

1. Select the Bulk_Mix Transfer Class.
2. Click **Phases**.

   The **Edit Phases** dialog box appears.
3. Click **Phase Control/Status**.

   The **Edit Phase Control/Status** dialog appears.
4. Click **Select All** and then click **Create Tags**.

   All tags needed to control and monitor the status of the Mix phase are automatically created.
5. Click **Close**.
6. Select the Mix_Hold transfer class.
7. Repeat steps 2 through 5.

Defining Formula Parameters

For each transfer class, you must define formula parameters.

To define formula parameters

1. Select the Bulk_Mix transfer class.
2. Click **Phases**.

   The **Edit Phases** dialog box opens.
3. Click **Formula Parameters**.

   The **Edit Formula Parameters** dialog box appears.
4. In the **Name** box, type **Qty_Kgs**.
5. From the **Type** list, select **Input**.
6. Click **Add**.

7. In the **Elements** area, select the **Target** and **Actual** check boxes.
8. Click **Create Tags**.
9. For the **Target** element, select the **Edit Allowed** check box.
10. For the **Actual** element, select the **Enable Display** check box.
11. For the **Material ID** element, select the **Enable Display** check box.
12. Click **Apply**.
13. Click **Close**.
14. On the **Edit Formula Parameters** dialog box, click **Close**.
15. Select the Mix_Hold transfer class.
16. Repeat steps 2 through 14, however, select **Output** from the **Type** list.

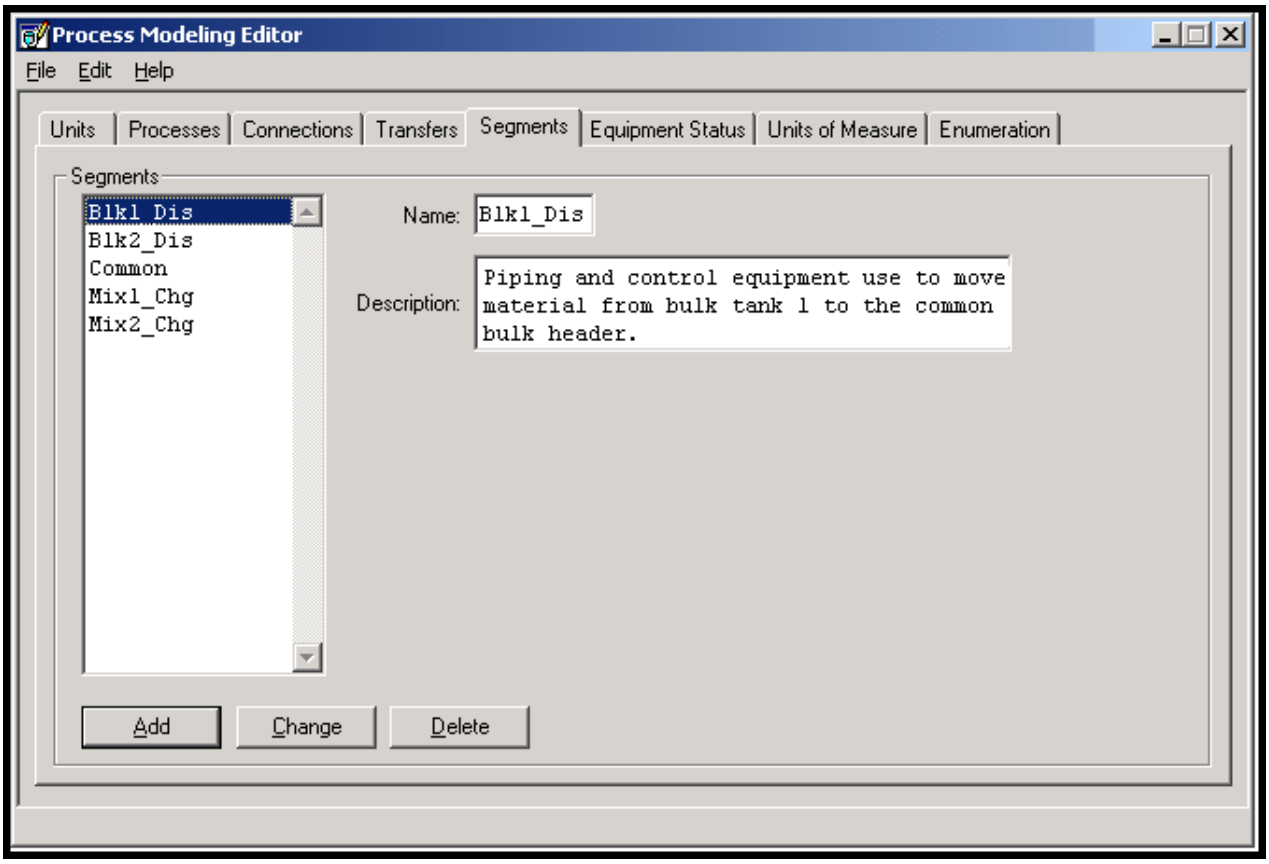
Defining Segments

A segment is a subsection (part of a connection). Segments are the lowest equipment entities that are managed by Batch Management. When a transfer is processed, the segments that make up a connection are allocated to a batch. This action prevents other transfers from using the same segments associated with their connection and enables the batch engine to provide automatic process interlocking.

To define segments

1. Click the **Segments** tab.
2. In the **Name** box, type the following segment name: Blk1_Dis.
3. Click **Add**.
4. Repeat the process for the following segment names:
   - Blk2_Dis
   - Common
   - Mix1_Chg
   - Mix2_Chg

The following figure shows the completed tabbed dialog box.



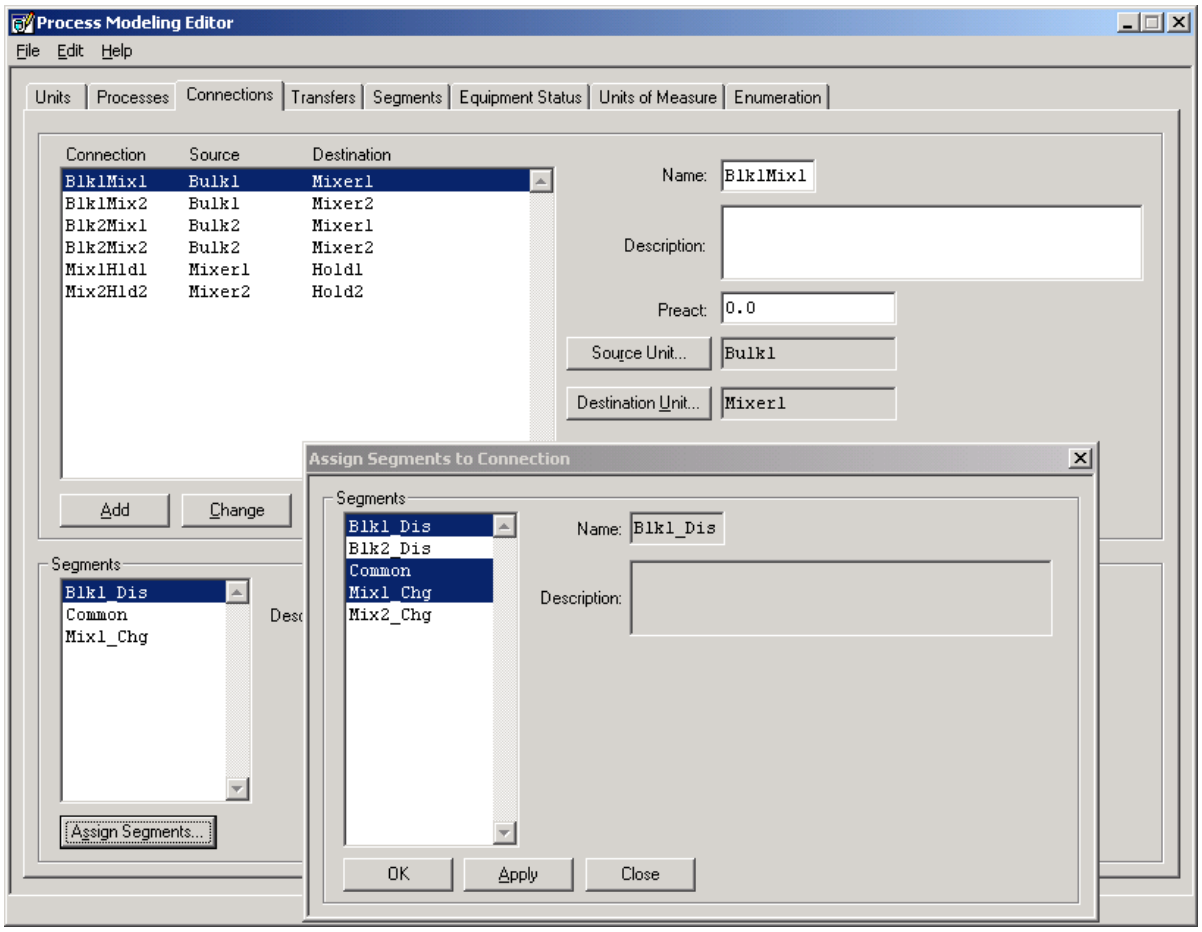
Assigning Segments to Connections

After defining segments, you must assign them to connections.

To assign each segments to a connection

1. Select the **Connections** tab.
2. Select following connection: Blk1Mix1.
3. On the **Segments** area, click **Assign Segments**.

The **Assign Segments to Connection** dialog appears.



4. From the **Segments** list, select the following segments and click **Apply**:
   - Blk1_Dis
   - Common
   - Mix1_Chg
5. Repeat this process for each connection name in the following table.

Connection Name	Segments
Blk1Mix2	Blk1_Dis, Common, Mix2_Chg
Blk2Mix1	Blk2_Dis, Common, Mix1_Chg
Blk2Mix2	Blk2_Dis, Common, Mix2_Chg

The above figure shows completed dialog boxes for Blk1Mix1.

Defining Equipment Status

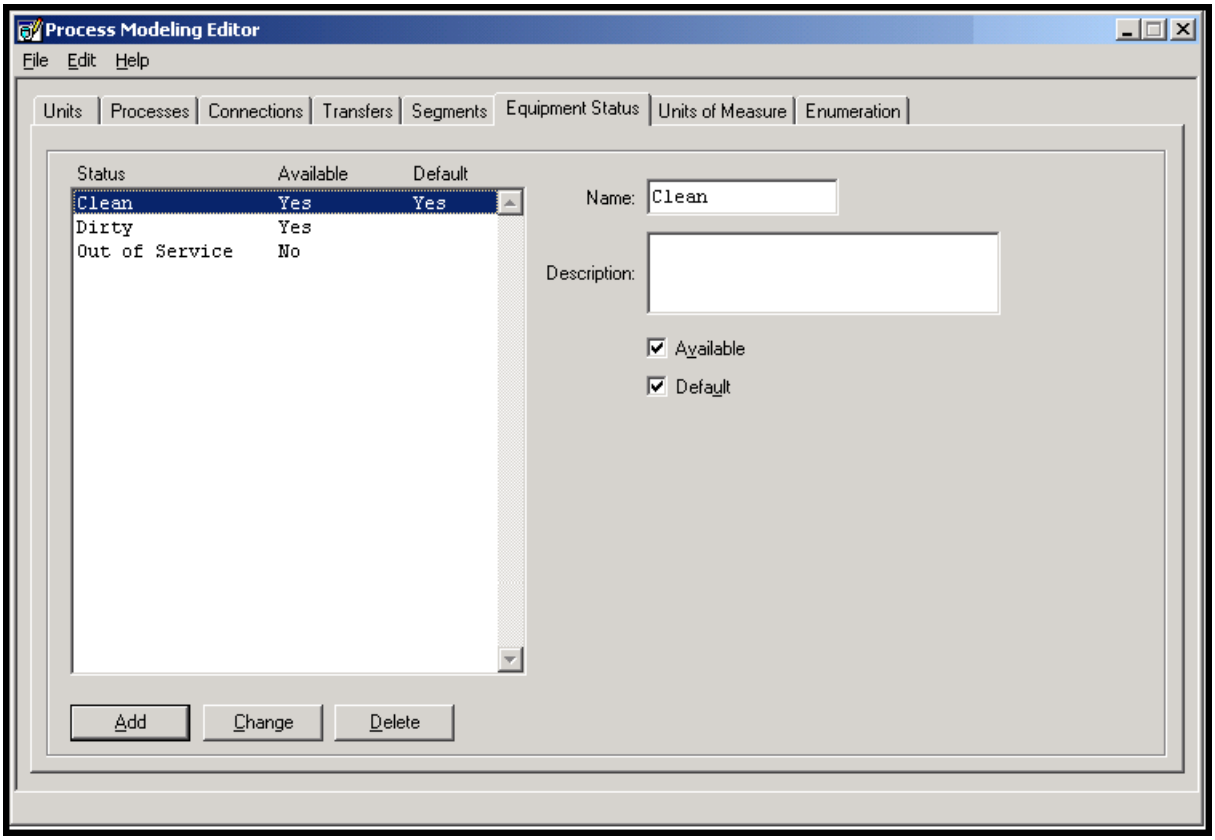
Equipment statuses apply to all units and segments in the system. The status of a unit or segment is evaluated before it is allocated to a batch. The equipment status must be Available before it can be allocated.

To define equipment status

1. Click the **Equipment Status** tab.
2. In the **Name** box, type Clean.
3. Select the **Available** and **Default** check boxes.
4. Click **Add**.
5. Repeat the process for the items in the following table.

Name	Available Check Box Status	Default Check Box Status
Dirty	Selected	Cleared
Out of Service	Cleared	Cleared

The following figure shows a summary of entries.



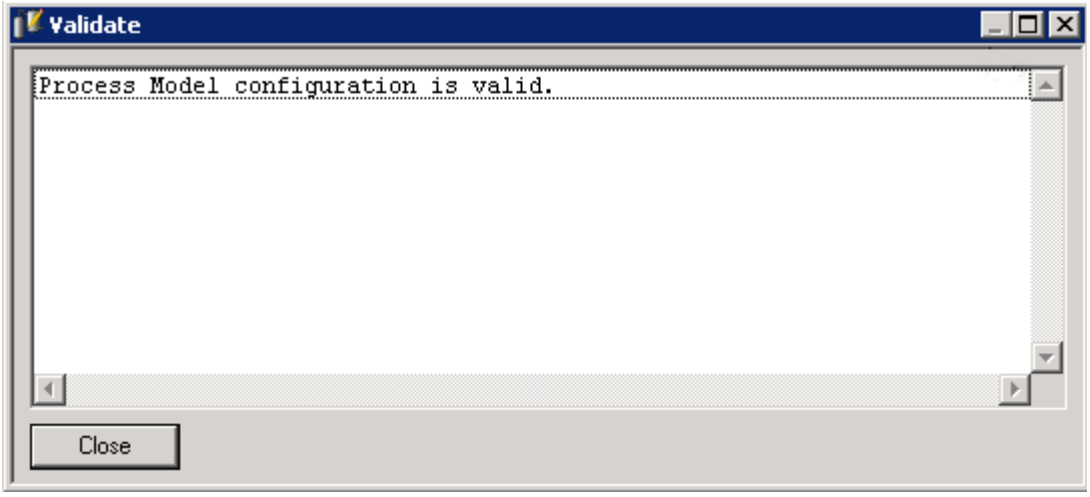
Validating the Model

After you have created the process model, you must validate it.

To validate the model

1. On the **Process Modeling Editor** dialog box, click **File > Validate** to check for modeling errors.

The following message appears if your model is valid.



2. If any discrepancies are reported, you must correct them and repeat the validation process.
3. Close the Process Model editor.

Updating the Runtime Databases

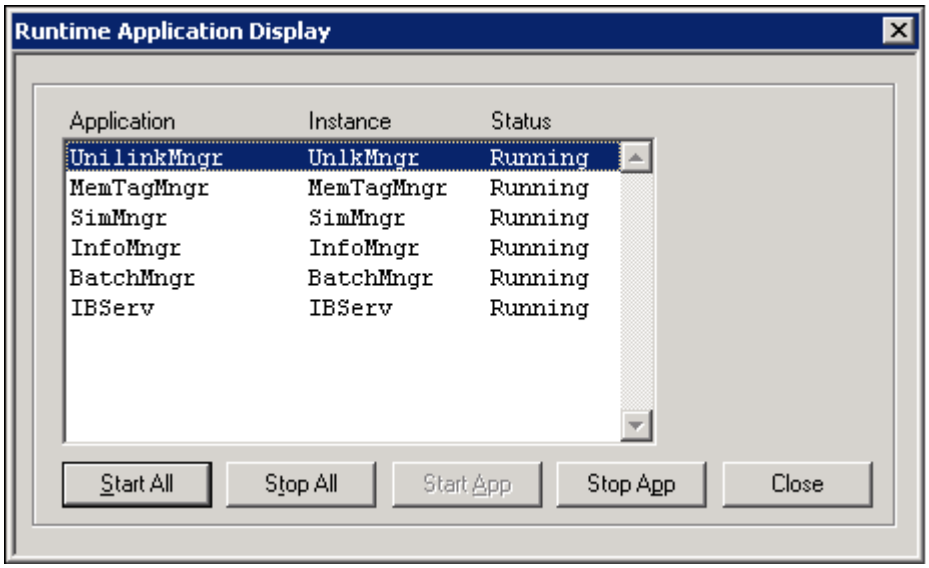
The Batch Management Environment system enables you to make offline changes to the process model and link databases.

To copy the contents of the process model and link configuration databases to the corresponding run-time databases, perform the following steps:

To update the run-time database

1. On the **Environment Display**, click **Runtime**.

   The **Runtime Application Display** dialog box appears.

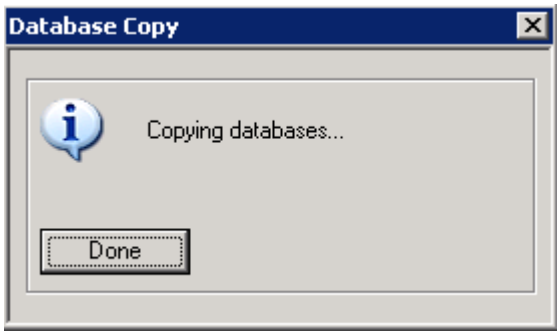


2. Click **Stop All** and wait for the **Status** to change to Stopped.
3. Click **Close**.
4. On the **Environment Display** menu, click **Update > Runtime.**

If you do not perform this action, the run-time system does not recognize the latest changes.

Note: This option is not permitted in a running system.

5. In the **Environment Display** dialog box, click **Yes**.
6. In the **Database Copy** dialog box, click **Done**.



7. Open the **Runtime Application Display** dialog box.
8. Click **Start All**.
9. When all services have a **Status** of Running, click **Close**.

Defining the Process Trains

After you define the process model, you must define the process trains. Process trains are lines of production that are assigned to scheduled batches. A train can contain one or more units, and a unit can be part of multiple trains.

To define process trains

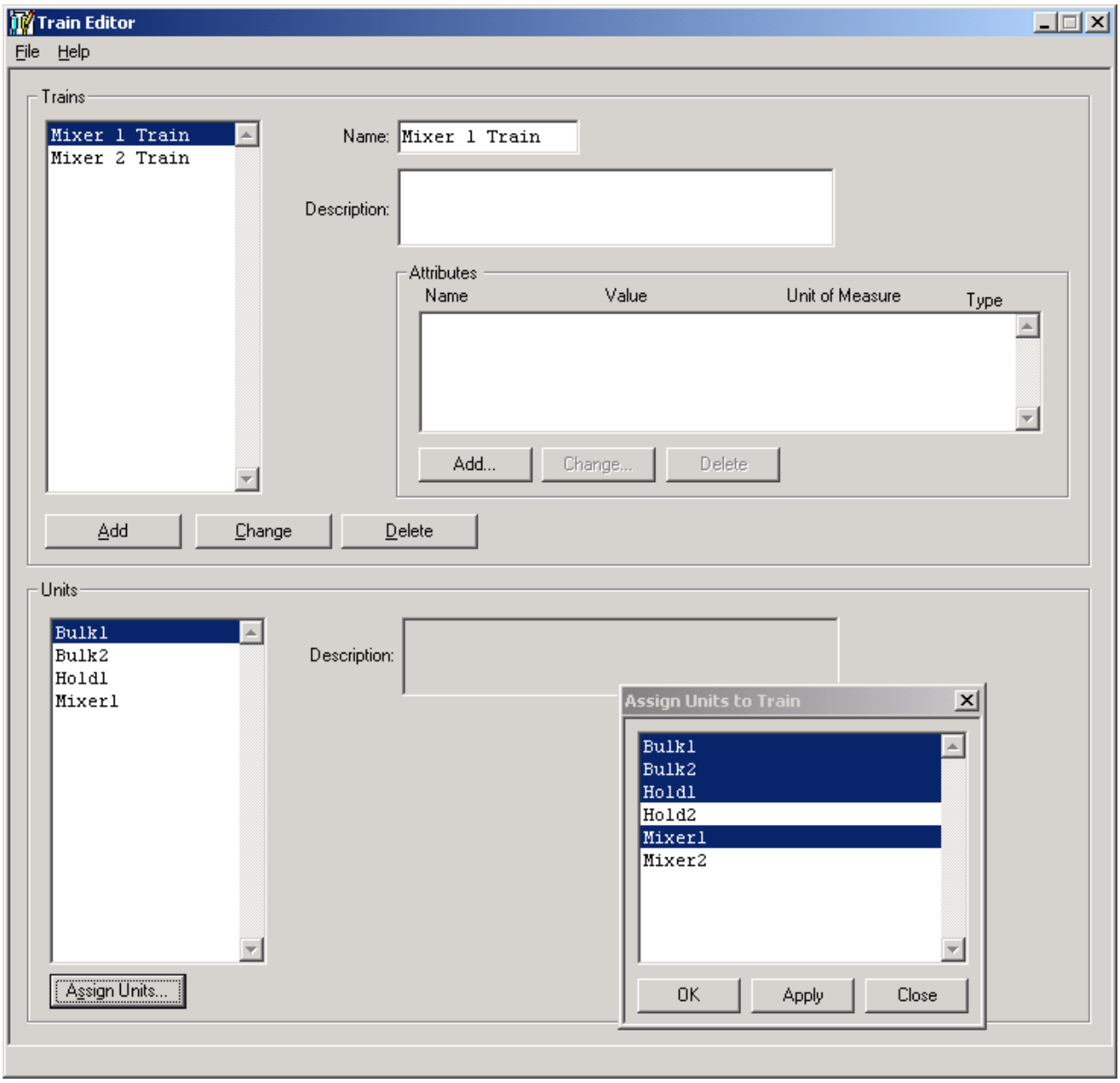
1. On the **Environment Display** dialog box, double-click the **TrainEdit** icon.

