Oracle® Process Manufacturing

Product Development User's Guide

Release 11*i*

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Oracle Process Manufacturing Product Development User's Guide, Release 11*i*

Part No. A92170-07

Primary Author: Richard D. Persen

Contributing Authors: Michele-Andrea Fields, Eddie Oumerretane, Gina Walsh

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Preface

Welcome to the Oracle Process Manufacturing Product Development User's Guide, Release 11*i*.

This guide assumes you have a working knowledge of the following:

- The principles and customary practices of your business area.
- Oracle Process Manufacturing.

  If you have never used Oracle Process Manufacturing, Oracle suggests you attend one or more of the Oracle Applications training classes available through Oracle University.
- Oracle Self-Service Web Applications.

  To learn more about Oracle Self-Service Web Applications, read the *Oracle Self-Service Web Applications Implementation Manual*.
- The Oracle Applications graphical user interface.

  To learn more about the Oracle Applications graphical user interface, read the *Oracle Applications User's Guide*.

See Other Information Sources for more information about Oracle Applications product information.

How To Use This Guide

The Oracle Process Manufacturing Product Development User's Guide contains the information you need to understand and use the Oracle Process Manufacturing Process Execution application. This guide contains eight chapters, five appendixes, and a glossary:

- Chapter 1, Understanding Product Development, describes the fundamentals of Product Development. It presents the basic processes required to develop a new product, and it introduces a basic understanding of navigation, workbenches, the status approval workflow, adding and editing status codes, and version control.
- Chapter 2, Setting Up, describes setup requirements in other applications. It presents the setup of responsibilities and menu access, and optional setup of formula classes, operation classes, and routing classes. The chapter also explains the setup of activities, laboratories, technical parameters, technical parameter sequences, item technical data, technical classes, and technical subclasses.
- Chapter 3, Formulas, includes a basic understanding of formula setup, including how to set up and find formula information. It shows how to find a formula. Information is provided for using formula phantoms. Methods available to scale formulas are discussed. In addition to entering formula details, the chapter provides information on how to define and maintain formulas at the header and line levels, including methods for displaying summaries of products, byproducts, and ingredients. Use of computer-aided formulation is provided, including how to set up and load formulas and batches onto the Simulator. Discussions include how to update formulas and batches, add lot and sublot information, display parameters, and view calculation errors. Optimizer and Workpad use are discussed in the context of formula and batch optimization, and the recalculation of quantities and physical properties. A detailed explanation of optimizing lot quantities while maintaining output yield is presented with ingredient distribution rules used in the optimization process. Procedures for running and interpreting the Indented Bill of Materials Report and formula inquiry are provided. The complete process of analyzing a formula, displaying formula analysis results, and overriding default explosion rules are given.
- Chapter 4, Operations, presents information on how to maintain operations, activities, and resources. It shows how to find an operation. The chapter also presents summaries of operations and operation headers to give an overview of operations created. The process to enter operation activity details and

activity-resource details is explained with information on how to display activity lines and how to edit a summary of resource lines.

- Chapter 5, Routings, presents information on how to define, maintain, and find routings. It shows how to find a routing. A summary of routings and routing headers delivers an overview of routings created. The process to enter routing details and display the routing step line summary is explained. Procedures to edit routing step lines and to enter routing step dependencies are given. The chapter also presents information on how to display and edit theoretical process loss, and how to search for and replace routings. Features available for the routing designer are presented.
- Chapter 6, Recipes, presents information on how to define and maintain recipes. It shows how to find a recipe. A summary of recipes and recipe headers delivers an overview of recipes created. A basic understanding of step quantity calculations is provided with a procedure to enter recipe details and recipe organization details. The process to enter and edit validity rules and to interpret recipe step and material association delivers a basic understanding of recipe use. Features available for the recipe designer are presented, including the entry and editing of information on the process instruction sheet.
- Chapter 7, Tools, presents information on how to perform a search and replace of components in operations, routings, formulas, or recipes.
- Appendix A, Product Development Navigator Paths, describes how to navigate to each window.
- Appendix B, Product Development Profile Options, describes profile options.
- Appendix C, Product Development Status Codes, describes status codes.
- Appendix D, Oracle E-Record Events in Product Development, briefly describes e-record and e-signature events used in Product Development.
- A Glossary provides definitions of terms that are used in this guide.

Documentation Accessibility

Our goal is to make Oracle products, services, and supporting documentation accessible, with good usability, to the disabled community. To that end, our documentation includes features that make information available to users of assistive technology. This documentation is available in HTML format, and contains markup to facilitate access by the disabled community. Standards will continue to evolve over time, and Oracle is actively engaged with other market-leading technology vendors to address technical obstacles so that our documentation can be accessible to all of our customers. For additional information, visit the Oracle Accessibility Program Web site at http://www.oracle.com/accessibility/

Accessibility of Code Examples in Documentation

JAWS, a Windows screen reader, may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, JAWS may not always read a line of text that consists solely of a bracket or brace.

Accessibility of Links to External Web Sites in Documentation

This documentation may contain links to Web sites of other companies or organizations that Oracle does not own or control. Oracle neither evaluates nor makes any representations regarding the accessibility of these Web sites.

Other Information Sources

You can choose from many sources of information, including documentation, training, and support services, to increase your knowledge and understanding of Oracle Process Manufacturing.

If this guide refers you to other Oracle Applications documentation, use only the Release 11*i* versions of those guides.

Online Documentation

All Oracle Applications documentation is available online (HTML or PDF).

- **PDF Documentation-** See the Online Documentation CD for current PDF documentation for your product with each release. This Documentation CD is also available on Oracle*MetaLink* and is updated frequently.
- **Online Help -** You can refer to Oracle Applications Help for current HTML online help for your product. Oracle provides patchable online help, which you can apply to your system for updated implementation and end user documentation. No system downtime is required to apply online help.
- **Release Content Document -** See the Release Content Document for descriptions of new features available by release. The Release Content Document is available on Oracle*MetaLink*.
- **About document -** Refer to the About document for information about your release, including feature updates, installation information, and new documentation or documentation patches that you can download. The About document is available on Oracle*MetaLink*.