   The **Train Editor** dialog box appears.
2. In the **Name** box, type the first train name shown in the table that follows.
3. Click **Add**.
4. On the **Units** area, click **Assign Units**.

   The **Assign Units to Train** dialog box appears.
5. Select the appropriate Assigned Units shown in the table that follows.
6. Click **Apply** or **OK** as appropriate. Remember that **Apply** does not close the dialog box.
7. Close the dialog box.

Train Name	Assigned Units
Mixer 1 Train	Bulk1, Bulk2, Hold1, Mixer1
Mixer 2 Train	Bulk1, Bulk2, Hold2, Mixer2

The following image shows an example of the entries for Mixer 1 Train.



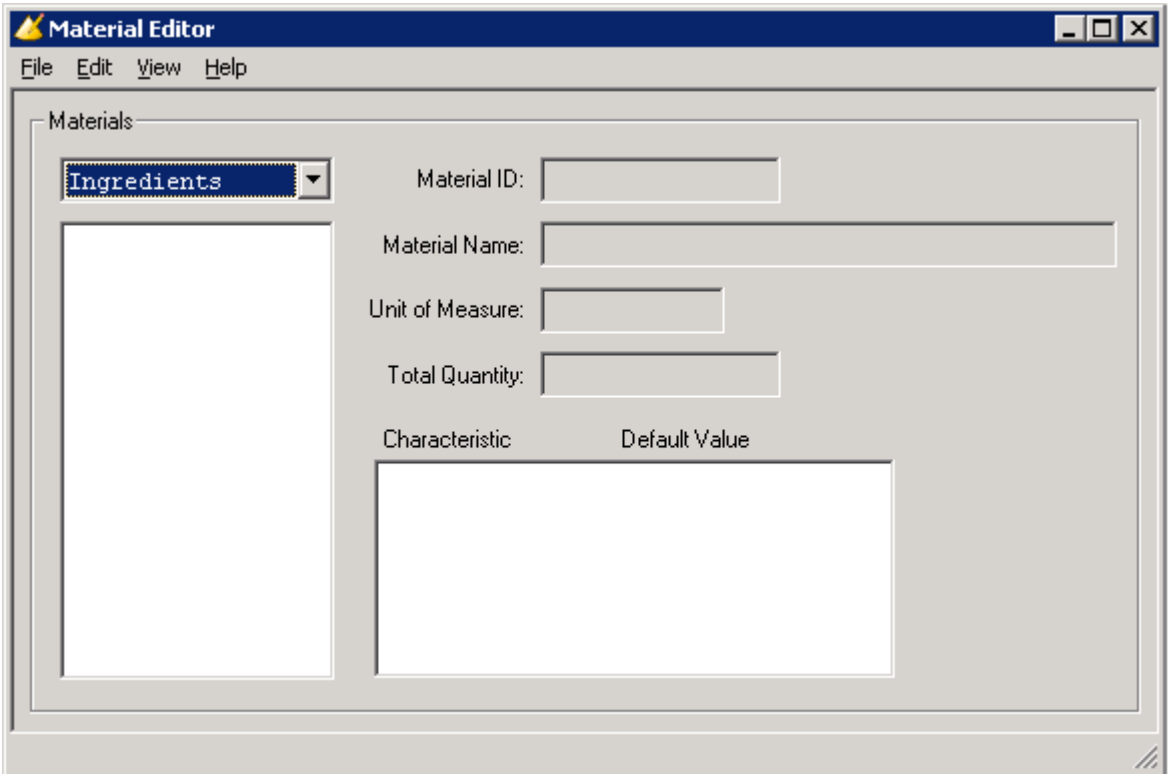
Defining the Materials and Material Locations

After you have created the model and defined the process trains, you must define materials and their locations. You do this through the Material Editor dialog box.

To open the Material Editor dialog box

- Double-click the **MtlEdit** icon on the **Environment Display** dialog box.

The **Material Editor** dialog box appears.



Defining Materials

First, define the materials used in the breading process.

To define materials

1. On the **Material Editor** dialog box, click **Edit > Materials Editor**.

   The **Materials Editor** dialog box appears.

2. In the **Materials** area, define the following ingredients.

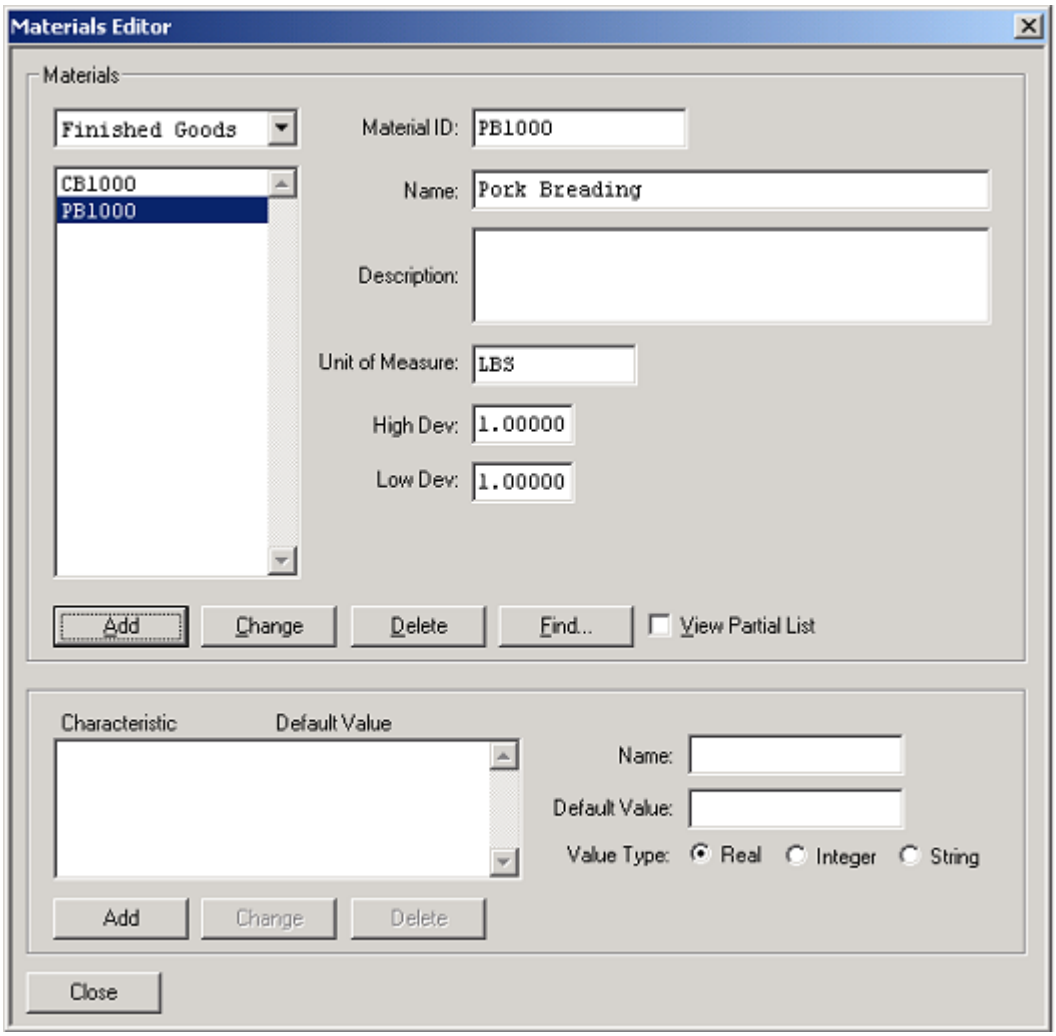
Material ID	Material Name	UOM	Hi Dev	Low Dev
Flour100	Pure White Flour	Kgs	1.0	1.0
Salt200	Pure Salt	Kgs	1.0	1.0
CS102	Chicken Spice	Kgs	1.0	1.0
PS102	Pork Spice	Kgs	1.0	1.0

3. In the **Materials** area, click the arrow for the list and select **Finished Goods**.
4. Define the following **Finished Goods**.

Material ID	Material Name	UOMS	Hi Dev	Low Dev
CB1000	Chicken Breading	Kgs	1.0	1.0
PB1000	Pork Breading	Kgs	1.0	1.0

5. Click **Close**.

The following figure shows the completed Finished Goods.



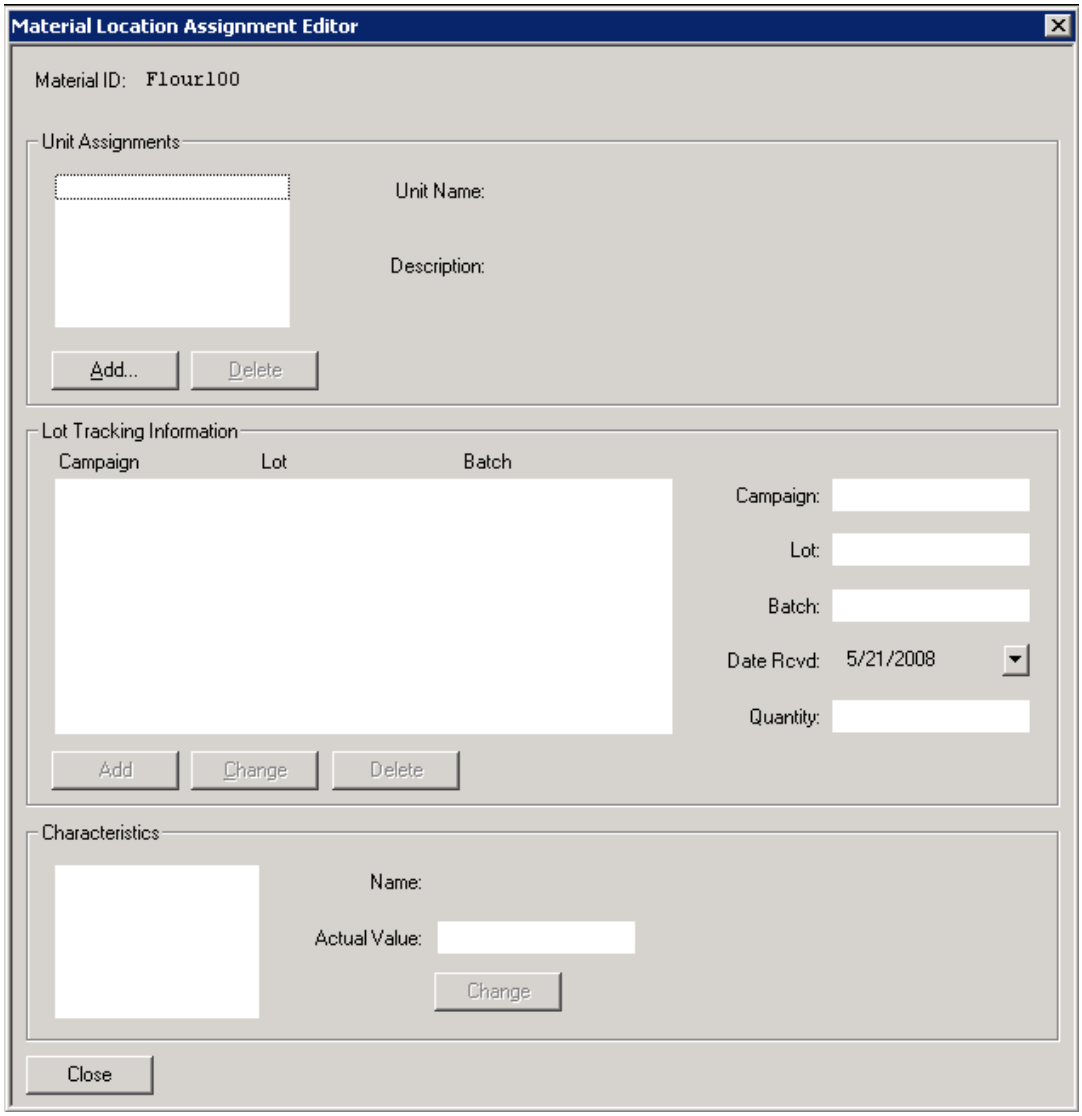
Defining Material Locations

After you have defined the materials, you must define their locations.

To define the material location for flour

1. On the **Materials Editor** dialog box, make sure that the **Ingredients** list is selected.
2. Select the ingredient named Flour100.

3. From the menu, click **Edit > Material Locations**. The **Material Location Assignment Editor** dialog box appears.



4. Click **Add**. The **Unit Selection** dialog box appears.
5. Select Bulk1 and click **Add**. Bulk1 appears in the **Unit Assignments** box.
6. In the **Lot Tracking Information** area, type the following information:
   - For **Lot**, type Flour Vendor 1.
   - For **Quantity**, type 50000 (no commas).
7. Click **Add** and then click **Close**.

To define the material location for salt

1. On the **Materials Editor** dialog box, make sure that the **Ingredients** list is selected.
2. Select the ingredient named Salt200.
3. From the menu, click **Edit > Material Locations**.
4. Click **Add**. The **Unit Selection** dialog box appears.
5. Select Bulk2 and click **Add**. Bulk2 appears in the **Unit Assignments** box.

6. In the **Lot Tracking Information** area, type the following information:
   - For **Lot**, type Salt Vendor 1.
   - For **Quantity**, type 30000 (no commas).
7. Click **Add** and then click **Close**.
8. Close the **Material Editor** dialog box.

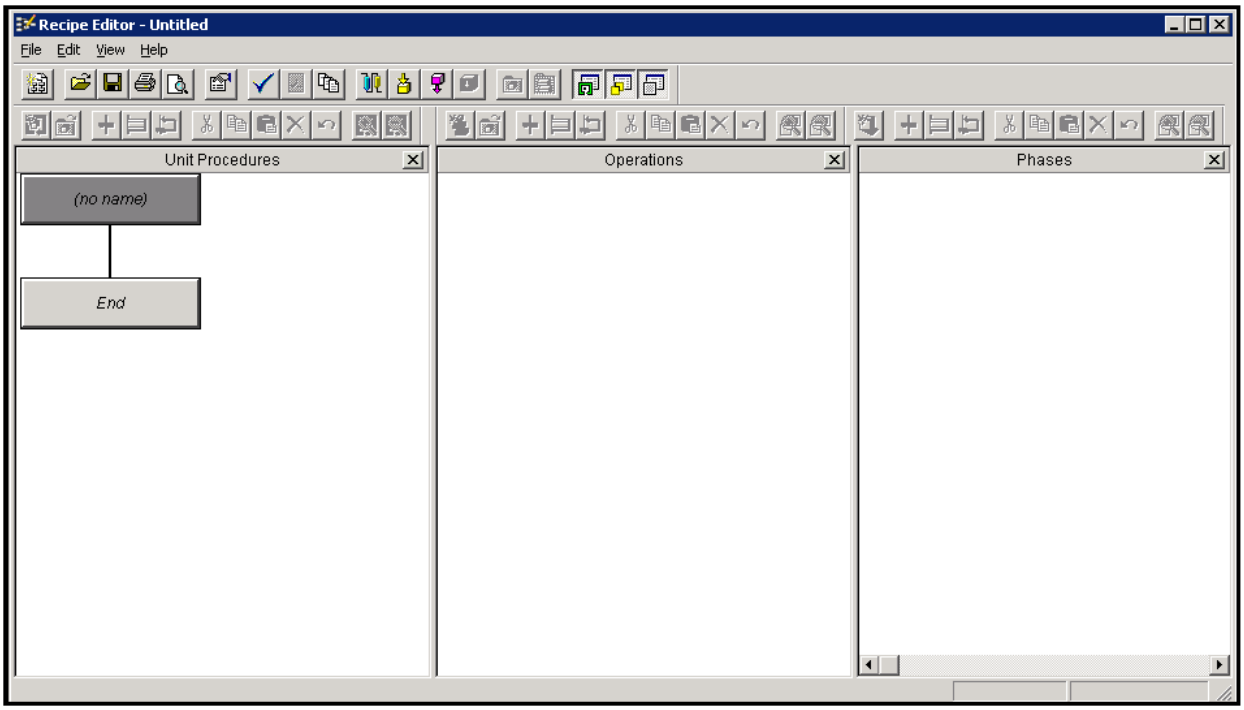
Building a Recipe

After you have defined the process, process trains, materials, and material locations, you are ready to build a recipe with the Recipe Editor.

To open the Recipe Editor

- On the **Environment Display** dialog box, double-click the **RecipeEdit** icon.

  The **Recipe Editor** dialog box appears.



Completing the Recipe Header

When you build a recipe, you must first enter information in the recipe header.

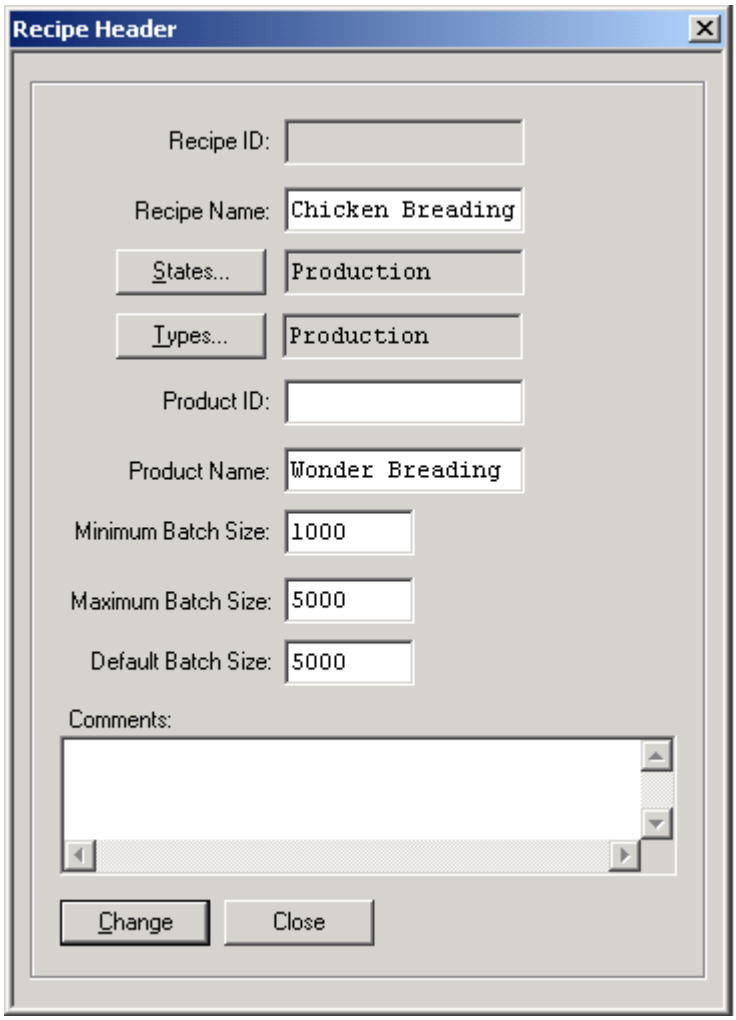
To enter information in the recipe header

1. On the **Recipe Editor** dialog box, select **Edit > Recipe Header**.

   You can also click the **Recipe Header** icon.

   The **Recipe Header** dialog box appears.

2. Enter the header information for the Chicken Breading recipe as shown in the following figure.



3. Click **Change**, and then click **Close**.

Defining Equipment Requirements

Use the following steps to define equipment requirements for your recipe.

To define equipment requirements

1. From the **Edit** menu, select **Equipment Requirements**.

   You can also click the **Equipment Requirements** icon.