Related Guides

Oracle Process Manufacturing shares business and setup information with other Oracle Applications products. Therefore, you may want to refer to other guides when you set up and use Oracle Process Manufacturing.

You can read the guides online by choosing Library from the expandable menu on your HTML help window, by reading from the Oracle Applications Document Library CD included in your media pack, or by using a Web browser with a URL that your system administrator provides.

If you require printed guides, you can purchase them from the Oracle Store at http://oraclestore.oracle.com.

Guides Related to All Products

Oracle Applications User's Guide

This guide explains how to enter data, query, run reports, and navigate using the graphical user interface (GUI). This guide also includes information on setting user profiles, as well as running and reviewing reports and concurrent processes.

You can access this user's guide online by choosing "Getting Started with Oracle Applications" from any Oracle Applications help file.

Guides Related to This Product

Accounting Setup User's Guide

The OPM Accounting Setup application is where users set up global accounting attributes about the way financial data will be collected by OPM. These attributes include such things as account keys, financial calendars, and account segments. Since OPM is closely integrated with Oracle General Ledger (GL), much of the attributes are defined in the Oracle GL instead of OPM, and therefore, the windows are display only within OPM. The *Oracle Process Manufacturing Accounting Setup User's Guide* describes how to setup and use this application.

Cost Management User's Guide

The OPM Cost Management application is used by cost accountants to capture and review the manufacturing costs incurred in their process manufacturing businesses. The *Oracle Process Manufacturing Cost Management User's Guide* describes how to setup and use this application.

Manufacturing Accounting Controller User's Guide

The Manufacturing Accounting Controller application is where users define the impact of manufacturing events on financials. For example, event RCPT (Inventory Receipts) results in a debit to inventory, a credit to accrued accounts payable, a debit or a credit to purchase price variance, etc. These impacts are predefined in the Manufacturing Accounting Controller application so users may begin using OPM to collect financial data out-of-the-box, however, they may also be adjusted per your business needs. The *Oracle Process Manufacturing Manufacturing Accounting Controller User's Guide* describes how to setup and use this application.

Oracle Financials Integration User's Guide

Since OPM is closely integrated with Oracle General Ledger, financial data that is collected about the manufacturing processes must be transferred to the Oracle Financials applications. The OPM Oracle Financials Integration application is where users define how that data is transferred. For example, users define whether data is transferred real time or batched and transferred at intervals. The *Oracle Process Manufacturing Oracle Financials Integration User's Guide* describes how to setup and use this application.

Inventory Management User's Guide

The OPM Inventory Management application is where data about the items purchased for, consumed during, and created as a result of the manufacturing process are tracked. The *Oracle Process Manufacturing Inventory Management User's Guide* includes information to help you effectively work with the Oracle Process Manufacturing Inventory application.

Physical Inventory User's Guide

Performing physical inventory count is the most accurate way to get an accounting of all material quantities purchased, manufactured, and sold, and update your onhand quantities accordingly. The OPM Physical Inventory application automates and enables the physical inventory process. The *Oracle Process Manufacturing Physical Inventory User's Guide* describes how to setup and use this application.

Order Fulfillment User's Guide

The OPM Order Fulfillment application automates sales order entry to reduce order cycle time. Order Fulfillment enables order entry personnel to inform customers of scheduled delivery dates and pricing. The *Oracle Process Manufacturing Order Fulfillment User's Guide* describes how to setup and use this application.

Purchase Management User's Guide

OPM Purchase Management and Oracle Purchasing combine to provide an integrated solution for Process Manufacturing. Purchase orders are entered in Oracle Purchasing and received in OPM. Then, the receipts entered in OPM are sent to Oracle Purchasing. The *Oracle Process Manufacturing Purchase Management User's Guide* describes how to setup and use this integrated solution.

Using Oracle Order Management with Process Inventory Guide

Oracle Process Manufacturing and Oracle Order Management combine to provide an integrated solution for process manufacturers. The manufacturing process is tracked and handled within Oracle Process Manufacturing, while sales orders are taken and tracked in Oracle Order Management. Process attributes, such as dual UOM and lot control, are enabled depending on the inventory organization for the item on the sales order. Order Management accepts orders entered through Oracle Customer Relationship Management (CRM). Within CRM, orders can originate from TeleSales, Sales Online, and iStore, and are booked in Order Management, making the CRM suite of products available to Process customers, through Order Management. The *Oracle Order Management User's Guide* and *Using Oracle Order Management with Process Inventory Guide* describes how to setup and use this integrated solution.

Process Execution User's Guide

The OPM Process Execution application lets you track firm planned orders and production batches from incoming materials through finished goods. Seamlessly integrated to the Product Development application, Process Execution lets you convert firm planned orders to single or multiple production batches, allocate ingredients, record actual ingredient usage, and then complete and close production batches. Production inquiries and preformatted reports help you optimize inventory costs while maintaining a high level of customer satisfaction with on-time delivery of high quality products. The *OPM Process Execution User's Guide* presents overviews of the tasks and responsibilities for the Production Supervisor and the Production Operator. It provides prerequisite setup in other applications, and details the windows, features, and functionality of the OPM Process Execution application.

Using Oracle Advanced Planning and Scheduling with Oracle Process Manufacturing

Oracle Process Manufacturing and Oracle Advanced Planning and Scheduling (APS) combine to provide a solution for process manufacturers that can help increase planning efficiency. This solution provides for constraint-based planning, performance management, materials management by exception, mixed mode manufacturing that enables you to choose the best method to produce each of your products, and combine all of these methods within the same plant/company. The *Using Oracle Advanced Planning and Scheduling with Oracle Process Manufacturing User's Guide* describes how to setup and use this application.

MPS/MRP and Forecasting User's Guide

The Oracle Process Manufacturing Material Requirements Planning (MRP) application provides long-term "views" of material demands and projected supply actions to satisfy those demands. The Master Production Scheduling (MPS) application lets you shorten that view to a much narrower and immediate time horizon, and see the immediate effects of demand and supply actions. The *Oracle Process Manufacturing MPS/MRP and Forecasting User's Guide* describes how to setup and use this application.