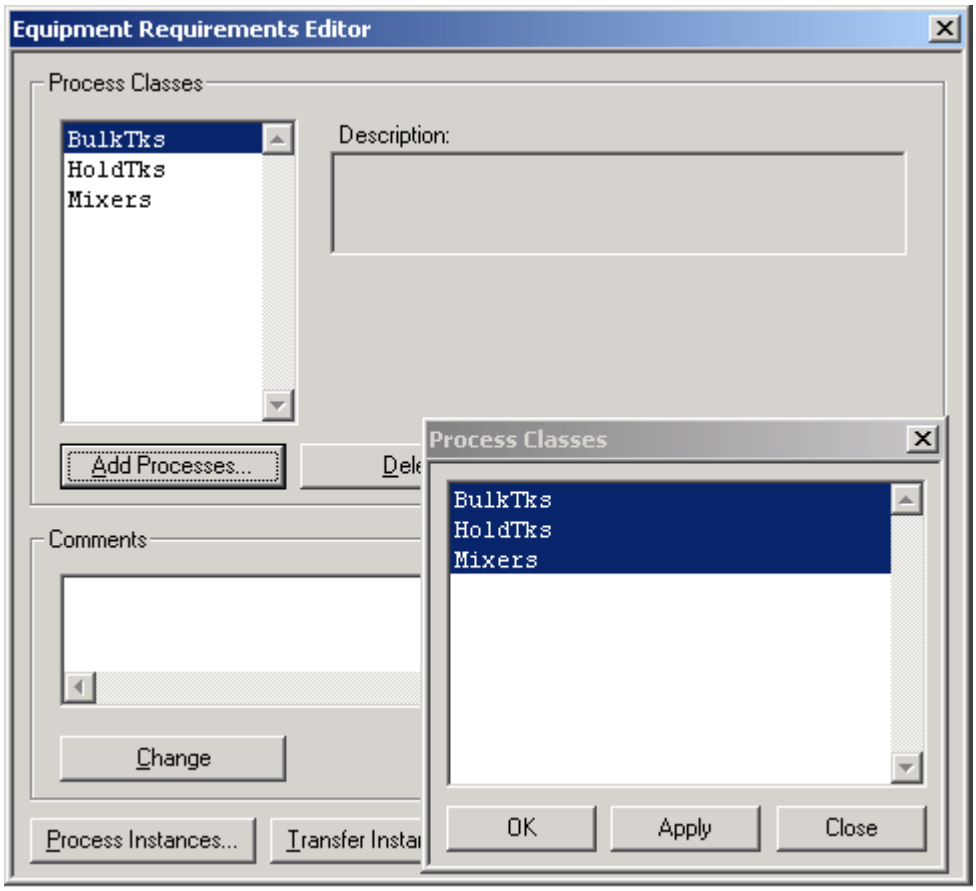
   The **Equipment Requirements Editor** dialog box appears.

2. Click **Add Processes.**

   The **Process Classes** dialog box appears.

3. Select all the items in the list and click **OK**.

The following figure shows the result of your actions.



4. Close the **Equipment Requirements Editor** dialog box.

Defining Formula Inputs

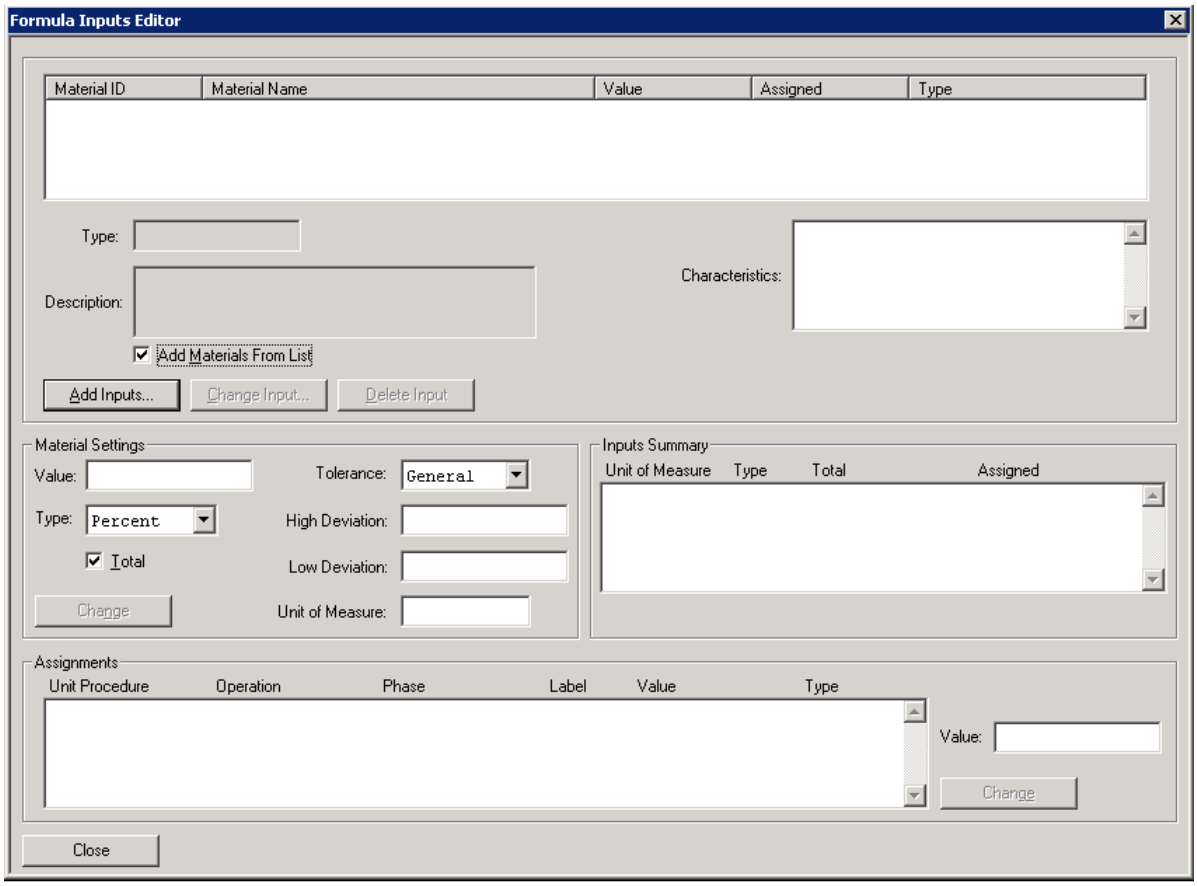
Use the following steps to define formula inputs for your recipe.

To define formula inputs

1. From the **Edit** menu, select **Formula Inputs**.

   You can also click the **Formula Inputs** icon.

The **Formula Inputs Editor** dialog box appears.



2. Click **Add Inputs.**

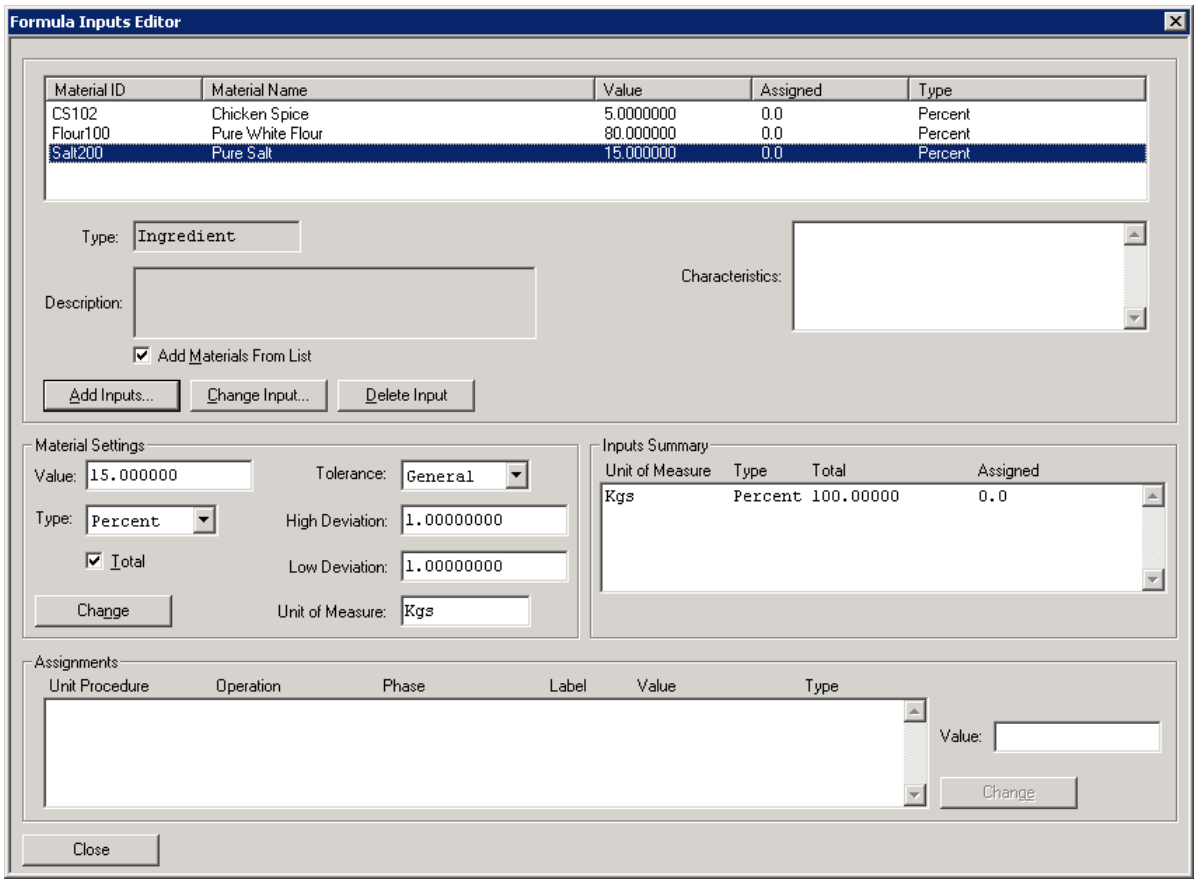
   The **Materials** dialog box appears.

3. Select the following items and click **OK**:
   - CS102
   - Flour100
   - Salt200

To define Material Settings

1. Select **Material ID** CS102.
2. For **Value**, type 5.
3. Click **Change**.
4. Select **Material ID** Flour100.
5. For **Value**, type 80.
6. Click **Change**.
7. Select **Material ID** Salt200.
8. For **Value**, type 15.
9. Click **Change**.

The following figure shows the completed dialog box.



10. Click **Close**.

Defining Formula Outputs

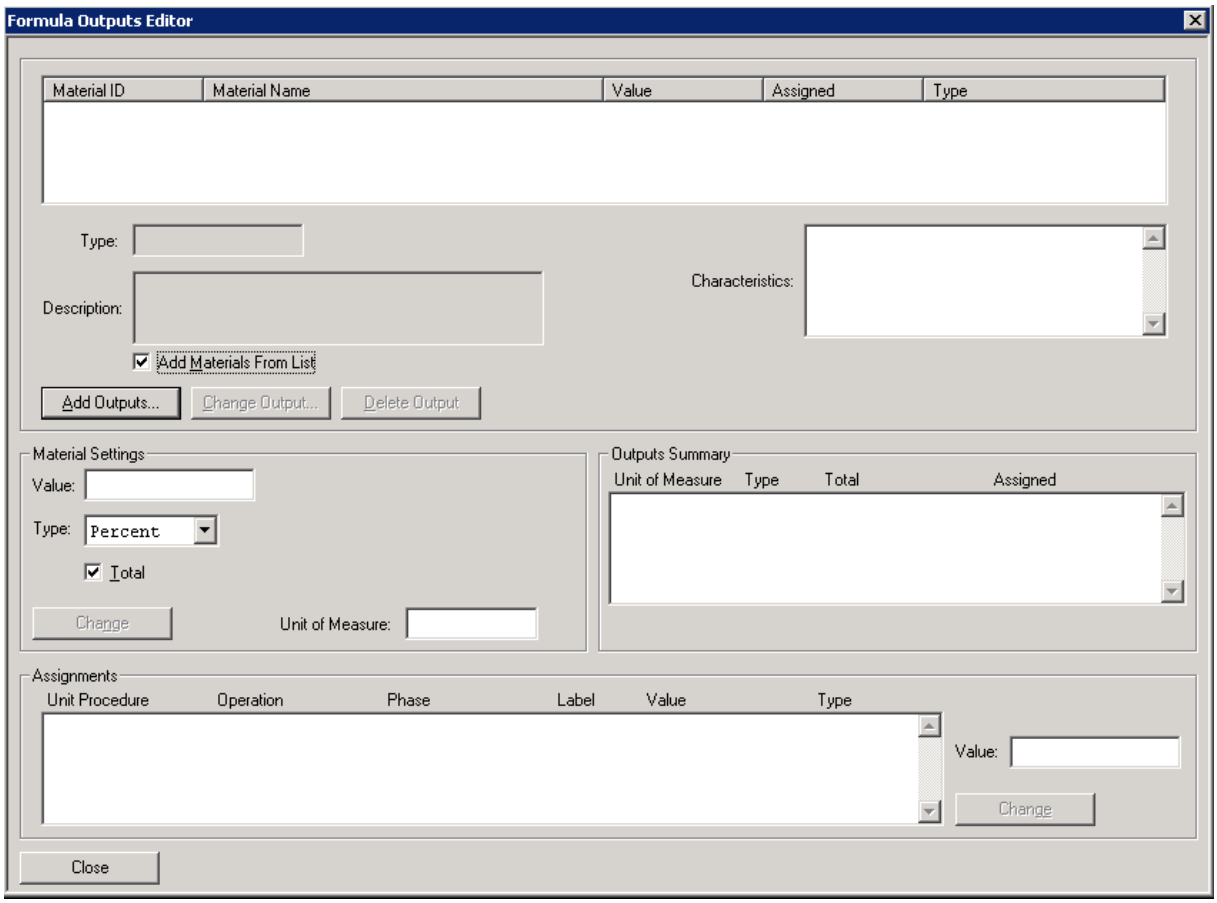
Use the following steps to define formula outputs for your recipe.

To define formula outputs

1. From the **Edit** menu, select **Formula Outputs**.

   You can also click the **Formula Outputs** icon.

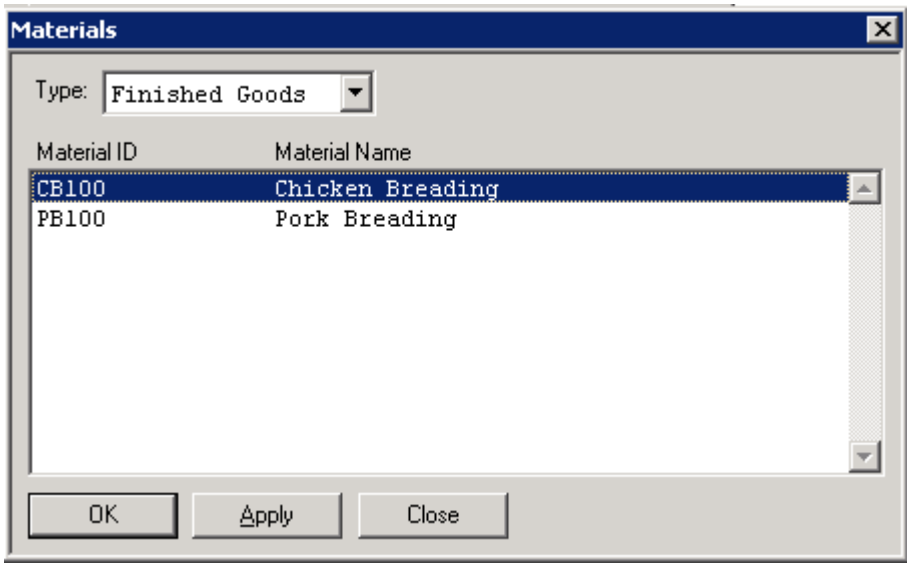
The **Formula Outputs Editor** dialog box appears.



2. Click **Add Outputs**.

   The **Materials Dialog** box appears.

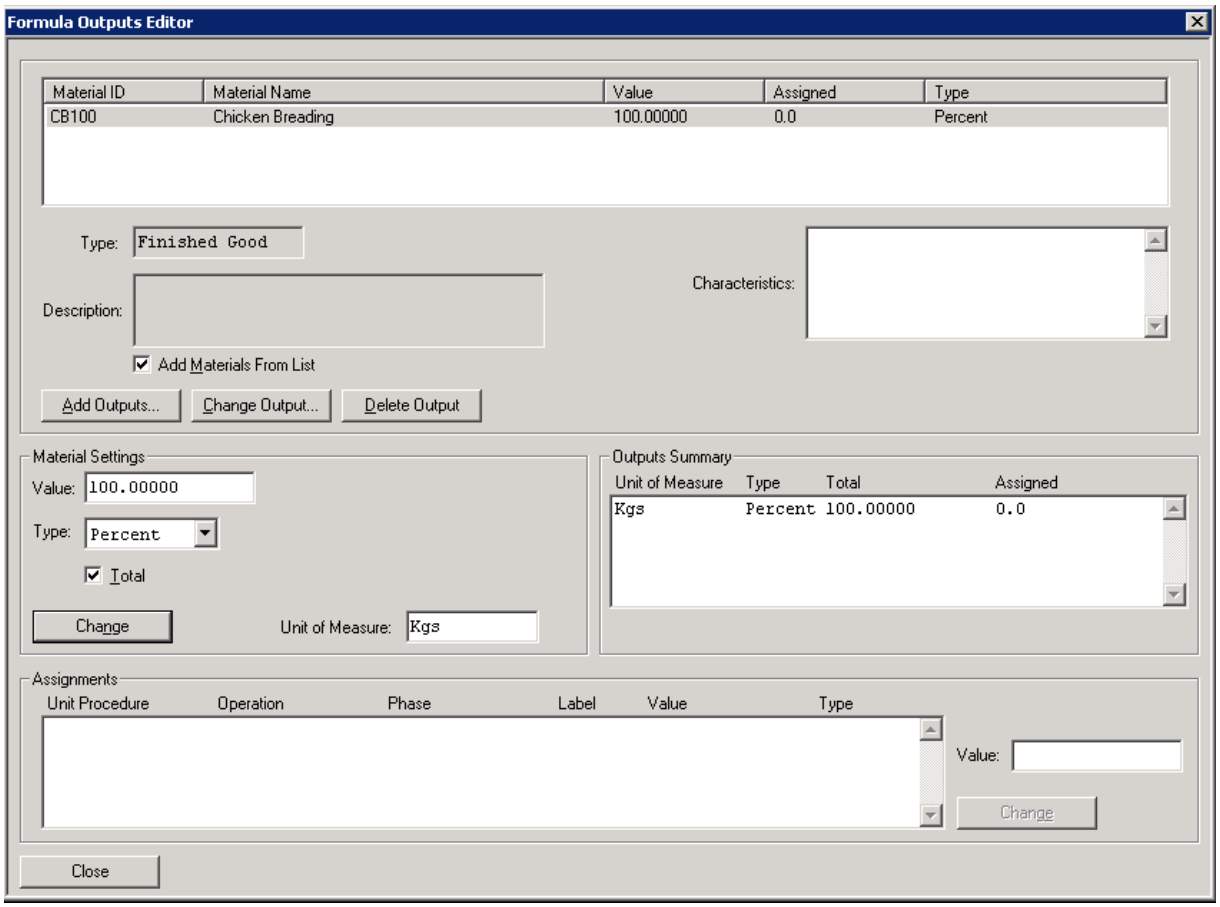
3. Click the list arrow and select Finished Goods.
4. From the list, select Chicken Breading and click **OK**.



5. In the **Material Settings** area, in the **Value** box, type 100.

6. Click **Change**.

   The following figure shows the completed dialog box.



7. Click **Close**.

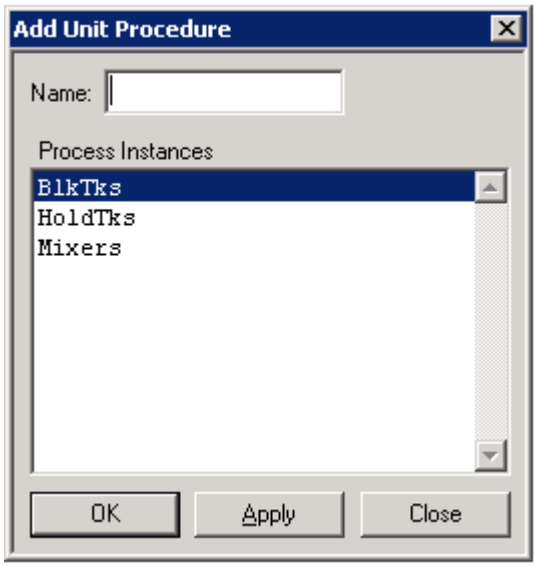
Constructing the Recipe Procedure

Construct the recipe procedure for the Chicken Breading product as shown on the following pages.

To add a unit procedure

1. From the **Unit Procedures** toolbar, click the **Add Unit Procedure** icon.

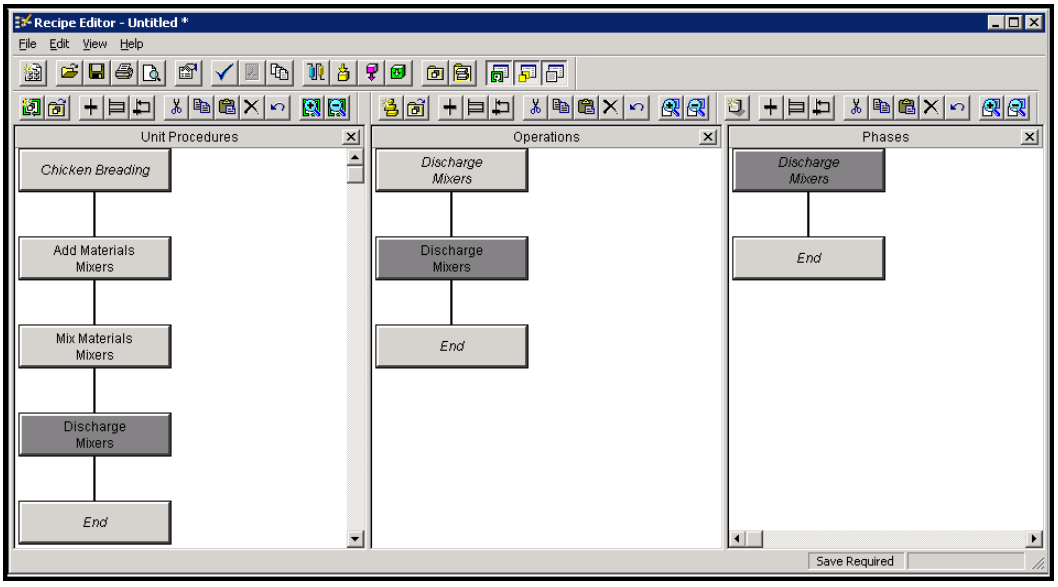
The **Add Unit Procedure** dialog box appears.



2. In the **Name** box, type Add Materials.
3. From the **Processes Instances** list, select Mixers.
4. Click **Apply**.
5. Repeat steps 2 through 4 for the unit procedures shown in the following table.

Unit Procedure Name	Process Instance
Mix Materials	Mixers
Discharge	Mixers

The following figure shows the completed process.



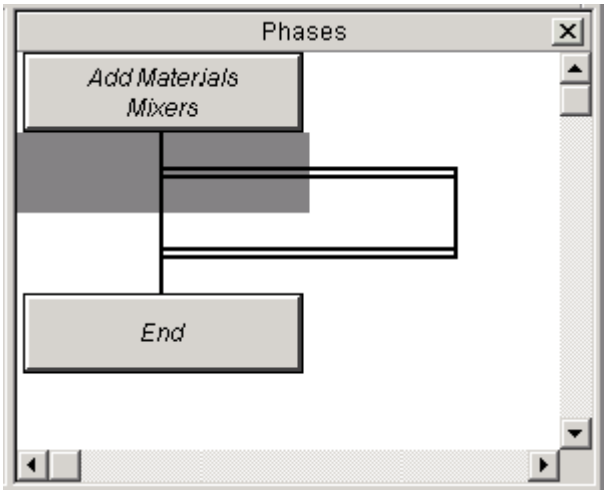
Add Materials Operation

The first step in the **Phases** pane is to add materials to the recipe.

To add the materials process phase

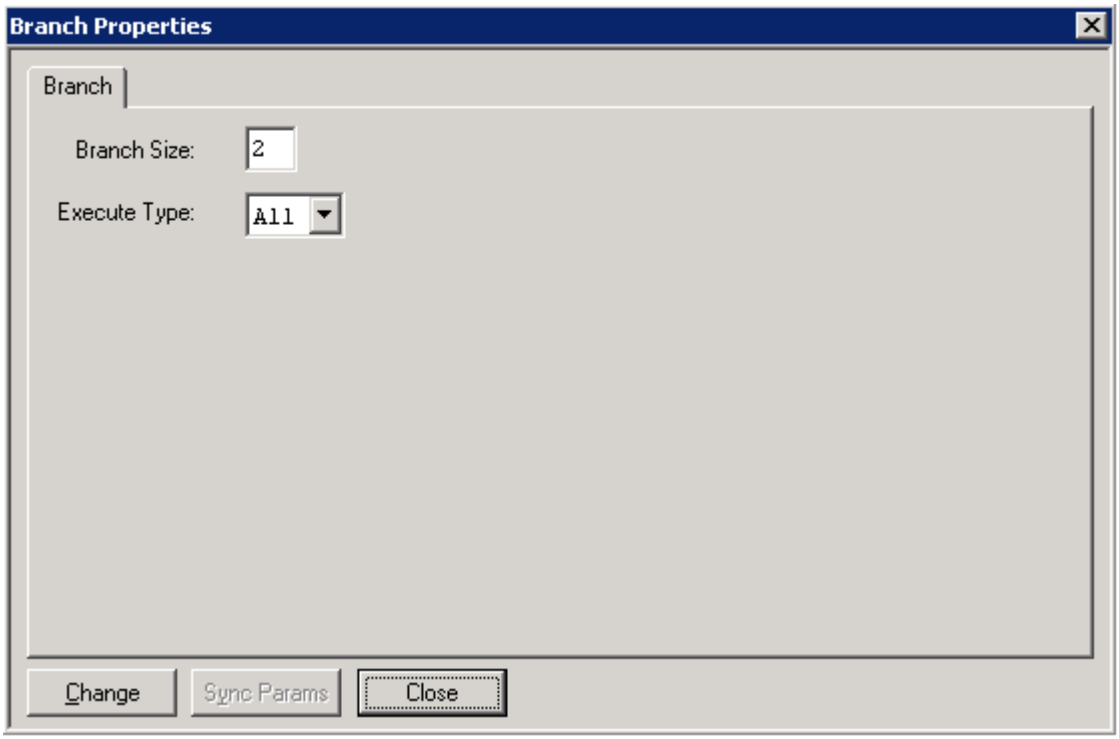
1. In the **Unit Procedures** pane, click the **Add Materials - Mixers** block.
2. From the **Phases** toolbar, click the **Add Phase Branch** icon.

   A phase branch appears in the **Phases** pane.



3. Double-click the gray area just below the **Add Materials Mixers** block.

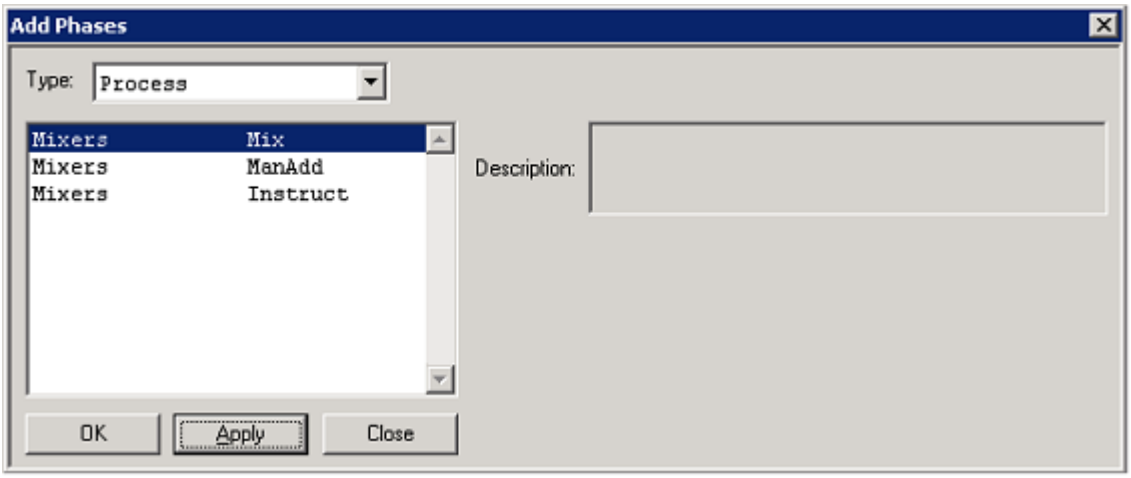
   The **Branch Properties** dialog box opens.



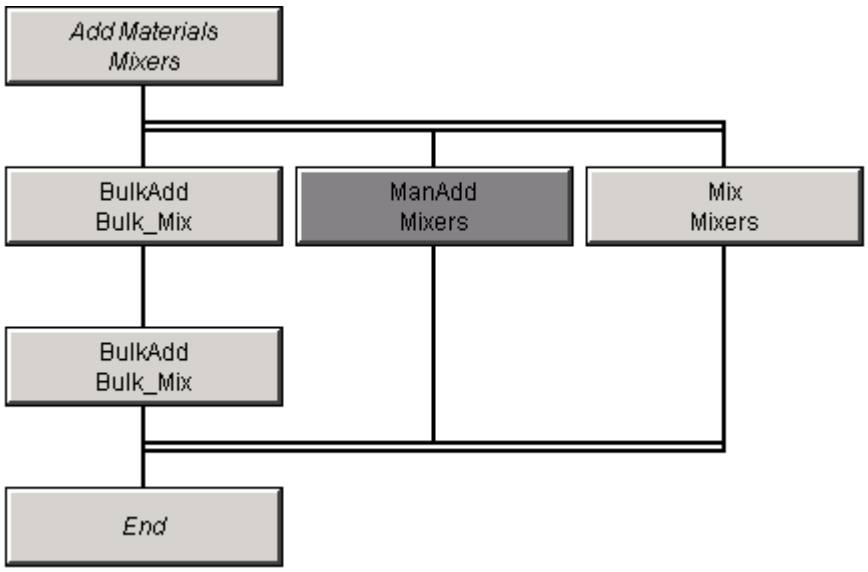
4. Change **Branch Size** to 3, accept the **Execute Type** of All.
5. Click **Change** and then click **Close**.

6. Click the **Add Phase** icon.

   The **Add Phases** dialog box appears.

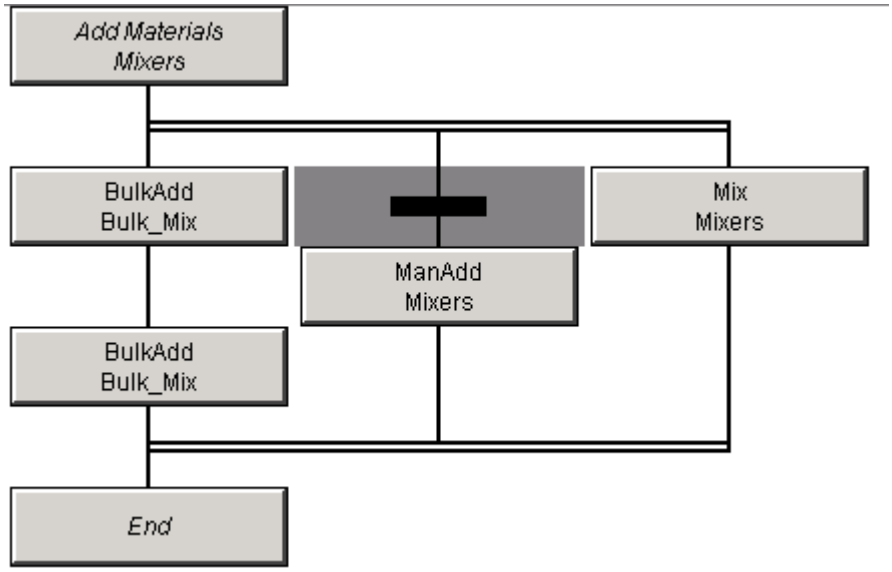


7. Select ManAdd and click **Apply**.
8. Select Mix and click **Apply**.
9. Change the **Type** to Transfer.
10. Select Bulk Mix and click **Apply**.
11. Select Bulk Mix again and click **OK**.
12. Drag the phase blocks so that they are in the positions indicated in the following figure.



13. Click the double line just above the **ManAdd Mixers** block.
14. Click the **Add Phase Transition** Icon.

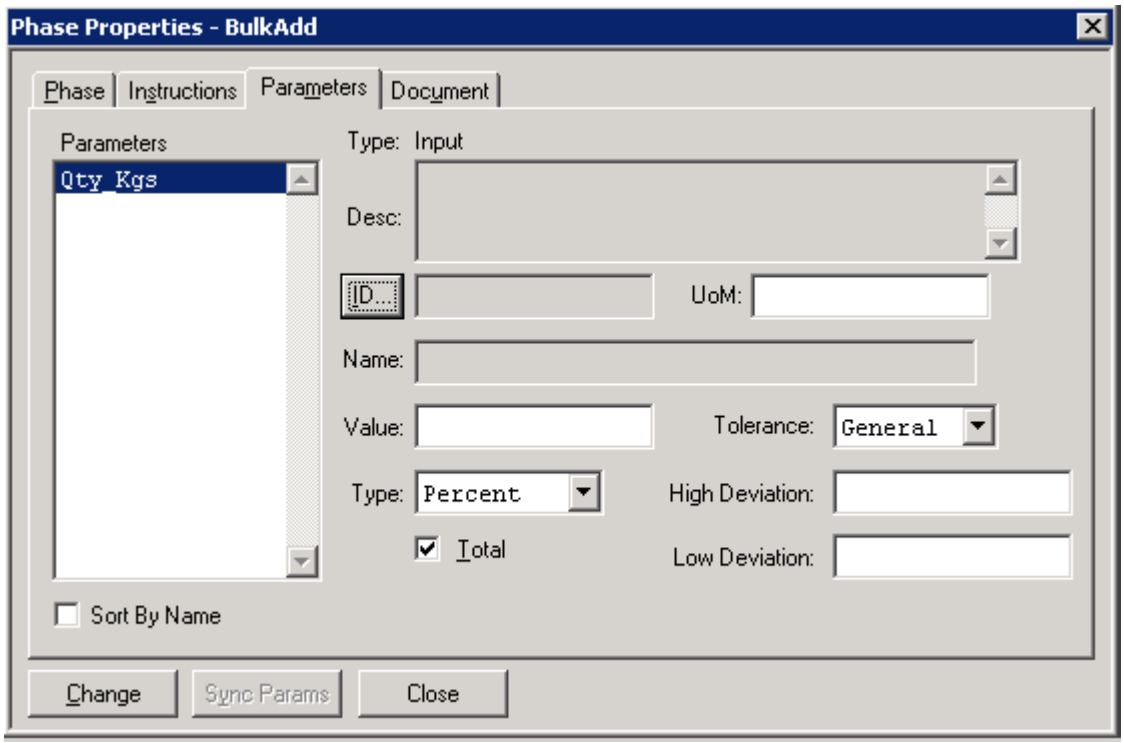
The following figure indicates how the **Add Phase Transition** indicator should appear in the phases diagram.



To configure the BulkAdd items

1. Double-click the first BulkAdd block.

   The **Phase Properties – BulkAdd** dialog box opens.



2. Select the **Parameters** tab.
3. Click the **ID** button.

   The **Inputs** dialog box appears.
4. Select Flour100 and click **OK**.

5. On the **Phase Properties – Bulk Add** dialog box, change the **Value** to 40.
6. Click **Change** and then click **Close**.
7. Double-click the second BulkAdd block.
8. Click **ID**.
9. On the **Inputs** dialog box, select Salt200 and click **OK**.
10. Click **Change** and then click **Close**.

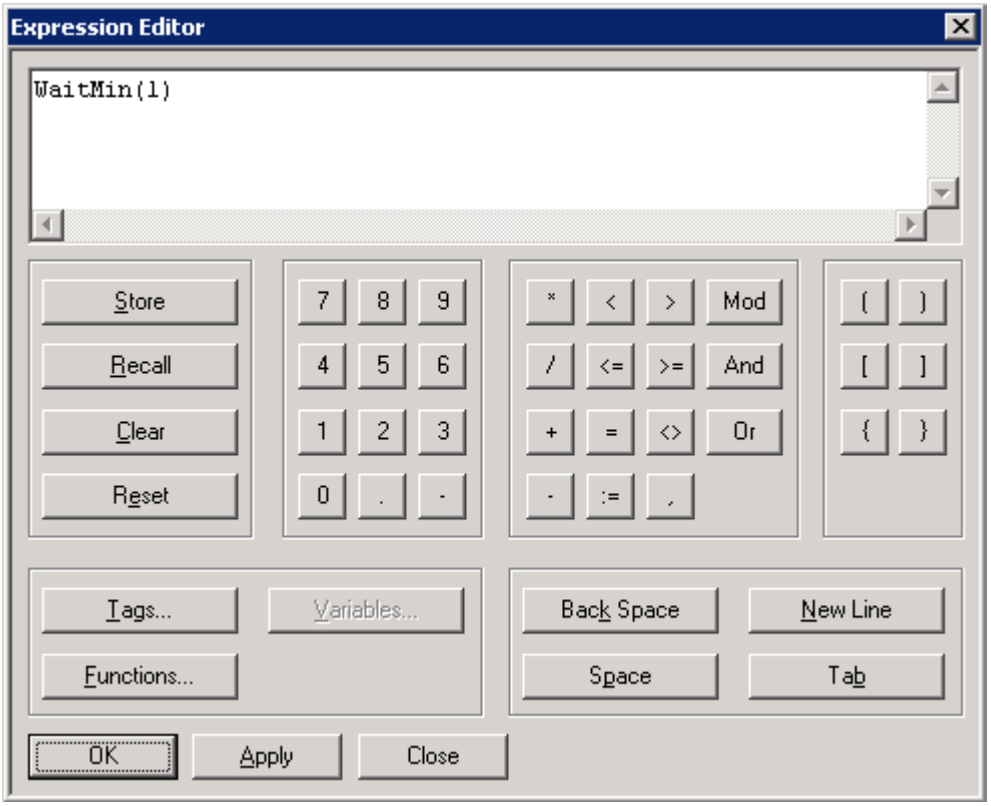
To configure the ManAdd item

1. Double-click the transition block (immediately above the ManAdd block).

   The **Transition Properties** dialog box appears.
2. Select the **Expression** tab.
3. Click **Expression Editor**.

   The **Expression Editor** dialog box appears.
4. Click **Functions**.

   The **Functions** dialog box appears.
5. Select **WaitMin** and click **OK**.
6. On the **Expression Editor** dialog box, type *1* within the parentheses and click **OK**.



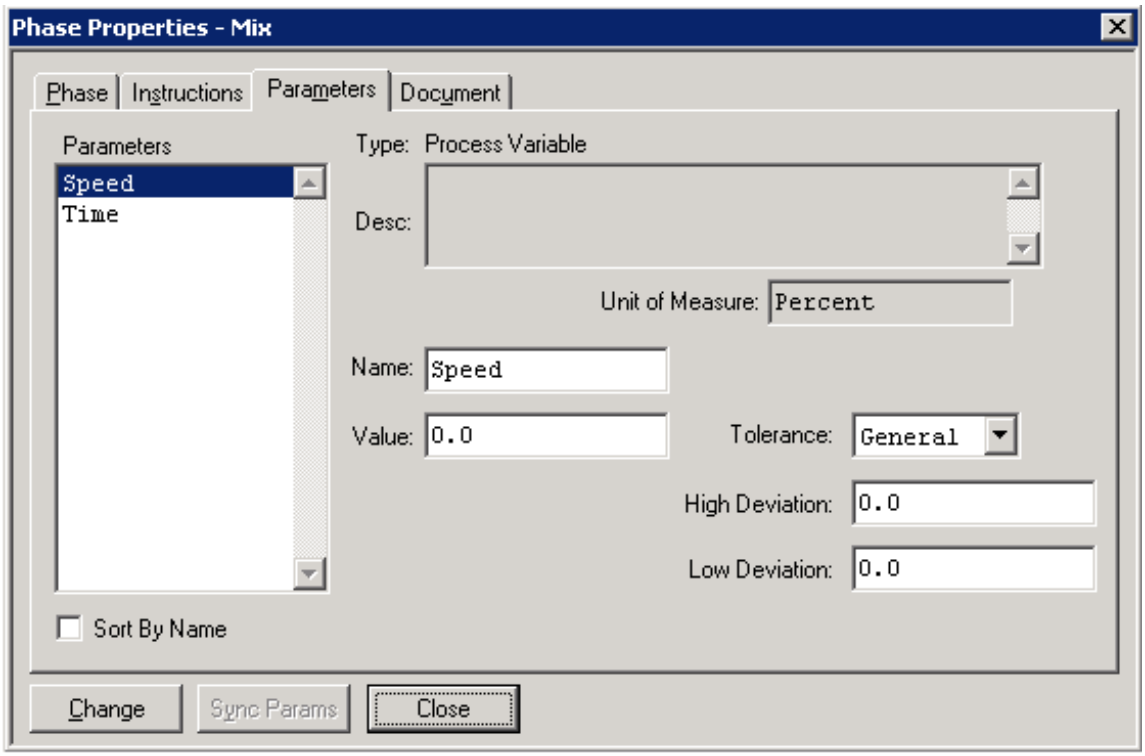
7. Close the **Transition Properties** dialog box.
8. Double-click the ManAdd block.
9. On the **Phase Properties – ManAdd** dialog box, click **ID**.
10. On the **Inputs** dialog box, select CS102, and then click **OK**.