Capacity Planning User's Guide

The OPM Capacity Planning User's Guide describes the setup required to use OPM with the Oracle Applications Advanced Supply Chain Planning solutions. In addition, Resource setup, used by the OPM Production Execution and New Product Development applications, is also described.

Using Oracle Process Manufacturing with Oracle Manufacturing Scheduling

Oracle Process Manufacturing integrates with Oracle Manufacturing Scheduling to manage and utilize resources and materials. Through the Process Manufacturing application, you set up manufacturing, inventory, procurement and sales order data. Through the Manufacturing Scheduling application, you can optimize the schedule based on resource and component constraints and user predefined priorities. Using different optimization objectives, you can tailor Manufacturing Scheduling to meet your needs.

Using Oracle Manufacturing Scheduling helps you improve productivity and efficiency on your shop floor. By optimally scheduling shop floor jobs, and being able to quickly react to unplanned constraints, you can lower manufacturing costs, increase resource utilization and efficiency, and increase customer satisfaction through improved on-time delivery. The *Using Oracle Process Manufacturing with Oracle Manufacturing Scheduling User's Guide* describes how to setup and use this integrated solution.

Product Development User's Guide

The Oracle Process Manufacturing Product Development application provides features to manage formula and laboratory work within the process manufacturing operation. It lets you manage multiple laboratory organizations and support varying product lines throughout the organization. You can characterize and simulate the technical properties of ingredients and their effects on formulas. You can optimize formulations before beginning expensive laboratory test batches. Product Development coordinates each development function and enables a rapid,

enterprise-wide implementation of new products in your plants. The *Oracle Process Manufacturing Product Development User's Guide* describes how to setup and use this application.

Quality Management User's Guide

The Oracle Process Manufacturing Quality Management application provides features to test material sampled from inventory, production, or receipts from external suppliers. The application lets you enter specifications and control their use throughout the enterprise. Customized workflows and electronic record keeping automate plans for sampling, testing, and result processing. You can compare specifications to assist in regrading items, and match customer specifications. Aggregate test results and print statistical assessments on quality certificates. Several preformatted reports and inquiries help manage quality testing and reporting. The *Oracle Process Manufacturing Quality Management User's Guide* describes how to set up and use this application.

Implementation Guide

The *Oracle Process Manufacturing Implementation Guide* offers information on setup. That is, those tasks you must complete following the initial installation of the Oracle Process Manufacturing software. Any tasks that must be completed in order to use the system out-of-the-box are included in this manual.

System Administration User's Guide

Much of the System Administration duties are performed at the Oracle Applications level, and are therefore described in the *Oracle Applications System Administrator's Guide.* The *Oracle Process Manufacturing System Administration User's Guide* provides information on the few tasks that are specific to OPM. It offers information on performing OPM file purge and archive, and maintaining such things as responsibilities, units of measure, and organizations.

API User's Guides

Public Application Programming Interfaces (APIs) are available for use with different areas of the Oracle Process Manufacturing application. APIs make it possible to pass information into and out of the application, bypassing the user interface. Use of these APIs is documented in individual manuals such as the *Oracle Process Manufacturing Inventory API User's Guide, Oracle Process Manufacturing Process Execution API User's Guide, Oracle Process Manufacturing Product Development Formula API User's Guide, Oracle Process Manufacturing Product Development Recipe API User's Guide, Oracle Process Manufacturing Quality Management API User's Guide,*

and the *Oracle Process Manufacturing Cost Management API User's Guide.* Additional API User's Guides are periodically added as additional public APIs are made available.

Installation and System Administration

Oracle Applications Concepts

This guide provides an introduction to the concepts, features, technology stack, architecture, and terminology for Oracle Applications Release 11*i*. It provides a useful first book to read before an installation of Oracle Applications. This guide also introduces the concepts behind Applications-wide features such as Business Intelligence (BIS), languages and character sets, and Self-Service Web Applications.

Installing Oracle Applications

This guide provides instructions for managing the installation of Oracle Applications products. In Release 11*i*, much of the installation process is handled using Oracle Rapid Install, which minimizes the time to install Oracle Applications and the Oracle technology stack by automating many of the required steps. This guide contains instructions for using Oracle Rapid Install and lists the tasks you need to perform to finish your installation. You should use this guide in conjunction with individual product user guides and implementation guides.

Upgrading Oracle Applications

Refer to this guide if you are upgrading your Oracle Applications Release 10.7 or Release 11.0 products to Release 11*i*. This guide describes the upgrade process and lists database and product-specific upgrade tasks. You must be either at Release 10.7 (NCA, SmartClient, or character mode) or Release 11.0, to upgrade to Release 11*i*. You cannot upgrade to Release 11*i* directly from releases prior to 10.7.

"About" Document

For information about implementation and user documentation, instructions for applying patches, new and changed setup steps, and descriptions of software updates, refer to the "About" document for your product. "About" documents are available on Oracle*MetaLink* for most products starting with Release 11.5.8.

Maintaining Oracle Applications

Use this guide to help you run the various AD utilities, such as AutoUpgrade, AutoPatch, AD Administration, AD Controller, AD Relink, License Manager, and others. It contains how-to steps, screenshots, and other information that you need to run the AD utilities. This guide also provides information on maintaining the Oracle applications file system and database.

Oracle Applications System Administrator's Guide

This guide provides planning and reference information for the Oracle Applications System Administrator. It contains information on how to define security, customize menus and online help, and manage concurrent processing.

Oracle Alert User's Guide

This guide explains how to define periodic and event alerts to monitor the status of your Oracle Applications data.

Oracle Applications Developer's Guide

This guide contains the coding standards followed by the Oracle Applications development staff and describes the Oracle Application Object Library components that are needed to implement the Oracle Applications user interface described in the *Oracle Applications User Interface Standards for Forms-Based Products*. This manual also provides information to help you build your custom Oracle Forms Developer forms so that the forms integrate with Oracle Applications.

Oracle Applications User Interface Standards for Forms-Based Products

This guide contains the user interface (UI) standards followed by the Oracle Applications development staff. It describes the UI for the Oracle Applications products and how to apply this UI to the design of an application built by using Oracle Forms.