11. On the **Phase Properties – BulkAdd** dialog box, click **Change**, and then click **Close**.

To configure the Mix item

1. Double-click the Mix block.

   The **Phase Properties – Mix** dialog box appears. You must configure two parameters, Speed and Time.



2. Select the Speed parameter.
3. In the **Value** box, type 40 and click **Change**.
4. Select the Time parameter.
5. In the **Value** box, type 2 and click **Change**.
6. Click **Close**.

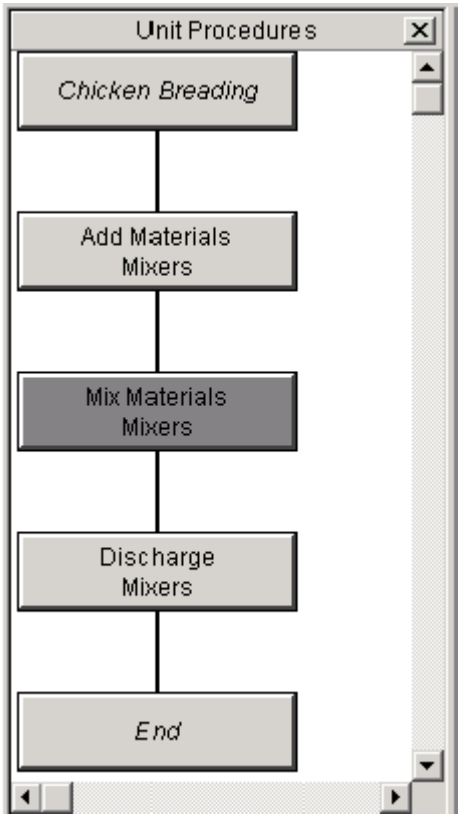
Mix Materials Operation

The next step in the Phases pane is to add the mix materials operation.

To change the Phase

- In the **Unit Procedures** pane, select the Mix Materials – Mixers block as shown in the following figure.

The **Phases** pane returns to its default state.



To add the first branch in the Phases pane

1. In the **Phases** pane, click just below the first block.
2. Click the **Add Phase Branch** icon.

   A phase branch appears beneath the first block.
3. Click the **Add Phase** icon.
4. On the **Add Phases** dialog box, check to ensure that the **Type** is Transfer.
5. Select **Bulk_Mix – Bulk Add** and then click **Apply**.
6. Change the **Type** to Process.
7. Select Mixers – Mix and click **OK**.
8. Drag the Mix – Mixers block to the right leg of the branch.

To add instructions for the block items

1. Double-click the BulkAdd – Bulk_Mix block.
2. On the **Phase Properties – Bulk Add** dialog box, click the **Parameters** tab.
3. Click **ID**.
4. On the **Inputs** dialog box, select Flour100 and click **OK**.
5. On the **Phase Properties – Bulk Add** dialog box, change the **Value** to 40.
6. Click **Change** and then click **Close**.
7. Double-click the Mix – Mixers block.
8. On the **Phase Properties – Mix** dialog box, perform these steps:

a. Select the **Speed** Parameter.

b. Type 10 in the **Value** box and click **Change**.

c. Select the **Time** Parameter.

d. Type 2 in the **Value** box and click **Change**.

e. Click **Close**.

To add another Mix – Mixers block below the branch

1. Click just above the End block.

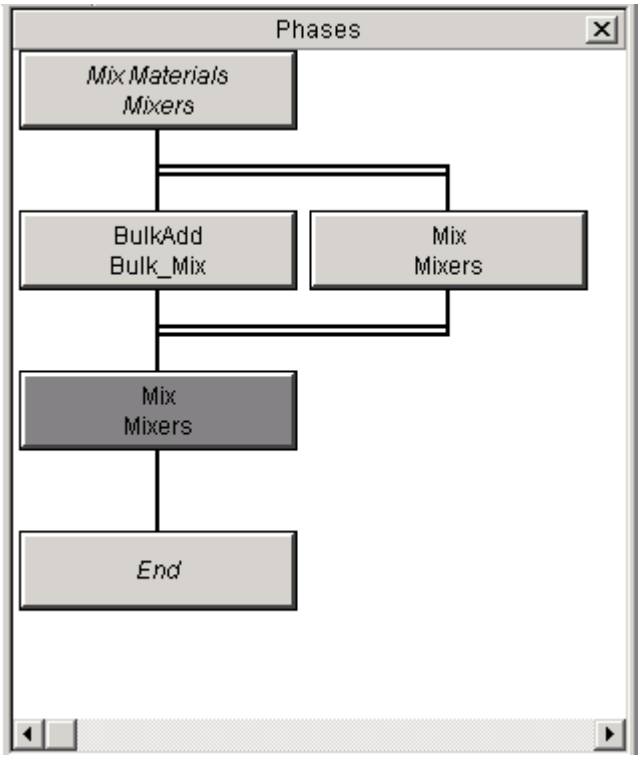
   A gray rectangle appears.

2. Click the **Add Phase** icon.

   The **Add Phases** dialog box appears.

3. Select Mixers – Mix and click **OK**.

   The Mix – Mixers block appears on the diagram.

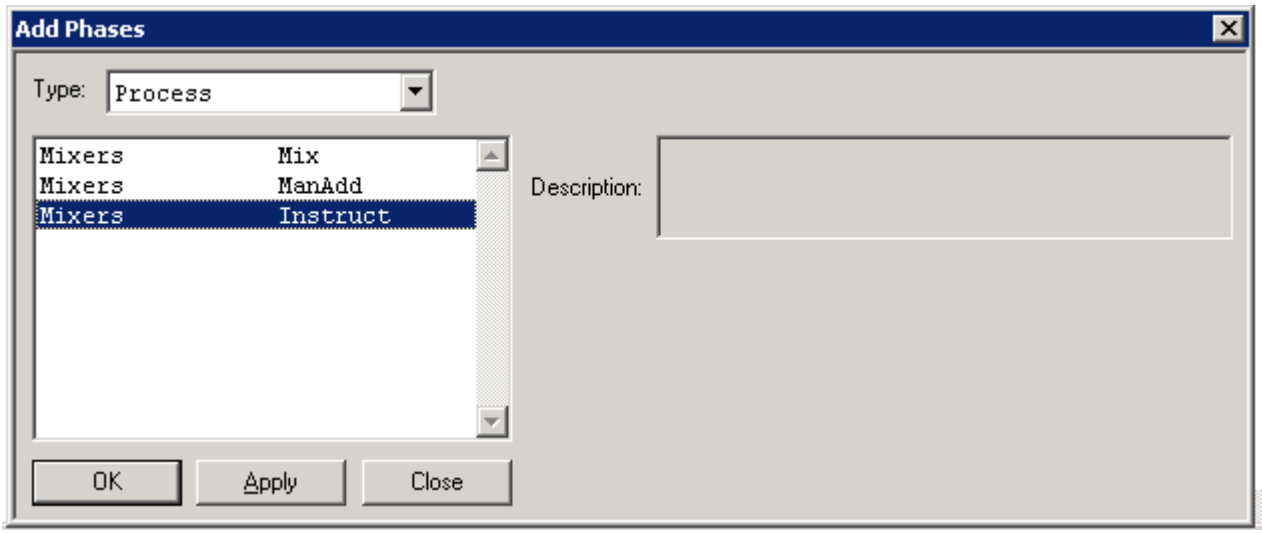


4. Double-click the Mix – Mixers block.
5. On the **Phase Properties – Mix** dialog box, select the Speed **Parameter**.
6. Type the **Value** 10 and click **Change**.
7. Select the Time **Parameter**.
8. Type the **Value** 2 and click **Change**.
9. Click **Close**.

To add the Instruct – Mixers block

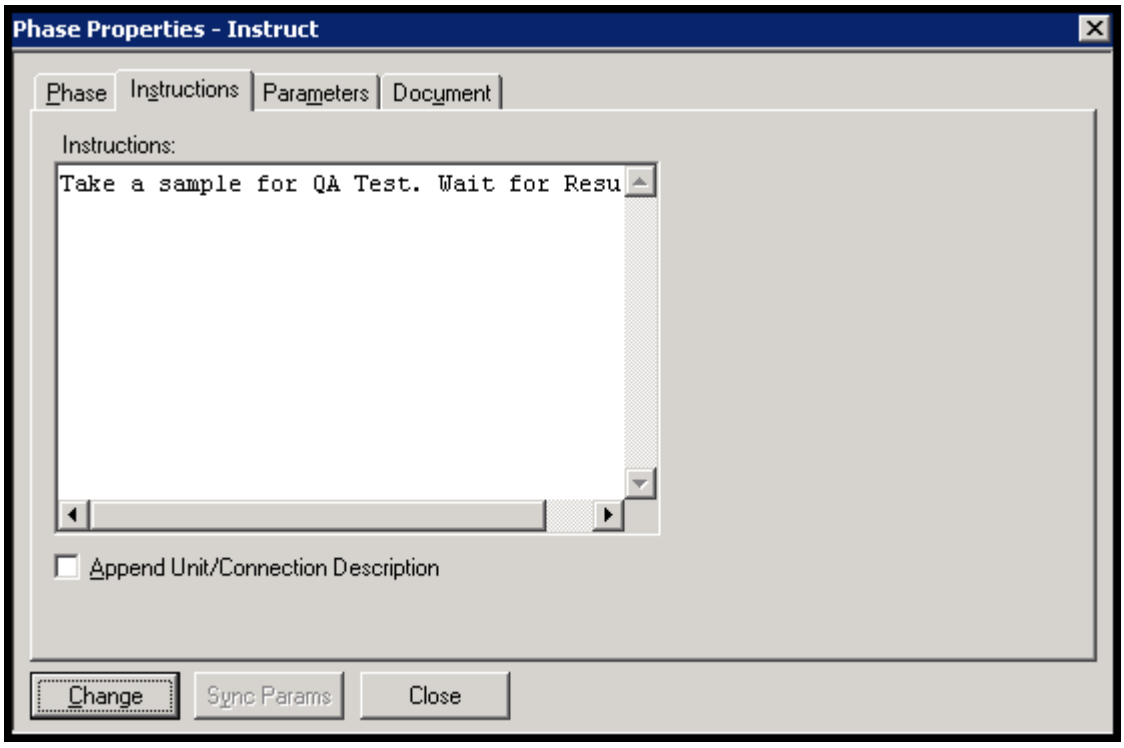
1. Click just below the second Mix – Mixers block.
2. Click the **Add Phase** icon.

The **Add Phases** dialog box appears.



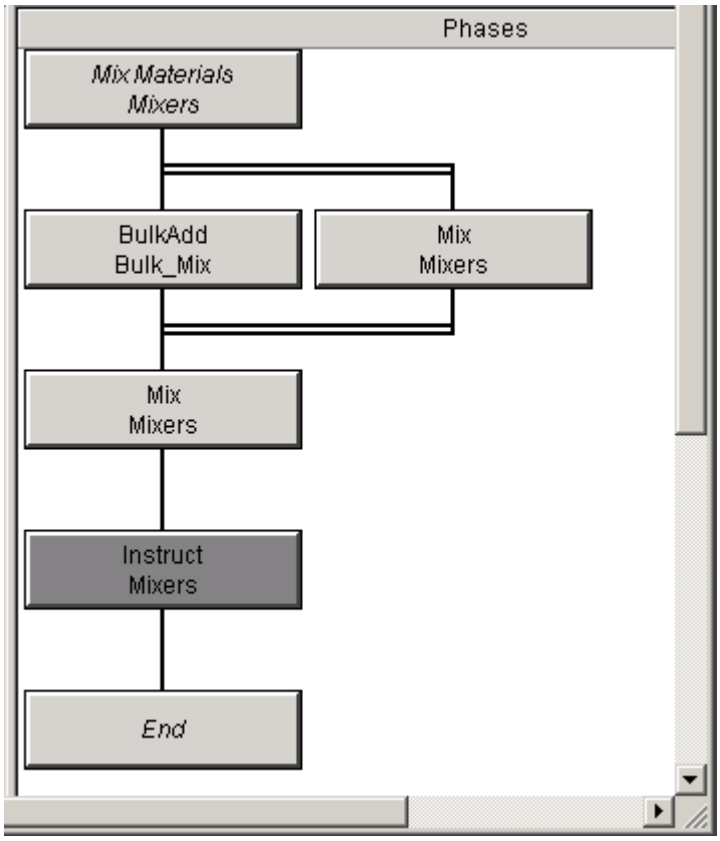
3. Select Mixers – Instruct and click **OK**.
4. Double click the Instruct – Mixers block.
5. On the **Phase Properties – Instruct** dialog box, select the **Instructions** tab.
6. In the **Instructions** box, type the following text:

   Take sample for QA Test. Wait for results.



7. Click **Change**, and then click **Close**.

The following figure shows the appearance of the Phases pane.

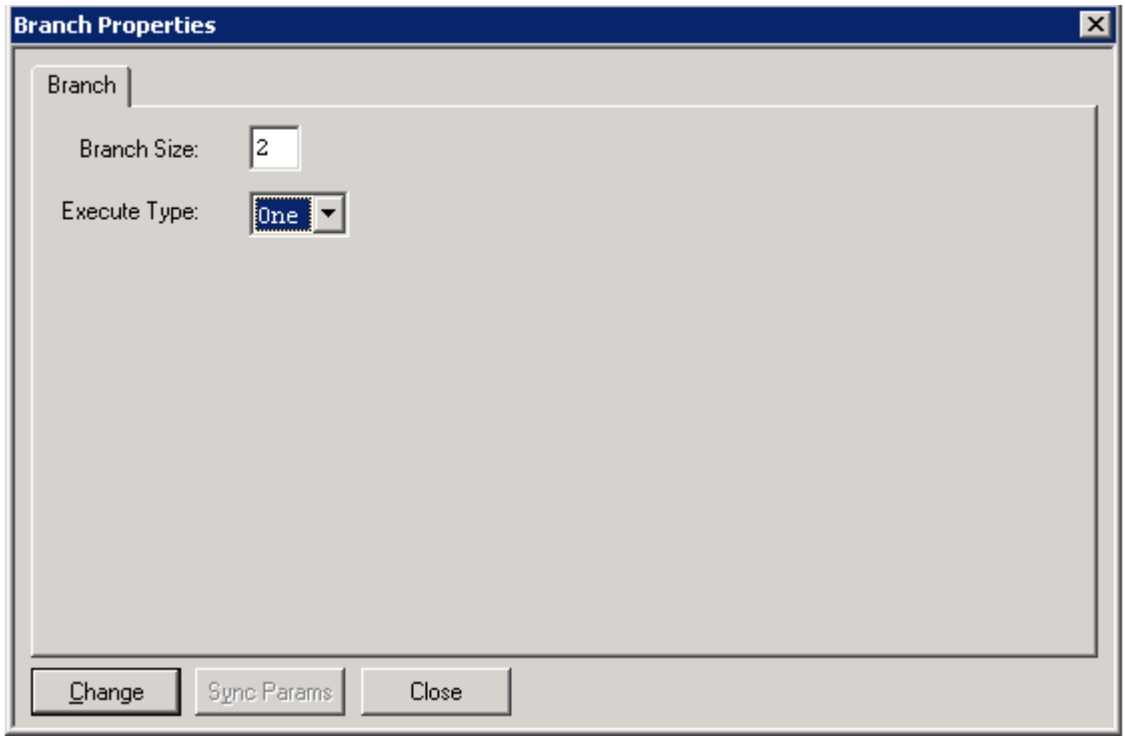


To add a mix branch

1. Click just below the Instruct – Mixers block.
2. Click the **Add Phase Branch** icon.
3. Double-click the branch.

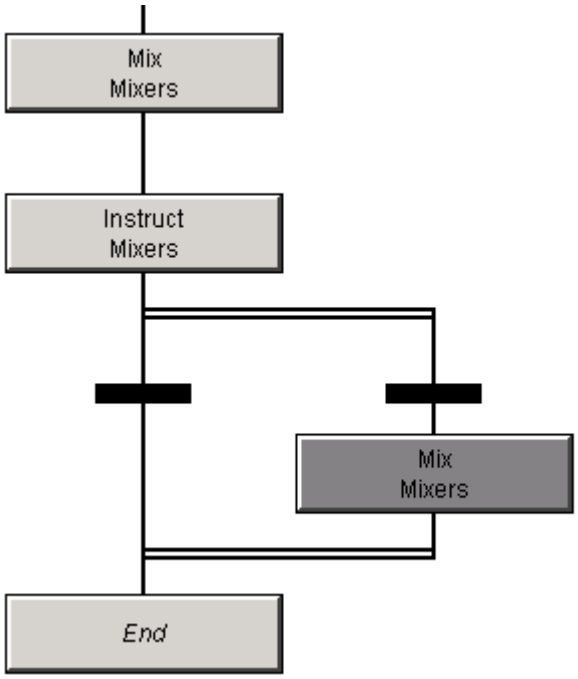
   The **Branch Properties** dialog box appears.

4. Accept the **Branch Size** value of 2 but change the **Execute Type** to One.



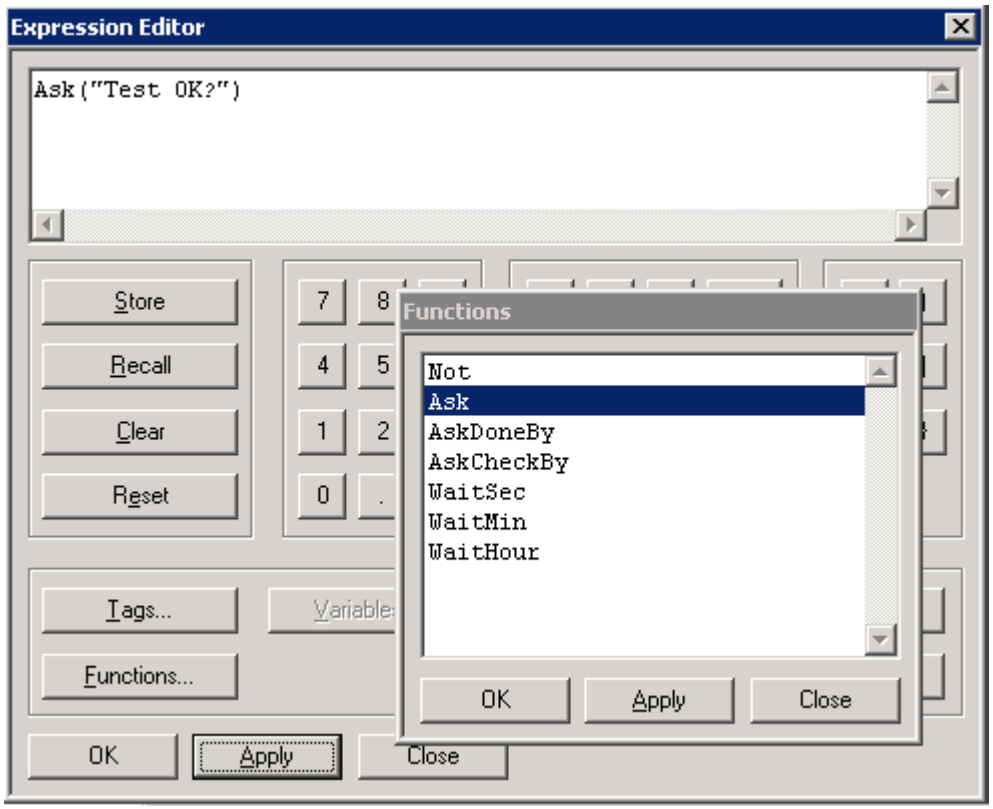
5. Click **Change** and then click **Close**.
6. Click the left edge of the branch and click the **Add Phase Transition** icon twice.
7. Drag one of the phase transition indicators to the right side of the branch.
8. Click the **Add Phase** icon.
   The **Add Phases** dialog box appears.
9. Check that the **Type** is Processes.
10. Select Mixers – Mix and click **OK**.
11. Drag the Mixers block to the right leg of the branch.

The following figure shows the appearance of the lower area of the **Phases** pane.



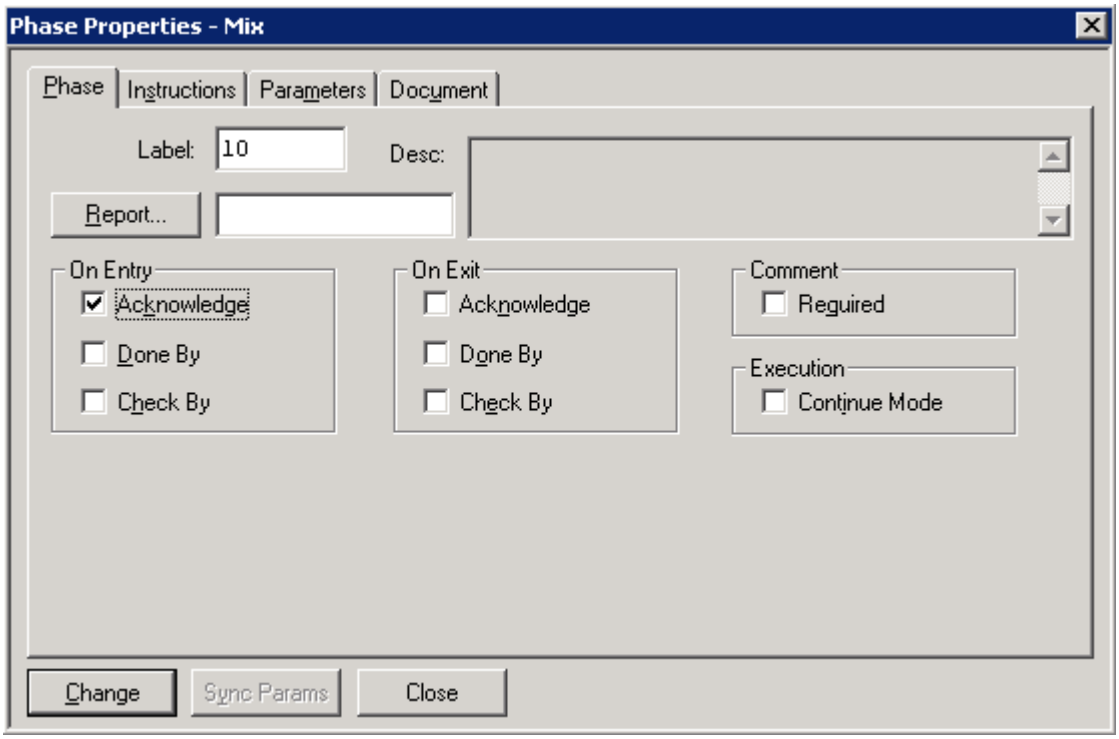
12. Double-click the transition indicator on the left side of the branch.
13. On the **Transition Properties** dialog box, click **Expression Editor**.
14. On the **Expression Editor** dialog box, click **Functions**.
15. On the **Functions** dialog box, select **Ask**, and click **OK**.

16. On the **Expression Editor** dialog box, type the following text between the parentheses: *"Test OK?"*



17. Click **OK**.
18. Close the **Transition Properties** dialog box.
19. Click the transition indicator on the right side of the branch and repeat steps 14 through 16.
20. On the **Expression Editor** dialog box, type the following text between the parentheses: *"Mix Again?"*
21. Close the **Transition Properties** dialog box.
22. Double-click the Mix – Mixers block.
23. On the **Phase Properties – Mix** dialog box, select the **Phase** tab.

24. In the **On Entry** area, select the **Acknowledge** check box.



25. Click **Change**.
26. Select the **Instructions** tab.
27. In the **Instructions** box, type the following text:

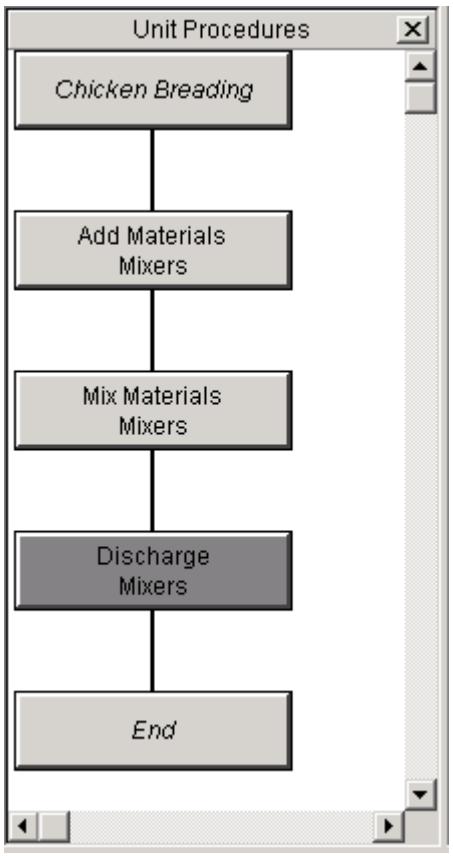
    Enter Speed and Time, then Acknowledge.
28. Click **Change** and then click **Close**.

Discharging the Equipment

The final step in the Phases pane is to add the discharge (free up) the equipment.

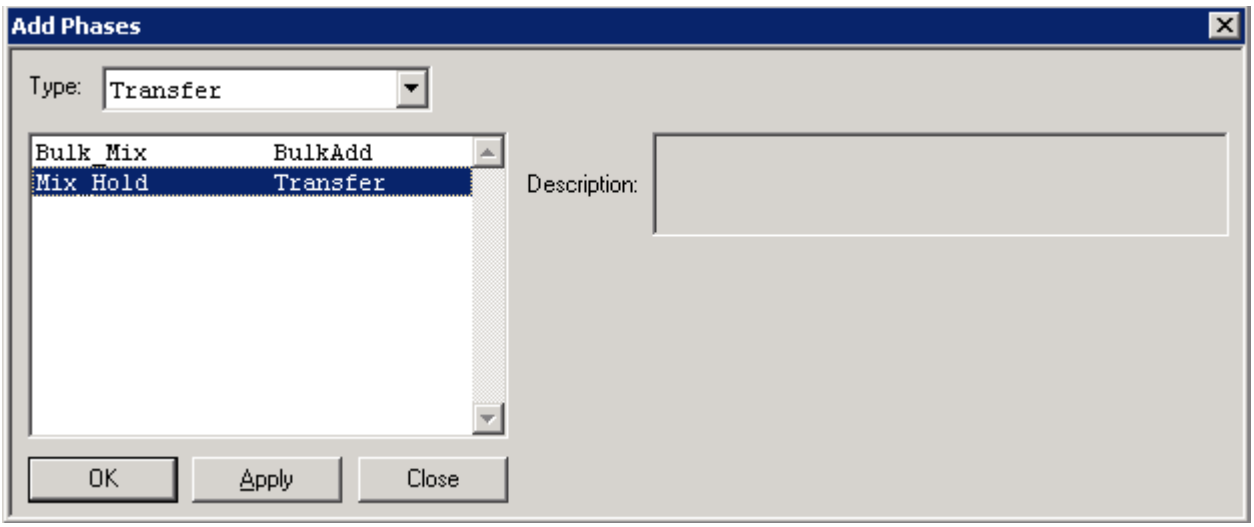
To discharge the mixers

- In the **Unit Procedures** pane, select the Discharge – Mixers block.



To add the Transfer – Mix Hold block in the Phases pane

1. In the **Phases** pane, click just below the Discharge – Mixers block.
2. Click the **Add Phase** icon.
3. On the **Add Phases** dialog box, check to make sure that the **Type** is Transfer.

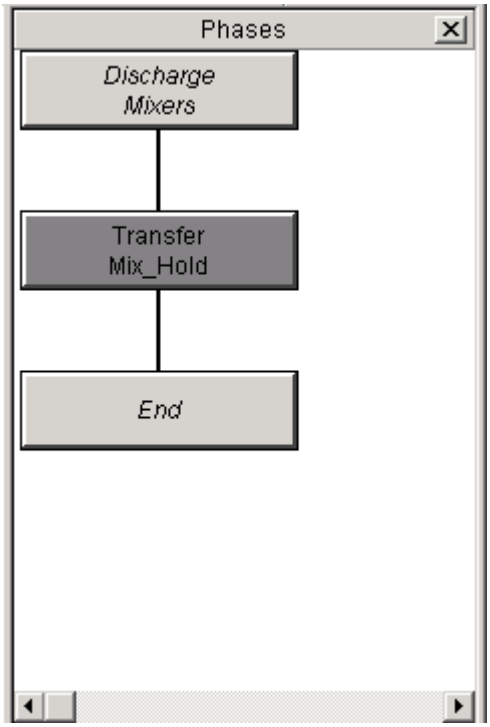


4. Select Mix_Hold – Transfer and click **OK**.

To configure the Transfer – Mix Hold block

1. Double click the **Transfer – Mix Hold** block.
2. On the **Phase Properties – Transfer** dialog box, select the **Parameters** tab.
3. Click **ID**.
4. On the **Outputs** dialog box, select CB100, and then click **OK**.
5. Accept the **Value** 100 and click **Change**.
6. Click **Close**.

   The following figure shows the completed Phases pane for the Discharge operation.



Validating the Recipe

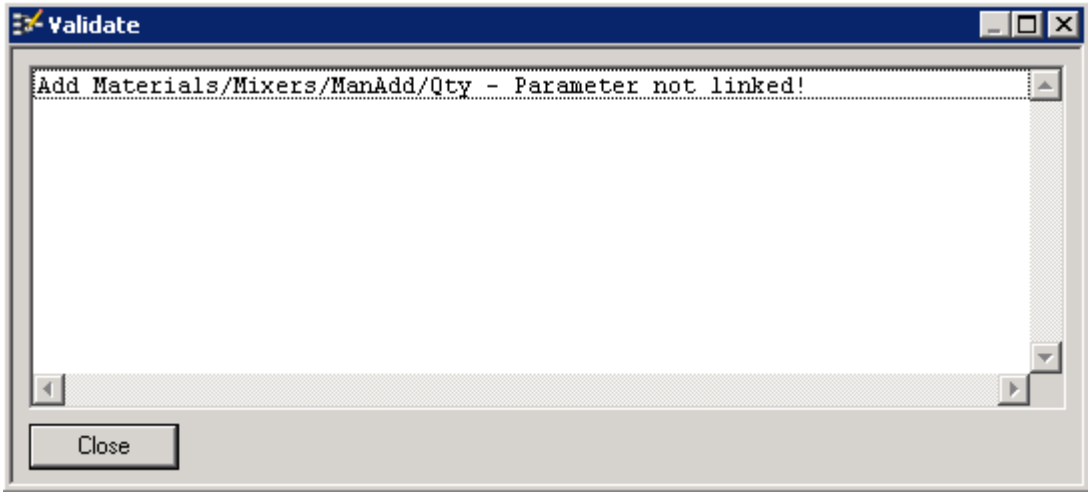
Before you save the recipe, you want to check for configuration errors.

Note: You cannot schedule and process the batch unless the recipe is valid.

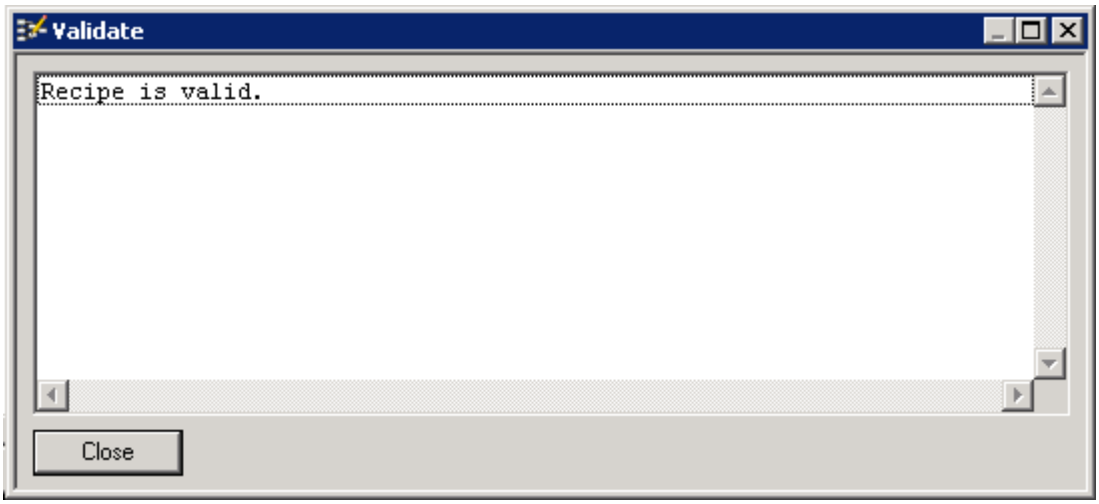
To validate the recipe

1. On the **Recipe Editor** dialog box, click **File > Validate**.
2. Correct any discrepancies.

The following figure shows an error message.



This figure shows that the recipe is valid.



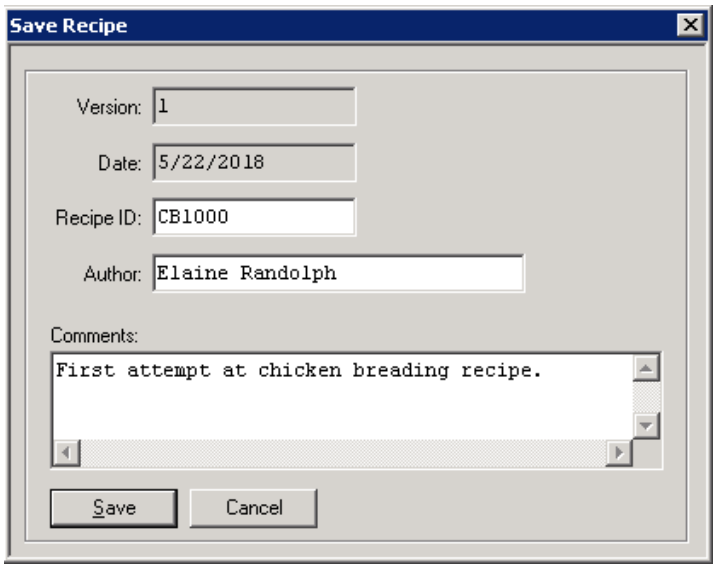
Saving the Recipe

After you have validated the recipe, you must save it for future use.

To save the recipe

1. On the **Recipe Editor** dialog box, click **File** > **Save**.
2. Enter the following required information on the **Save Recipe** dialog box:
   - **Recipe ID**
   - **Author**
   - **Comments**
3. Click **Save**.

The following figure shows a completed dialog box.

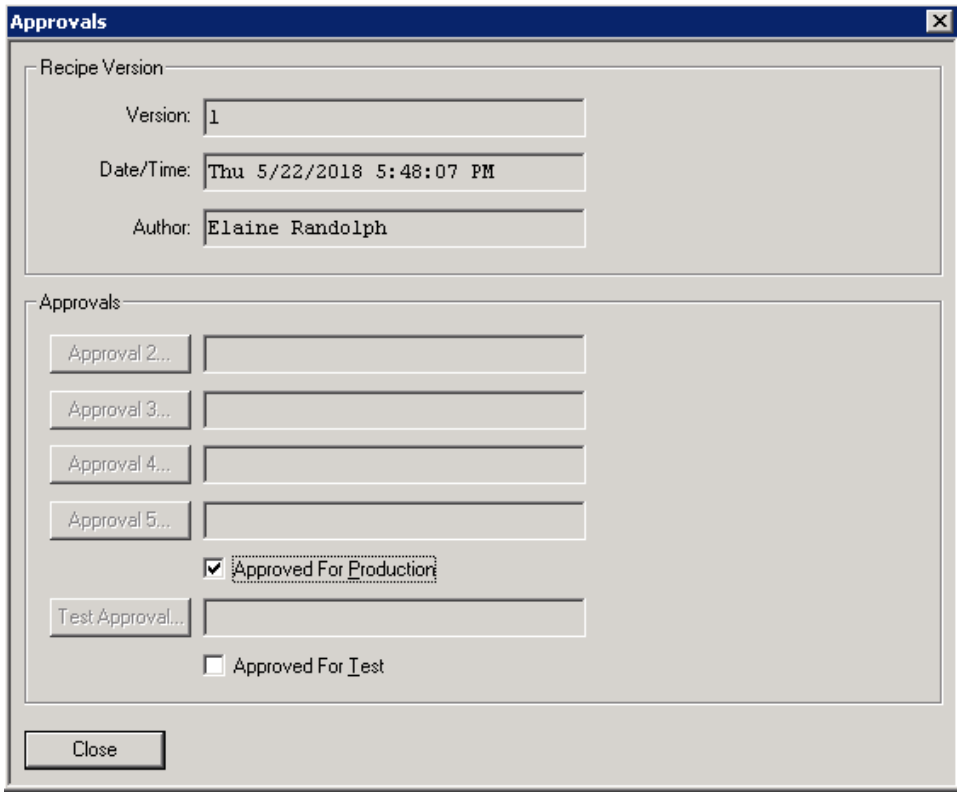


Approving the Recipe for Production

After you save the recipe, you must have it approved for production.

To approve the recipe for production

1. On the **Recipe Editor** dialog box, click **File > Approvals**.
2. Select the **Approved for Production** check box.



3. Click **Close**.

4. Close the **Recipe Editor** dialog box.

Configure and Schedule a Report

Before you schedule and run batches, you should set up the reports that you want to produce.

These instructions enable you to configure and schedule a Batch Journal Report that runs at the end of every batch. After you run your batches, you can view the report data.

Batch Management Reports Administration Client Application

The Batch Management Reports Administration Client application allows you to perform the following activities:

- Configure reports
- Schedule reports
- Report Log Admin

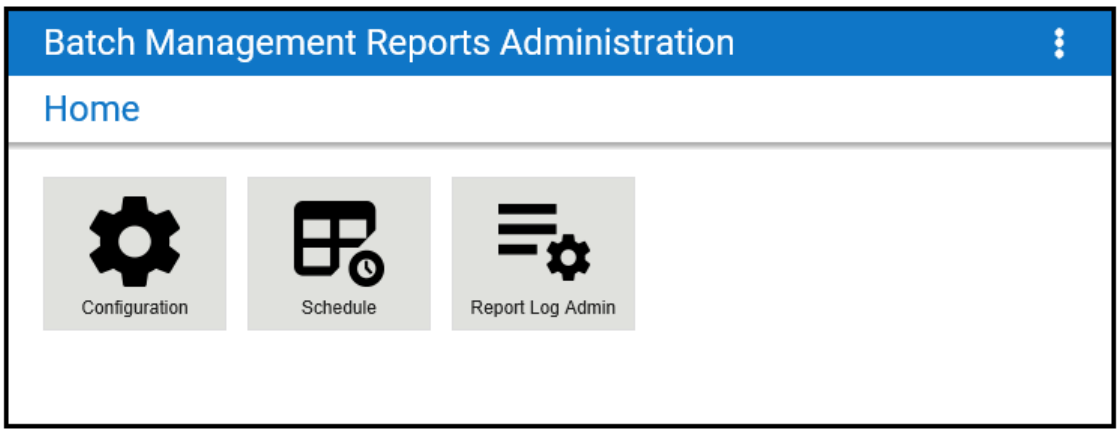
Configuring Reports

You can add, view, edit, and delete report configurations to the reporting system.

You must have administrative rights to be able to access this capability.

To access the report configuration menu

1. Open the **Batch Management Reports Administration** page using the Batch Management Reports Administration shortcut.



2. Click the **Configuration** icon. The **Report Configuration** page opens. You can see a list of configured reports.
3. Click **Add Report.**

   The **Add Report Config** form appears.
4. In the **Name** box, type `End of Batch`.
5. In the **Description** box, type a brief description of the report: Report run at end of each batch.
6. From the **Report Template** box, select the Batch Journal template.
7. Select the **Output to File** check box.
8. Type the complete path information in the **Output Path** box: C:\Reports.
9. From the **Output Type** list, select MHTML.

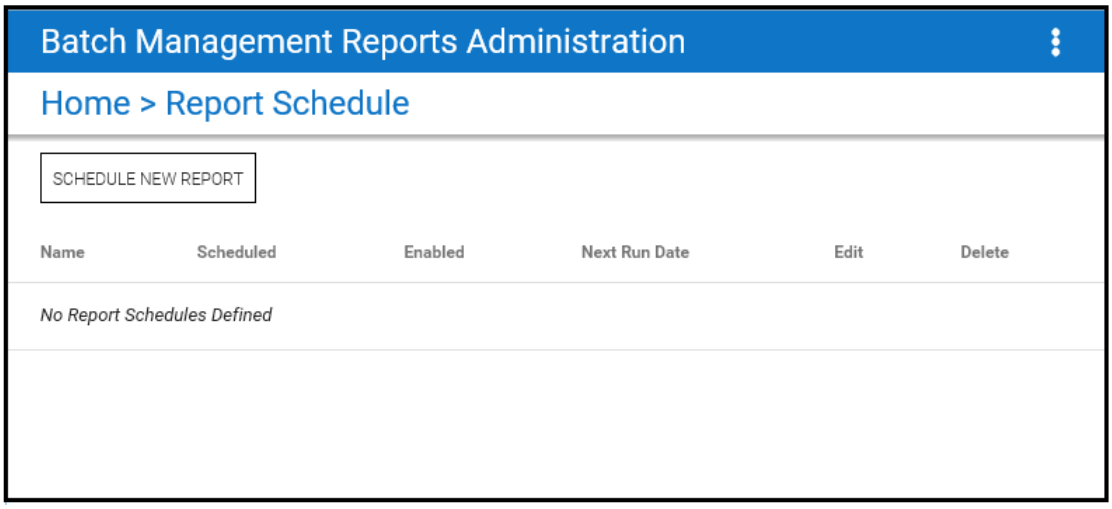
10. Click **Add Report**.

Scheduling Configured Reports

You can define schedules for the reports that you have configured. You can schedule reports for one time only or on a recurring basis. The schedules are stored as SQL jobs on the BatchHistory databases SQL Agent (NOTE: SQL Agent needs to be running). You can edit them as your specific application requires.