Other Implementation Documentation

Oracle Applications Product Update Notes

Use this guide as a reference for upgrading an installation of Oracle Applications. It provides a history of the changes to individual Oracle Applications products between Release 11.0 and Release 11*i*. It includes new features, enhancements, and changes made to database objects, profile options, and seed data for this interval.

Oracle Workflow Administrator's Guide

This guide explains how to complete the setup steps necessary for any Oracle Applications product that includes workflow-enabled processes, as well as how to monitor the progress of runtime workflow processes.

Oracle Workflow Developer's Guide

This guide explains how to define new workflow business processes and customize existing Oracle Applications-embedded workflow processes. It also describes how to define and customize business events and event subscriptions.

Oracle Workflow User's Guide

This guide describes how Oracle Applications users can view and respond to workflow notifications and monitor the progress of their workflow processes.

Oracle Workflow API Reference

This guide describes the APIs provided for developers and administrators to access Oracle Workflow.

Oracle Applications Flexfields Guide

This guide provides flexfields planning, setup and reference information for the Oracle Process Manufacturing implementation team, as well as for users responsible for the ongoing maintenance of Oracle Applications product data. This guide also provides information on creating custom reports on flexfields data.

Oracle eTechnical Reference Manuals

Each eTechnical Reference Manual (eTRM) contains database diagrams and a detailed description of database tables, forms, reports, and programs for a specific Oracle Applications product. This information helps you convert data from your existing applications, integrate Oracle Applications data with non-Oracle applications, and write custom reports for Oracle Applications products. Oracle eTRM is available on Oracle*Metalink*

Oracle Applications Message Manual

This manual describes all Oracle Applications messages. This manual is available in HTML format on the documentation CD-ROM for Release 11*i*.

Training and Support

Training

Oracle offers a complete set of training courses to help you and your staff master Oracle Process Manufacturing and reach full productivity quickly. These courses are organized into functional learning paths, so you take only those courses appropriate to your job or area of responsibility.

You have a choice of educational environments. You can attend courses offered by Oracle University at any one of our many education centers, you can arrange for our trainers to teach at your facility, or you can use Oracle Learning Network (OLN), Oracle University's online education utility. In addition, Oracle training professionals can tailor standard courses or develop custom courses to meet your needs. For example, you may want to use your organization structure, terminology, and data as examples in a customized training session delivered at your own facility.

Support

From on-site support to central support, our team of experienced professionals provides the help and information you need to keep Oracle Process Manufacturing working for you. This team includes your technical representative, account manager, and Oracle's large staff of consultants and support specialists with expertise in your business area, managing an Oracle server, and your hardware and software environment.

Do Not Use Database Tools to Modify Oracle Applications Data

Oracle STRONGLY RECOMMENDS that you never use SQL*Plus, Oracle Data Browser, database triggers, or any other tool to modify Oracle Applications data unless otherwise instructed.

Oracle provides powerful tools you can use to create, store, change, retrieve, and maintain information in an Oracle database. But if you use Oracle tools such as SQL*Plus to modify Oracle Applications data, you risk destroying the integrity of your data and you lose the ability to audit changes to your data.

Because Oracle Applications tables are interrelated, any change you make using Oracle Applications can update many tables at once. But when you modify Oracle Applications data using anything other than Oracle Applications, you may change a row in one table without making corresponding changes in related tables. If your tables get out of synchronization with each other, you risk retrieving erroneous information and you risk unpredictable results throughout Oracle Applications.

When you use Oracle Applications to modify your data, Oracle Applications automatically checks that your changes are valid. Oracle Applications also keeps track of who changes information. If you enter information into database tables using database tools, you may store invalid information. You also lose the ability to track who has changed your information because SQL*Plus and other database tools do not keep a record of changes.

About Oracle

Oracle develops and markets an integrated line of software products for database management, applications development, decision support, and office automation, as well as Oracle Applications, an integrated suite of more than 160 software modules for financial management, supply chain management, manufacturing, project systems, human resources and customer relationship management.

Oracle products are available for mainframes, minicomputers, personal computers, network computers and personal digital assistants, allowing organizations to integrate different computers, different operating systems, different networks, and even different database management systems, into a single, unified computing and information resource.

Oracle is the world's leading supplier of software for information management, and the world's second largest software company. Oracle offers its database, tools, and applications products, along with related consulting, education, and support services, in over 145 countries around the world.

Your Feedback

Thank you for using Oracle Process Manufacturing and this user guide.

Oracle values your comments and feedback. In this guide is a reader's comment form that you can use to explain what you like or dislike about Oracle Process Manufacturing or this user guide. Mail your comments to the following address or call us directly at (650) 506-7000.

Oracle Applications Documentation Manager
Oracle Corporation
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Or, send electronic mail to appsdoc_us@oracle.com.

1

Understanding Product Development

This topic provides the fundamentals of Product Development. It presents the basic tasks, responsibilities, and process flow required to develop a product. You are given a basic understanding of navigation, workbenches, the status approval workflow, and version control. You are shown how to add and edit status codes.

The following topics are covered:

About This Guide

The purpose of this guide is to provide reference information for end-level users of the OPM Product Development application. It presents:

- Overviews of all the processes that comprise the Product Development application, and how these were developed from a detailed analysis of the tasks and responsibilities.
- Overviews of navigation, workbenches, status approval workflow, and version control.
- Prerequisite setup in the OPM System Administration, OPM Inventory Control, and OPM Cost Management applications.
- Setup required in the Product Development application for: responsibilities and menu access, formula classes, operation classes, routing classes, activities, resources, plant resources, laboratories, technical parameters, technical parameter sequences, and technical class and subclass category sets.
- Procedures for formula management, including: entering item technical data, setting up formula information, using formula phantoms, defining and maintaining formulas, using formula summaries, entering formula details and editing formula lines, using computer-aided formulation, loading formulas and batches onto the Simulator, using the Simulator, using the Optimizer, performing an ingredient where used inquiry, running an Indented Bill of Materials Report, using formula inquiry, interpreting a formula inquiry, analyzing a formula, displaying formula analysis results, finding a formula analysis, and overriding default explosion rules. Procedures are also provided for using the Routing Designer.
- Procedures for operation management, including: defining and maintaining operations, defining and maintaining activities, defining and maintaining resources, finding an operation, displaying operations summaries, entering operation activity details, entering activity resource details, displaying operation activity lines, and, editing resource lines.
- Procedures for routing management, including: defining and maintaining routings, finding a routing, using routing summaries, entering routing details, displaying routing step line summaries, editing routing step lines, entering routing step dependencies and, displaying and editing theoretical process loss.
- Procedures for recipe management, including: defining and maintaining recipes, finding a recipe, displaying recipe summaries, understanding step quantity calculations, entering recipe details, entering recipe organization

details, entering multi-record validity rules, editing validity rules, and displaying the recipe step and material association. Procedures are also provided for using the Recipe Designer.

- Procedures for mass search and replace, including: understanding search and replace, mass search and replace security, performing a search and replace, and using the Replace Results window.

Depending on your system security profile, it is possible that you do not have access to all of the windows and functions described in this guide. If you do not see a menu option described, and you need to access it, contact your system administrator.

About Product Development

Reducing time to market is one of the most important objectives in developing a successful product. Research shows that one of the strongest drivers for on time product delivery is the use of a cross-functional, dedicated, and accountable team. To be successful, the team needs a strong leader and top management support. Oracle Process Manufacturing Product Development delivers a seamless, development environment that helps your team:

- Reduce time to market by using a solid framework that manages recipes from concept through production.
- Expand the enterprise by strengthening relationships with vendors and customers.
- Share project information and collaborate globally using the Internet.
- Manage quality processes proactively.
- Streamline production efficiencies.

Product Development enhances product consistency and reduces the costs associated with creating and modifying formulas by letting you adapt quickly to different research and development environments. You are able to manage many laboratory organizations and support varying product lines throughout the organization. You can characterize and simulate the technical properties of ingredients and their effects on formulas. You can optimize formulations before beginning expensive laboratory test batches. Product Development coordinates each development function and enables a rapid, enterprise-wide implementation of new products in your plants.

By managing a recipe from its inception through production you have the ability to reduce the overall product development life cycle time. Recipes account not only for ingredient usage, but also for quality characteristics of those ingredients, costing implications of any alternate materials or processes, specific requirements of customers, corporate manufacturing standards, and regulatory compliance issues. Product Development combines the previous Laboratory and Formula Management applications into a single, integrated, secure formulation environment. Formulators and Process Engineers are able to collaborate in the development and maintenance of new and existing products using a workbench. The workbench is a job specific role that enables rapid definition and easier maintenance of recipe components. Workbenches increase formula usage flexibility to streamline the overall production process.

Tasks and Responsibilities

One of the most challenging aspects of Product Development is effective information transfer. Each job role must collaborate at various points throughout the product development cycle.

The following is representative of the work breakdown structure required to develop a new product. It lists most of the key tasks and the job titles responsible for those tasks:

- Define product requirements.
  - Product Development Manager
  - Marketing Manager
  - Customer
- Search for or copy a formula.
  - Formulator
- Define ingredient parameters.
  - Formulator
- Prototype the formula.
  - Formulator
- Determine production feasibility of the prototype formula.
  - Formulator
  - Purchasing
- Determine formula reproducibility using laboratory scale batches.
  - Formulator
  - Tester
- Determine formula stability.
  - Formulator
  - Packaging Engineer
- Evaluate quality control specifications.
  - Formulator
  - Tester

- Create a routing.
  - Packaging Engineer
  - Process Engineer
- Run pilot plant batches.
  - Process Engineer
- Select the optimal recipe.
  - Marketing Manager
  - Customer
- Obtain field approvals.
  - Plant Manager
  - Process Engineer
- Assign effective date use.
  - Formulator
  - Process Engineer

Process Flow

The Product Development application provides a seamless integration of the work breakdown structure outlined in the Tasks and Responsibilities topic. The Product Development process flow consists of the following steps in each of the applications listed. Prerequisite Setup is required before the remaining steps are completed. Formula Setup and Creation, Laboratory Setup, and Routing Setup and Creation can be performed in parallel. Recipe Creation ties all the preceding activities together.

Prerequisite Setup

Prerequisite setup must be completed for each of the following applications:

- OPM System Administration
  - Set up required profile options as described in *Oracle Process Manufacturing Implementation Guide*, *Oracle Inventory User's Guide*, and *Oracle Workflow*. Required.
  - Set up Responsibilities for Formulator, Process Engineer, Product Development Security Manager, and Product Development Security Profile Manager. Required.
  - Set up Version Control. Required.
  - Set up the Status Approval Workflow. Optional.
  - Set up Oracle E-Records as described in the *Oracle E-Records Implementation Guide*. Optional.
  - Set up Mass Search and Replace security.
- OPM Inventory Control
  - Set up items, item attributes, unit of measure conversions, and item lot and sublot conversions. Required.
- OPM Cost Management
  - Set up cost analysis codes and the cost calendar. Required.

Formula Setup and Creation

Formula setup and creation is performed in:

- Formulator
  - Set up formula classes. Optional.

- Create new formulas. Required.

Laboratory Setup

Laboratory setup is performed in:

- OPM System Administration
  - Set up laboratories. Optional.
  - Set up technical parameters. Optional.
  - Set up technical parameter sequences. Optional.

Routing Setup and Creation

Routing setup and creation is performed in:

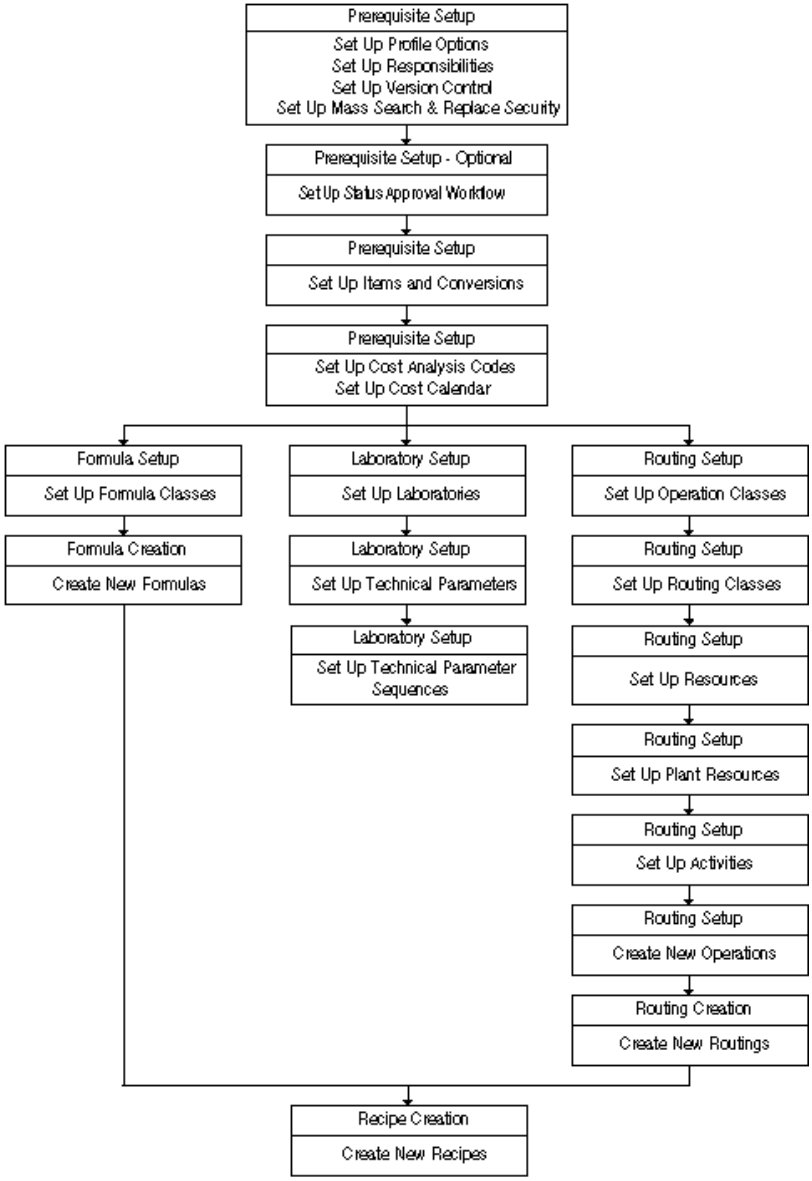
- Process Engineer
  - Set up operation classes. Optional.
  - Set up routing classes. Optional.
  - Set up resources. Required if setting up operations.
  - Set up plant resources. Required if setting up operations.
  - Set up activities. Required if setting up operations.
  - Create new operations. Required if setting up routings.
  - Create new routings. Required if using routings in recipes.

Recipe Creation

Recipe creation is performed in:

- Formulator
  - Create new recipes. Required.

The following depicts the previously described process flow:



Understanding Navigation

The following information is a summary of more detailed discussions found in the *Oracle Applications User's Guide*.

Navigating the Product Development Application:

In addition to the standard menu and toolbar, a navigator tree provides a hierarchical display of the objects in a treelike framework.

Node and Leaf

The higher level nodes in the navigator tree include forms and database objects. All other nodes, and the objects they contain, are indented to indicate that they belong to these higher level nodes. The terminal node is a leaf. The Product Development application uses Data Organizer tabs to group various objects such as recipes, formulas, routing and operations. Refer to Identifying Nodes and Tabs on the Navigator for specific nodes and tabs that are used in the Product Development application.

Menu and Toolbar

Menu and toolbar components let you access all globally available functions.

Data Organizer

The Data Organizer groups objects on separate tabs. Each has a unique icon and its own tree hierarchy.

Summary Views

Summary views provide the highest level of business information and display information. When you select any container on the Data Organizer navigator tree, the summary view can also list the contents of the container in a multirecord block.

Detail Views

Detail views let you display and edit information.

See: *Oracle Applications User's Guide* for more information on navigation.

◗ To navigate the Product Development application:

The following is a typical flow through the Product Development application Data Organizer navigator tree:

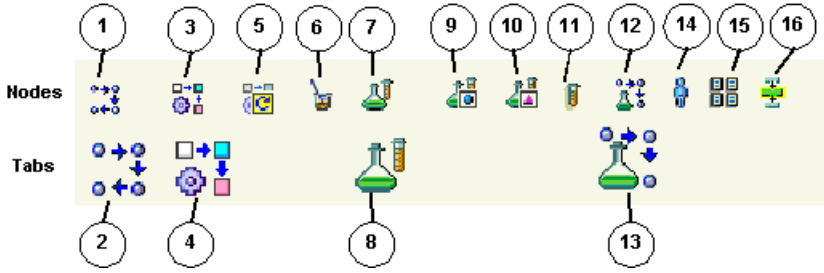
1. Open the appropriate Formulator or Process Engineer workbench. These are assigned by the System Administrator.
2. Click the region that contains the object type of interest. For example, the Process Engineer workbench includes these tabs:
   - Recipe
   - Formula
   - Routing
   - Operation
3. Select the appropriate **View By** field. This field presents records sorted and grouped by the selection you make. View By fields include:
   - Recipe, Formula, Routing, or Operation
   - Status
   - Owner
   - Class
4. Use one of the following methods to find the appropriate object:
   - Expand or collapse entries in the hierarchical Data Organizer tree.
   - Perform a Find operation from the View menu, choose the appropriate object from the results, and optionally, save the object in a Personal or Public folder. Optionally, use the right mouse click feature to perform a Find operation.
5. Use one of the following methods to show selected object Details:
   - Select the object in the Summary view, and click **Details**.
   - Select the top node of an expanded object on the navigator tree, and choose **New** from the **File** menu.
   - Select the top node of an expanded object on the navigator tree, and right mouse click. Select **New** from the right mouse click menu.
6. Double-click an expanded node in the Data Organizer until you reach the terminal or leaf object. When you click this object, it opens.
7. Perform actions on the selected object. Navigate from the Detail views to other related items of interest.

8. Use the right mouse click menu to copy objects from the navigator tree nodes and paste them into your Personal Shortcuts. You can retrieve these objects without the need to find them by methods previously described.

Identifying Nodes and Tabs on the Navigator Tree:

The following discussion and graphic identify and explain each of the nodes and tabs displayed on the navigator tree.