To schedule a report

1. Open the **Batch Management Reports Administration** page.
2. Click **Schedule**. The **Report Schedule** page appears.



3. Click **Schedule New Report.**

   The **Add Report** form appears.
4. In the **Name** box, type `End of Batch Report.`
5. Slide the **Options** setting to **Enabled**.

   If you do not slide the **Options** setting to **Enabled**, the report does not run as specified by the scheduled settings.
6. Select a report type from the **Report Selection** list.

   The list contains the report configurations that you have defined using the **Report Configuration** page.
7. Select a **Schedule Type** from the list.
8. Click **Save Report Data**.

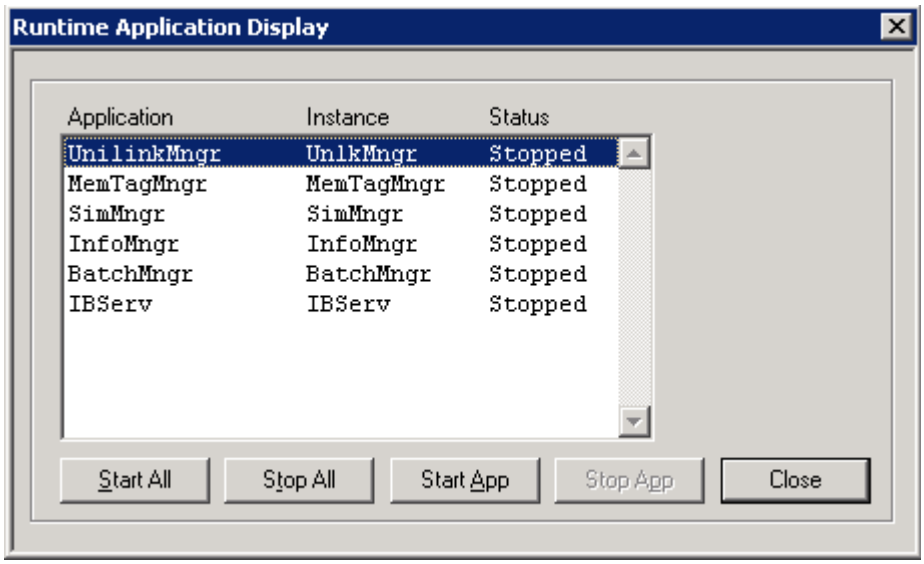
Scheduling and Running Batches

Before you schedule and run batches, ensure that certain services are running on the Batch Server.

To start the Batch Server

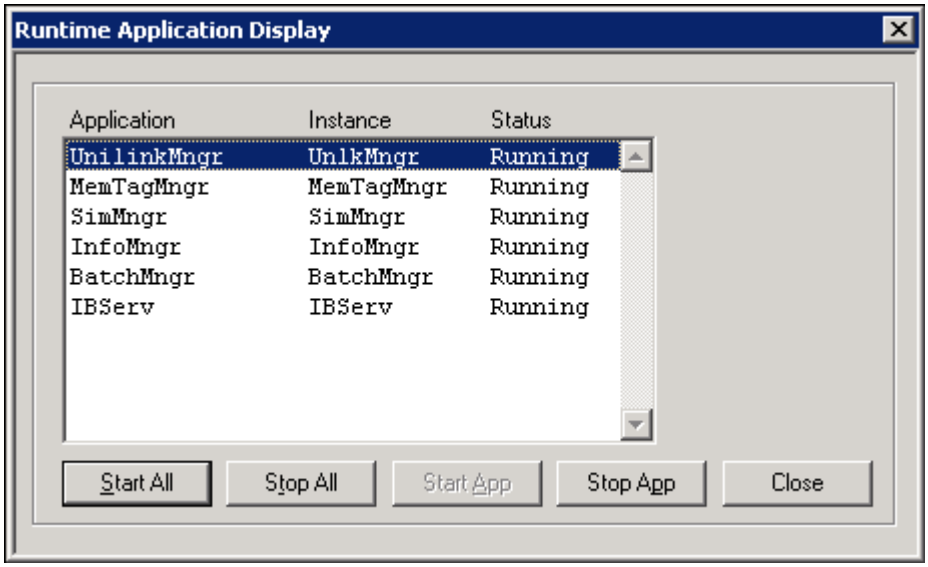
1. On the **Environment Display** dialog box, click **Runtime**.

The **Runtime Application Display** dialog box appears.



2. If the applications do not have a status of Running, click **Start All**.
3. After all the **Applications** have the **Status** of Running, click **Close**.

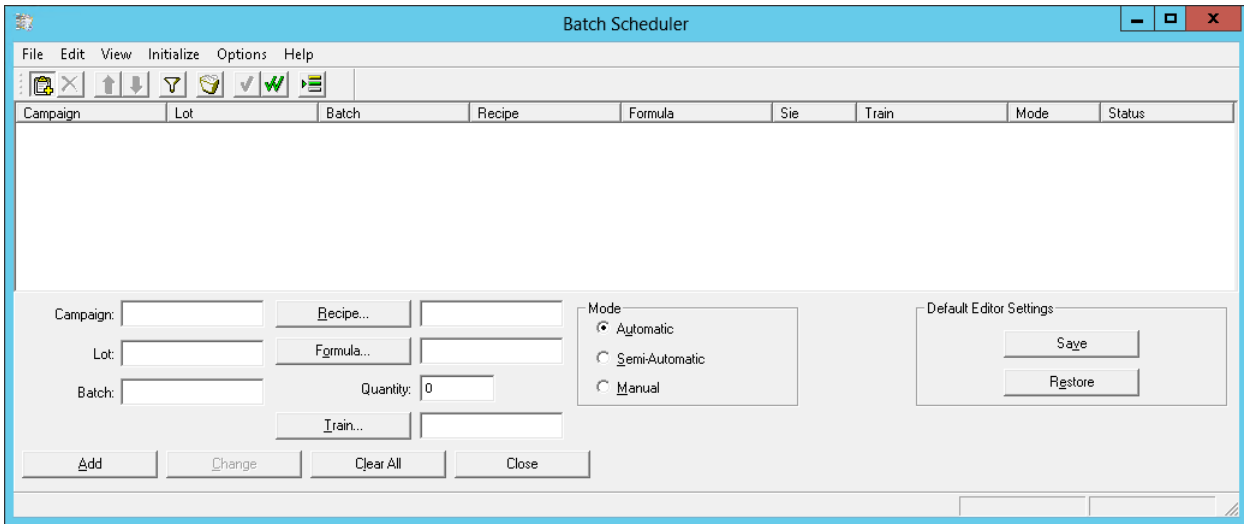
   You can now start the Batch Scheduler.



To schedule a batch

1. On the **Environment Display** dialog box, double-click the **BatchSched** icon.

The **Batch Scheduler** dialog box appears.



2. Schedule the batches shown in the following table. Detailed instructions follow the table.

Campaign	Lot	Batch	Recipe	Quantity	Train	Mode
1001	1	1	CB1000	1000	Mixer 1 Train	Automatic
1001	1	2	CB1000	3000	Mixer 2 Train	Automatic
1001	1	3	CB1000	5000	Mixer 2 Train	Automatic
1001	2	4	CB1000	2000	Mixer 1 Train	Automatic
1001	2	5	CB1000	5000	Mixer 2 Train	Automatic

a. In the **Campaign** box, type the campaign number.

b. In the **Lot** box, type the lot number.

c. In the **Batch** box, type the batch number.

d. Click **Recipe** and select the chicken breading recipe from the **Recipes** dialog box.

e. In the **Quantity** box, type the quantity.

f. Click **Train** and select a train from the **Trains** dialog box.

g. Select a **Mode**.

h. Click **Add**.

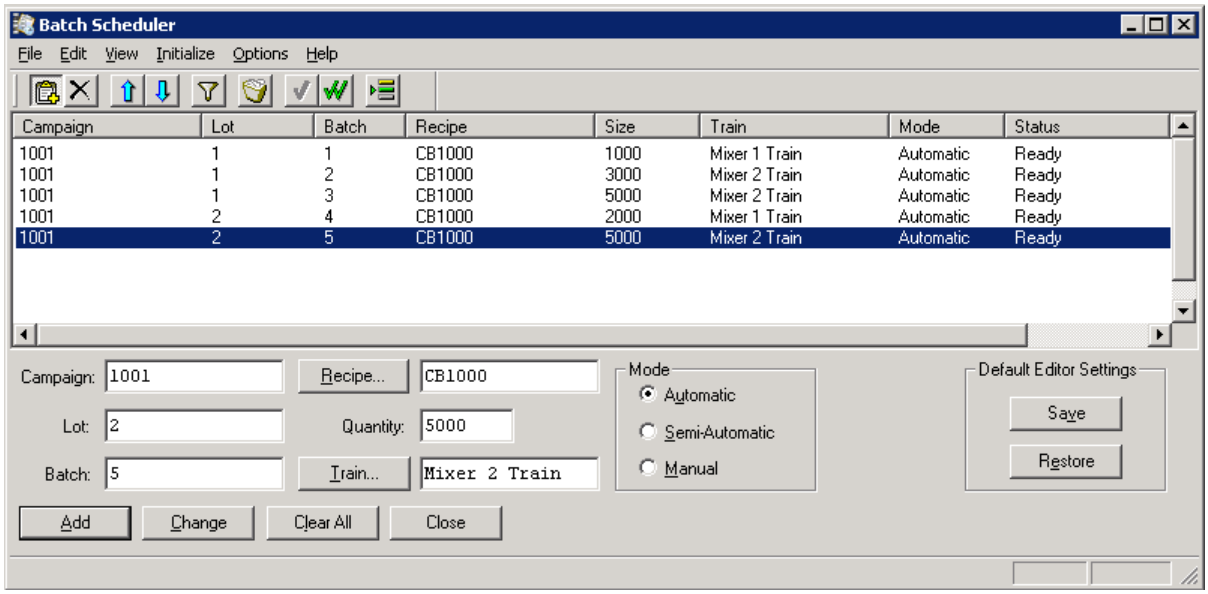
i. Repeat steps a through h for each batch.

To change the status of the batches from Open to Ready

1. On the **Initialize** menu, select **All**.

Note: You can also change the status of one batch from the **Initialize** menu.

Notice that the **Status** column now indicates that all the batches are Ready.

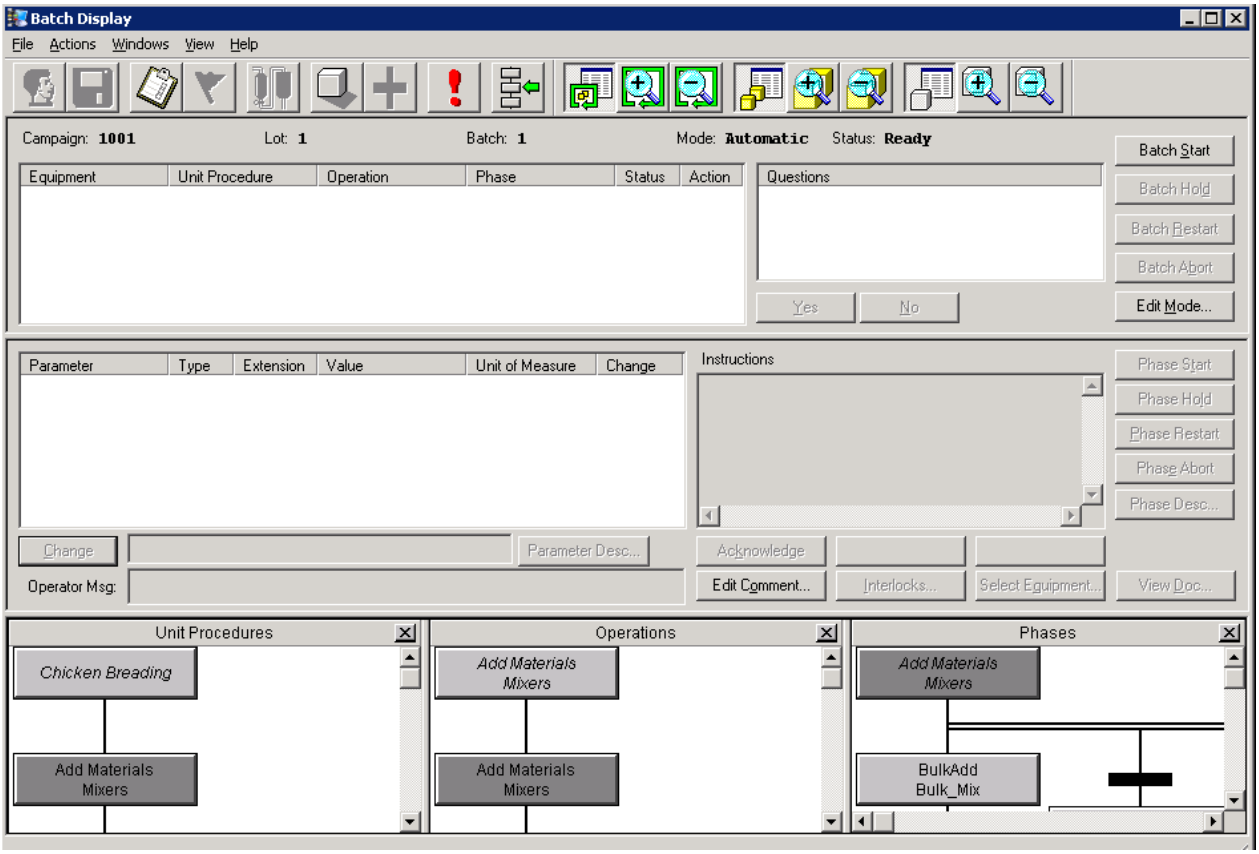


2. Close the **Batch Scheduler** dialog box.

To run a batch

1. On the **Environment Display** dialog box, click the **BatchDspl** icon.

   The **Batch Display** dialog box appears.



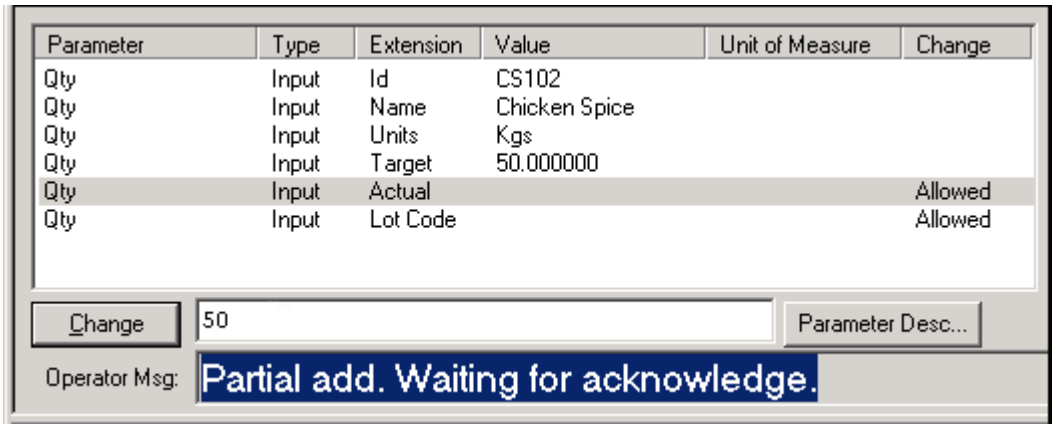
Notice that the first scheduled batch appears by default in the upper area.

2. Click **Batch Start** button, which is in the upper right corner of the dialog box.

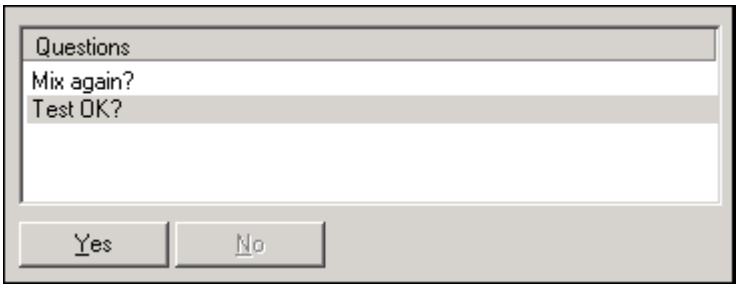
   The batch starts running. Information appears in the upper and middle areas of the dialog box.

3. As the batch runs, respond appropriately to program prompts.

   a. When you see the message *Waiting for exit acknowledge*, click the **Acknowledge** button.



   b. When you see the message *Partial add. Waiting for acknowledge*, click the **Actual** quantity, type the amount to add in the text box, click **Change**, and then click **Acknowledge**. When the process reaches the test phase, the following message appears in the **Questions** pane.



   c. Click **Yes**. When the recipe completes processing, the **Status** indicator in the upper area of the **Batch Display** dialog box changes to Done.

Viewing the Reports

The **Batch Management Reports** web pages enable you to run interactive reports and view reports that have been automatically generated by Batch Management. That is, these are reports that you configured and scheduled to run at a specific time.

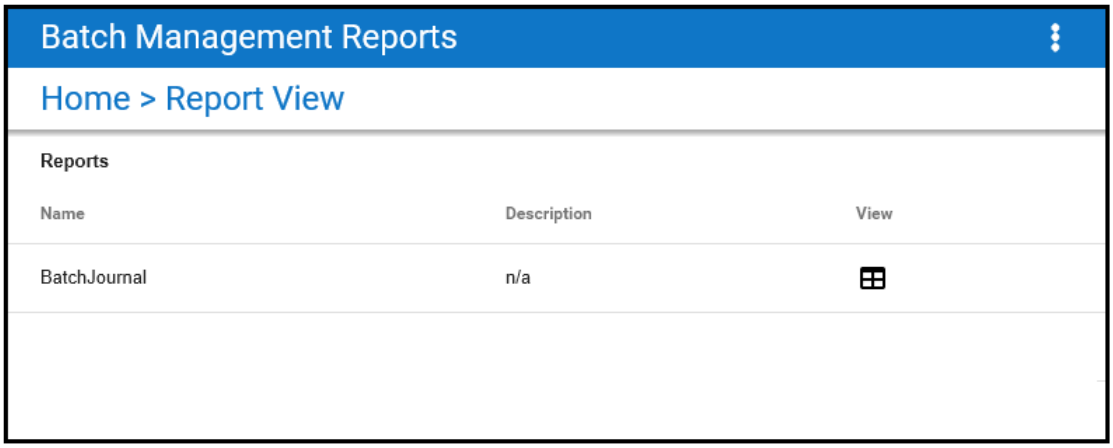
To open the Batch Management Reports web page

1. On the Report Content Server, click **Programs > Wonderware > Batch Management > Reporting Content > Batch Management Reports.**

   Alternatively, on the **Environment Display** dialog box, click the **BatchReport i**con.

   The **Batch Management Reports** page appears.

2. Click **View Reports**.



All the reports that have been previously defined appear in the **Reports** list.

To view a report

Note: You must have appropriate permissions to be able to view reports.

1. Click the **View** button associated with the report that you want to view.

   The **View Report** page appears.

   All instances for the selected report that have been printed to a disk file are listed.

2. Identify the instance (as determined by date and time) and click the corresponding **View** button.

   The report appears.

Creating a Batch Management Run-Time Client (InTouch) Application

This section describes the steps required to create the batch client application using InTouch. A simple Batch Scheduler is created using the ActiveX GUI Controls.

Creating the InTouch Window

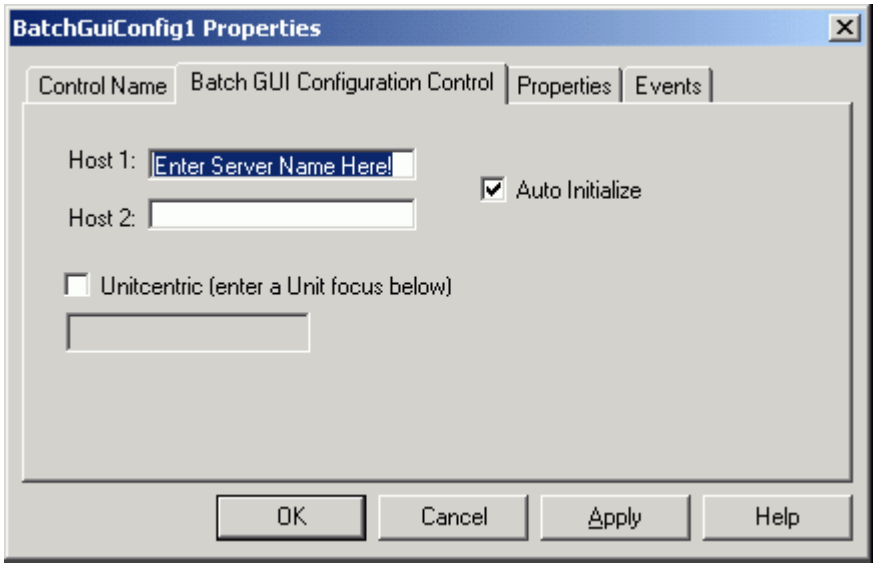
First, you must create an InTouch window.

To create an InTouch window

1. Configure InTouch WindowMaker with the ActiveX controls.
2. Create a window and drop a BatchGuiConfig control on it.

Tip: BatchGuiConfig buttons can look very large on the screen. After you determine a usable size by resizing the control, you can use the InTouch duplicate feature to create additional instances of the button and then configure each as the button type you require.