- 1 is a Routing node. It identifies a Routing on the Navigator.
- 2 is a Routing tab. Select it to display all Routing available to your Responsibility.
- 3 is an Operation node. It identifies an Operation on the Navigator.
- 4 is an Operation tab. Select it to display all Operations available to your Responsibility
- 5 is an Activity node. It identifies an Activity on the Navigator.
- 6 is a Resource node. It identifies a Resource on the Navigator.
- 7 is a Formula node. It identifies a Formula on the Navigator.
- 8 is a Formula tab. Select it to display all Formulas available to your Responsibility.
- 9 is a Product node. It identifies a Product on the Navigator.
- 10 is a By-Product node. It identifies a By-Product on the Navigator.
- 11 is an Ingredient node. It identifies an Ingredient on the Navigator.
- 12 is a Recipe node. It identifies a Recipe on the Navigator.
- 13 is a Recipe tab. Select it to view all Recipes available to your Responsibility.
- 14 is an Owner node. It identifies an Owner on the Navigator.
- 15 is a Class node. It identifies a Class on the Navigator.
- 16 is a Status node. It identifies a Status on the Navigator.



Understanding Workbenches

The workbench provides you with a complete product, production, technical and cost profiling tool that enables you to model a new product and help you meet initial product specifications rapidly.

One of the major benefits of using a workbench is that you are able to perform what if analyses to facilitate the overall formulation process.

The workbench concept is different from previous approaches used to develop products by process manufacturers. Since new products are developed in the laboratory, the list of ingredients and products are recorded in the laboratory formula. Once the development is complete, production and cost formulas are required to manufacture and assign a cost to the product. With the Formulator Workbench, laboratory and production formulas are differentiated by a change in Status. Changing the status of an experimental formula for use by production, costing, or a Material Safety Data Sheet (MSDS) replaces the previous Formula upload and download functions with a new business process.

By coupling the workbench capability to a Status Approval Workflow, the entire process of initiating and monitoring the development of a new product is simplified.

To display the Process Engineer Workbench:

1. Navigate to the **Product Development Workbench**.
2. Expand **Routings** to view a summary of routings available to your responsibility. Expand **Operations**, **Formulas** and **Recipes** available to your responsibility as appropriate.
3. Expand **Personal Shortcuts** to view a summary of all of the personal shortcuts available to your responsibility.
4. Expand **Public Shortcuts** to view a summary of all public shortcuts available to your responsibility.

To display the Formulator Workbench:

1. Navigate to the **Formulator Workbench**.
2. Expand **Formulas** to view a summary of formulas available to your responsibility. Expand **Recipes**, **Routings**, and **Operations** available to your responsibility as appropriate.

3. Expand **Personal Shortcuts** to view a summary of all personal shortcuts available to your responsibility.
4. Expand **Public Shortcuts** to view a summary of all public shortcuts available to your responsibility.

See Also

Oracle Applications User's Guide

Understanding the Status Approval Workflow

When the Status Approval Workflow is activated, recipes, formulas, routings, operations, and validity rules require a series of approvals that result in reassigning their statuses through a predefined approval process. Laboratory Approval is optional in this workflow.

Individual tasks are included in each topic to show you how to manage the approval workflow process.

Understanding Workflow Processes

Oracle Workflow lets you automate and continuously improve business processes by routing information according to a set of business rules. You transmit this information to individuals both inside and outside your enterprise as needed.

Setting Up Approvers

The Status Approval Workflow routes information to an approver. An approver is an individual or a group. Any individual associated with that approver is able to act on the notification. Each notification includes a message associated with all the information an individual must make a decision. Some possible responses are also included. The Status Approval Workflow interprets each response and moves on to the next workflow activity.

Setting Up Workflow Processes

In order for a workflow to operate properly, set up the Oracle Workflow application as described in the *Oracle Workflow Guide*.

A workflow process starts when an application calls a set of Oracle Workflow Engine Application Program Interfaces (APIs). The workflow itself is depicted as a process diagram containing icons that represent activities. The process contains several workflow steps that include approvers, activities, and decision trees that are needed to complete the workflow.

Delivering Electronic Notifications

Oracle Workflow enables you to let people receive notifications of items awaiting their attention through electronic mail by using a web browser, or on a Notification Summary window in Oracle Applications.

Setting Up the Status Approval Workflow

Set up the Status Approval Workflow in the OPM System Administration application. Contact your System Administrator if you are not sure that this is set up.

Your OPM System Administrator must set up the following windows:

- **Workflow Process Activation** to define the approval processes that use the generic workflow process configuration framework. This window enables or disables the approval process in the database instance.
- **Workflow Process Configuration Framework** to define the configuration parameters for each approval process. These configuration parameters customize the approval process. For example, if a configuration parameter is specified as organization, the approval process for an organization could be enabled or disabled.
- **Workflow Activity Approval Configuration Framework** to define the configuration parameters for each approval process activity. These configuration parameters customize the behavior of an activity. For example, if the configuration parameter is specified as organization, the approval process activity behavior could be customized for an organization.
- **Workflow Process Configuration** to customize the approval process behavior at a customer site. Approval can be required based on a business process requirement. This window lets you enable or disable the approval process based on parameters that you defined in the Approval Process Configuration Framework.
- **Workflow Activity Configuration** to customize the approval process activities behavior based on configuration parameters defined in the Approval Process Activity Configuration Workflow. Enable or disable an activity and define an approver if the activity requires approval.

If the workflow does not start, the Workflow Activation window can be set to Deactivate. Contact your OPM System Administrator to determine if this window and all appropriate triggers have been set properly.

> **Note:** Product Development Workflows do not function if seed data is changed.

See: *Oracle Process Manufacturing System Administration User's Guide* for more information.

Enabling the Status Approval Workflow

Enable the Status Approval Workflow by setting it up in the System Administration application. Once it is set up and operating, the workflow is activated by changing the Status of a recipe, formula, routing, operation, or validity rule from NEW to any of the other available status.

Adding and Editing Status Codes to the Status Approval Workflow

If you modify or delete any of the predefined status codes that are supplied with this application, the Status Approval Workflow does not run as described in this documentation. You have the capability to add or edit status codes as described in the *Adding and Editing Status Codes* topic.