3. If InTouch is running on a computer other than the Batch Management server, you must configure the Host1 property of the Batch GUI Configuration Control to the node name of the Batch Server. If the Host1 property is left blank, the local node is assumed to be the Batch Server.



Adding the Schedule BatchList Control

Next, you must add a control for scheduling the batch.

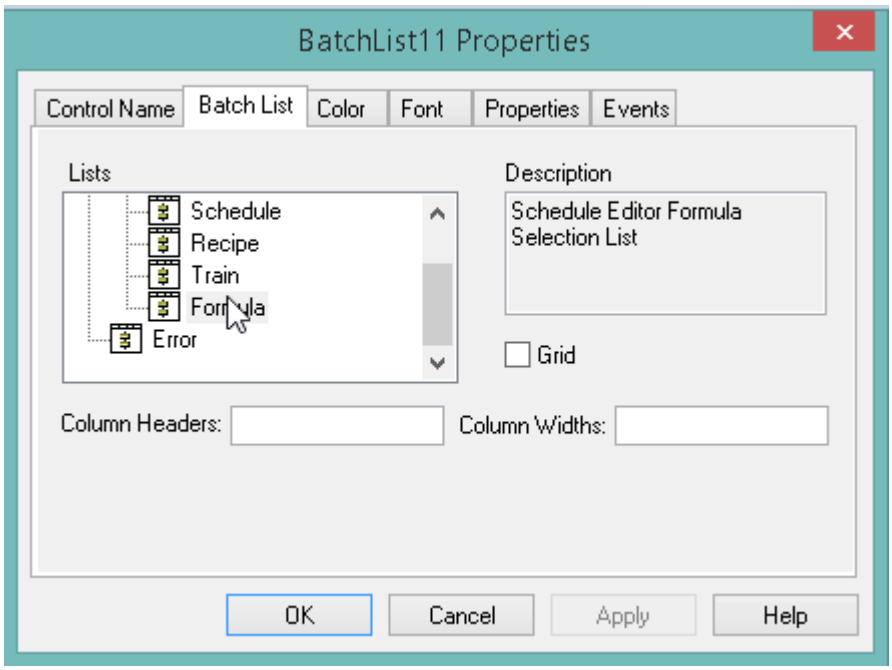
To add the Schedule BatchList control

1. Drop a BatchList control onto the InTouch window.
2. Double-click the control.

   The **BatchList Properties** dialog box appears.
3. To open the **ScheduleEdit** folder in the tree view, click the **BatchList** tab.
4. Select the **Schedule** list and click **Apply**.

   The BatchList control configures itself as a Schedule list, complete with column headings.

Note: If you are running InTouch on the Batch Management server, you do not need to configure the control for the host name.

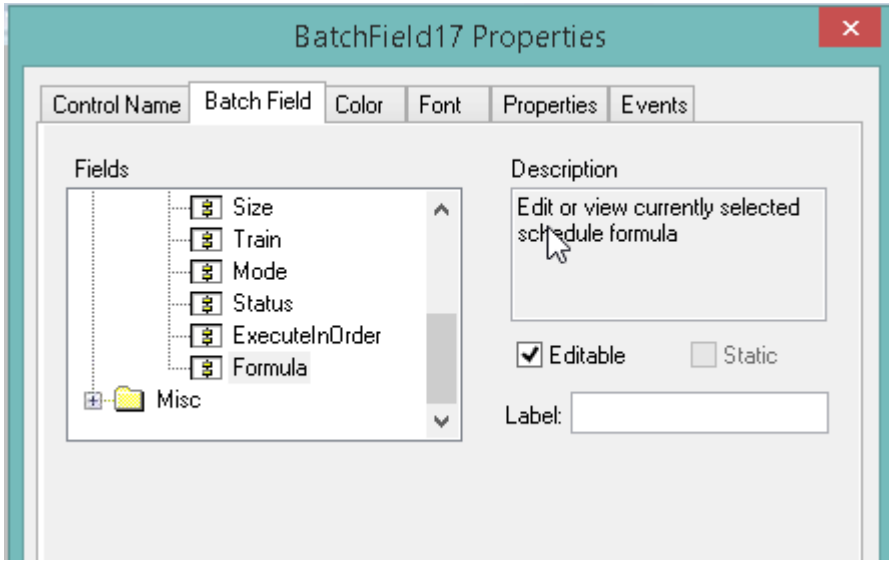


Adding the BatchField Controls

You can enter information into the schedule list using the BatchField controls.

To add BatchField controls

1. Drop a BatchField control onto the screen below the list.
2. Double-click the control to bring up its property page.

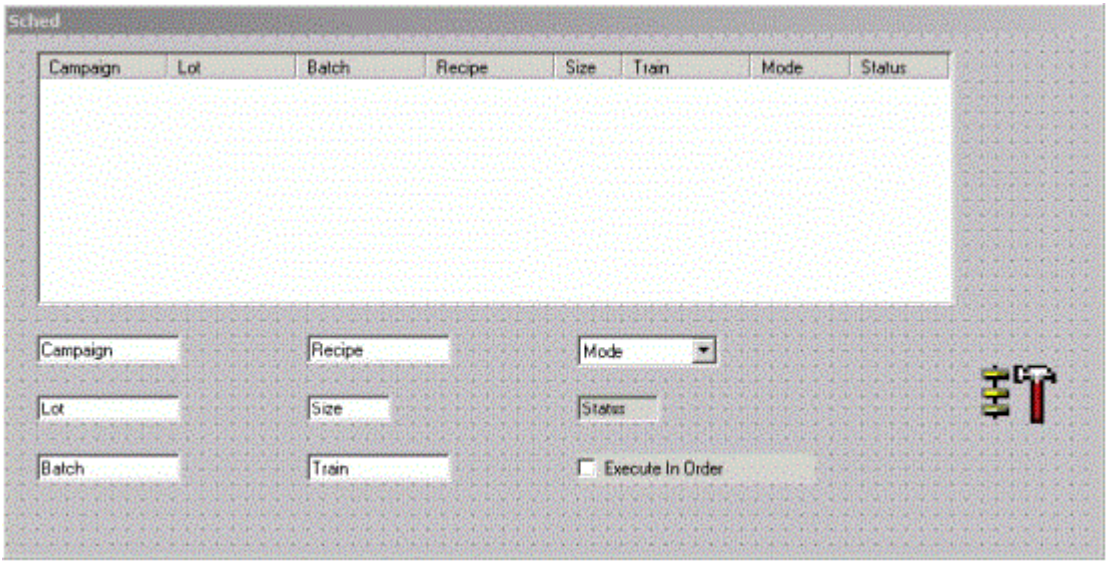


3. Select the **Batch Field** tab and open the **ScheduleEdit** folder in the tree view.

   The schedule list is now a folder. The folder contains all the BatchField types associated with the schedule list.

4. Select the **Campaign** entry and click **Apply**.
5. Copy this control and configure the copies to be the **Lot**, **Batch**, **Recipe, Size**, **Train**, **Mode**, **Status**, **ExecuteInOrder**, and **Formula** fields.

   In the following figure, notice that the **Mode** field appears as a list. The **Status** is not editable because it is a Read Only field, and the **ExecuteInOrder BatchField** becomes a check box control.



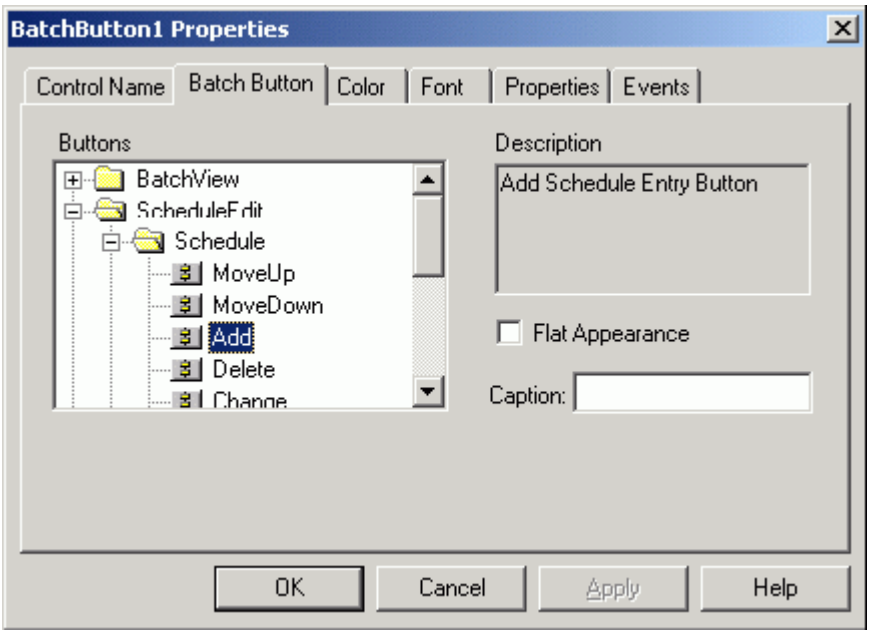
Adding BatchButton Controls

To manipulate the schedule list, you can add BatchButton controls to the window.

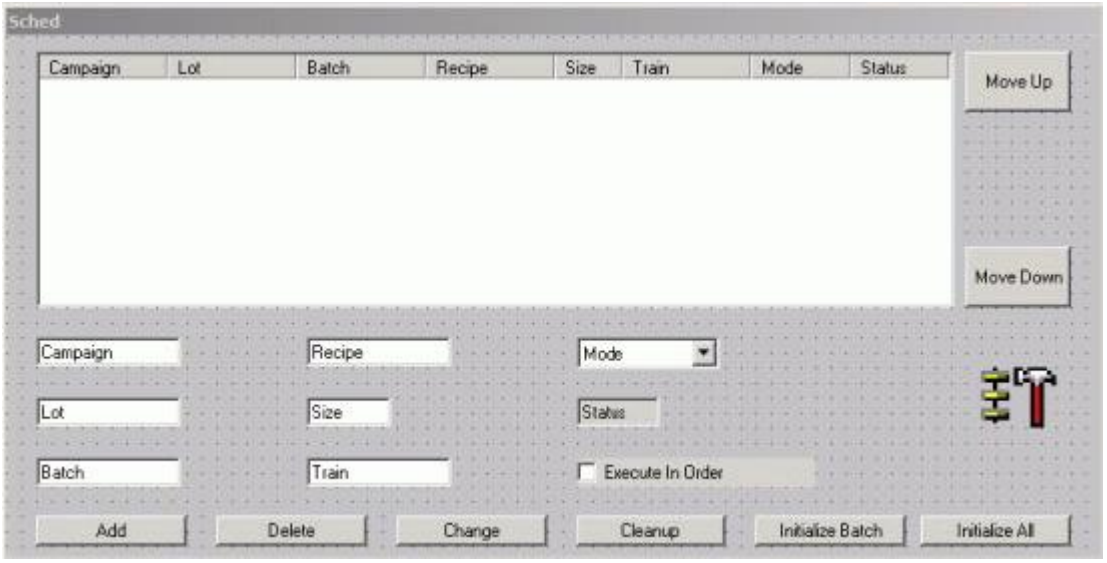
To add button controls

1. Drop a BatchButton control onto the window at the lower left.
2. Double-click the control to display the property page.
3. Click the **Batch Button** tab and open the **Schedule Edit** node of the tree view.
4. Open the **Schedule** list folder.

5. Click **Add** button and then click **Apply.**



6. Copy this control seven more times and configure the copies as the **Delete**, **Change**, **CleanUp**, **Initialize Batch**, **Initialize All**, **Move Up**, and **Move Down** buttons as shown in the following figure.



You are now ready to test the scheduler.

Running the Scheduler

To run the scheduled application, first make sure that you have a valid model and that you have defined some materials and at least one recipe. Then start the Batch Management run-time applications on the Batch Management Server.

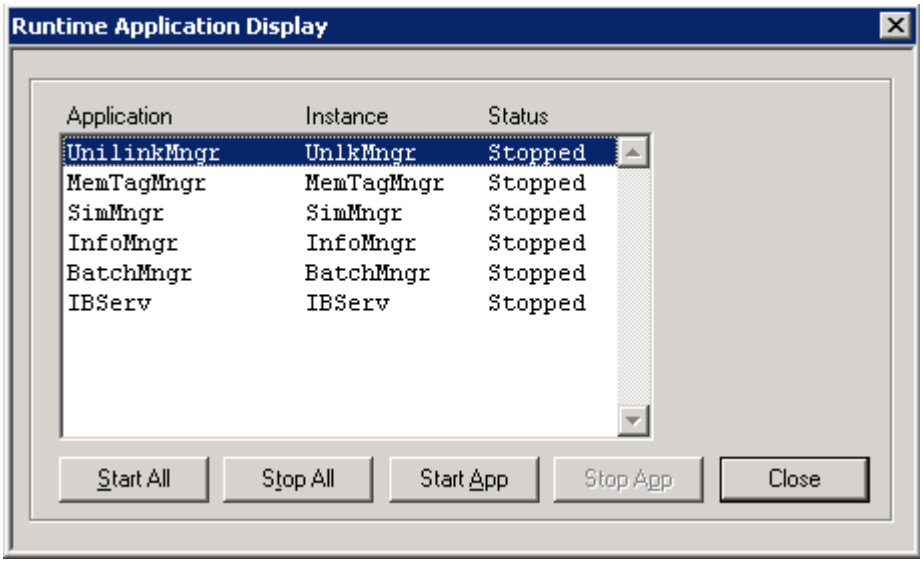
Start the Batch Management Server

This is the minimum set of run-time services that you must run on the Batch Management server in order for InTouch Scheduler to work correctly.

Service Name	Description or Function
BatchMngr	The Batch Engine. Always Required.
UnilinkMngr	Always required
MemTagMngr	Creates the Batch Management Memory Tags
SimMngr (or IBCli)	SimMngr simulates the phases. IBCli is hooked up to real I/O.
InfoMngr	Required for ActiveX client controls: OcxBatch, BatchSFC, and BatchGUI.
IBMX	Required if you are connecting to a Galaxy.

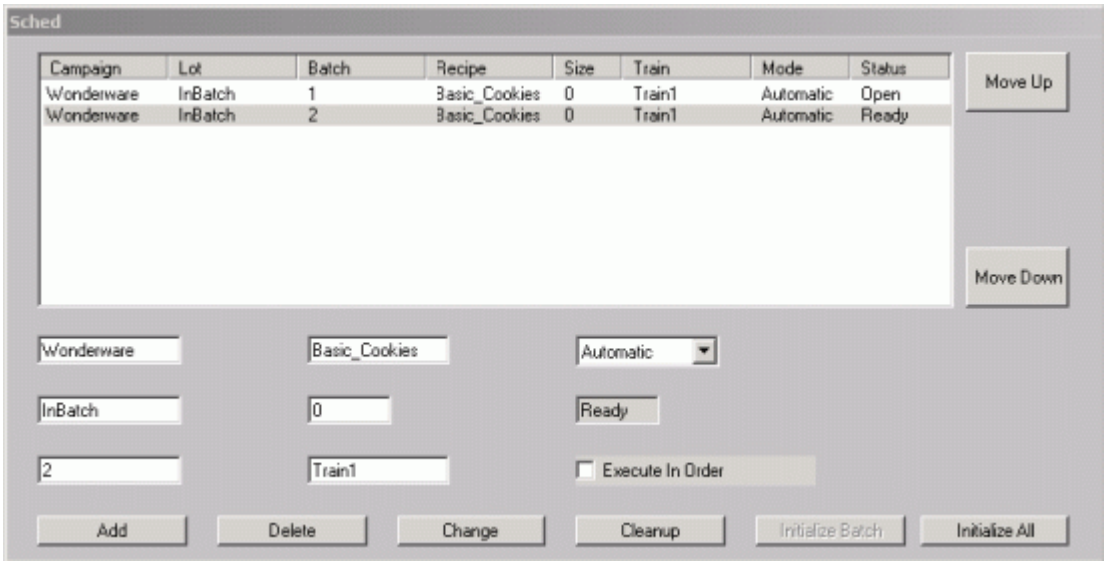
Note: By default, the IBServ application is also in the runtime list. IBServ is responsible for providing Batch Management tag information to DDE or SuiteLink clients. Since the BatchGUI controls do not use tag communications, IBServ may not be required. However, IBServ is required if you want to use the Batch Management system tags elsewhere in your InTouch client application.

- Open the **Runtime Application Display** dialog box and click **Start All**.



Running the InTouch Application

After all the Batch Management run-time services have started, you can switch the InTouch application to **Runtime**. If the AutoInit property of the BatchGuiConfig control is set (it is set by default), the application automatically connects to the Batch Management server. If batches are already scheduled on the server, you see them in the schedule list.



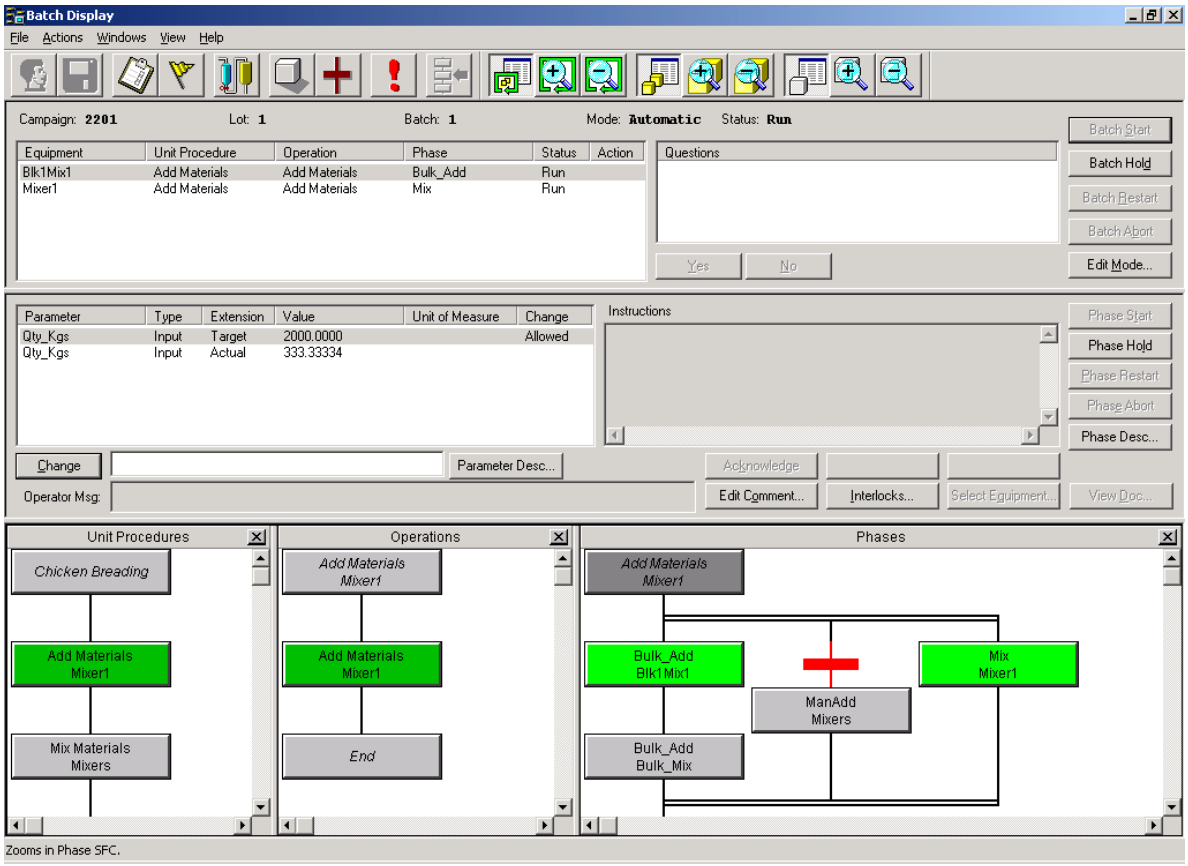
Note: The Recipe and Train fields can be populated from the Recipe List and Train List BatchList controls respectively. These can be added on this window or as a separate pop-up window.

Starting a Batch from the Batch Management Server

Perform the following steps to start a batch from the Batch Management Server.

To start a batch

1. On the **Environment Display** dialog box, double-click the **BatchDspl** icon. The **Batch Display** dialog box appears.



2. On the **Batch Display** dialog box, from the **Windows** menu, select **Schedule**. This action displays a list of available batches.
3. Select a batch from the list and click **Batch Start**.
4. Monitor the execution of the batch: answer any questions, enter data for manual phases, and acknowledge phases when necessary.

Starting a Batch from the Batch Management Run-Time Client (InTouch)

1. Make sure the InTouch WindowViewer application is running and appears in the **Schedule** dialog box.
2. Enter the information shown below and then click **Add**.

Batch Item	Value
Campaign	C001
Lot	L002
Batch	1

Batch Item	Value
Recipe	CB1000
Quantity	5000
Train	Mixer 1 Train

3. To initialize the new batch, click **Init Batch**. The batch status changes from **Open** to **Ready**.