Understanding the Status Approval Workflow

When a recipe, or validity rule is created, the workflow runs as follows:

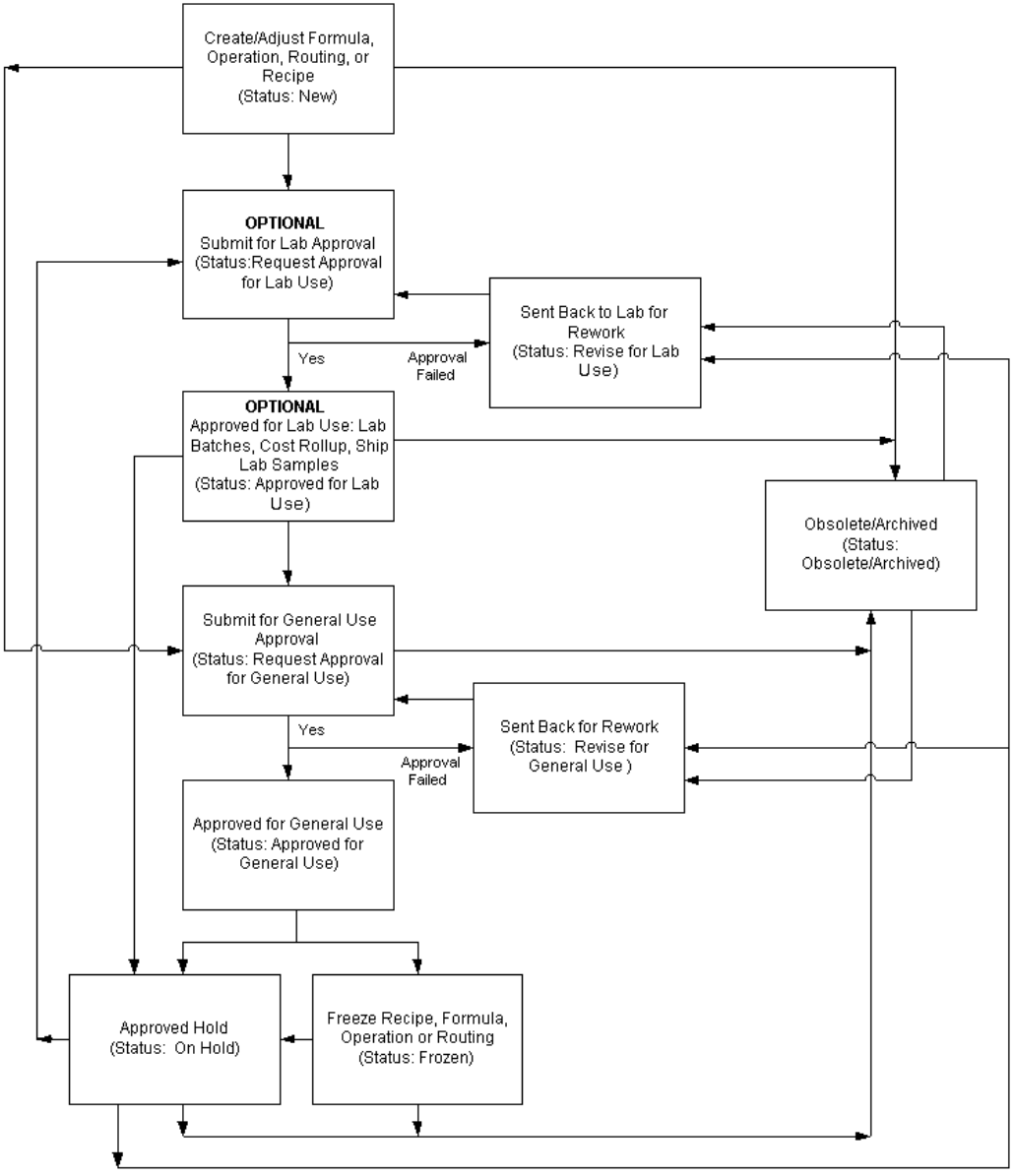
1. Upon creation, by default, the **Status** for a recipe, formula, routing, operation, or validity rule is assigned the Status **NEW**.
2. If you choose **Change Status** from the **Actions** menu and then select **Approved for Laboratory Use**, the workflow changes Status to **Request Approval for Laboratory Use**. Once approved, Status changes to **Approved for Laboratory Use**.
3. If you choose **Change Status** from the **Actions** menu and then select **Approved for General Use,** the workflow changes Status to **Request Approval for General Use**. Once approved, Status changes to **Approved for General Use**.
4. You have the option to assign the Status **Obsolete** or **Archived**.
5. An **Approved for Laboratory Use** status can be assigned these statuses:
   - On Hold
   - Obsolete or Archived
6. An **Approved for General Use** status can be assigned these statuses:
   - On Hold
   - Frozen
   - Obsolete or Archived
7. A **Pending Approval for Laboratory** status or a **Pending Approval for General Use** status can be assigned these statuses:
   - Obsolete

- Archived

8. Formulas, routings, operations, recipes, or validity rules that:
   - Fail the approval of **Pending Approval for Laboratory Use** Status are assigned the Status **Revise for Laboratory Use**.
   - Fail the approval of **Request Approval for General Use** Status are assigned the Status **Revise for General Use**.

Refer to "Generating a Recipe and Validity Rule Automatically" for additional information.

The following graphic depicts the previously described Status Approval Workflow:



Disabling the Status Approval Workflow

The System Administrator must disable the Status Approval Workflow. If the workflow is disabled, you can still change the Status of a recipe, formula, routing, operation, or validity rule. However, the Status change does not initiate the Status Approval Workflow.

See Also

Oracle Process Manufacturing System Administration User's Guide

Adding and Editing Status Codes

You are able to add to or edit the predefined status codes listed in Appendix C of this user's guide. Modification or deletion of the predefined status codes that are supplied with the application may result in the Status Approval Workflow not running as described in this documentation.

Do not delete predefined status codes since this could result in unexpected behavior of the application.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Read the *Understanding the Status Approval Workflow* topic.

◗ To add a new status code:

1. Navigate to the **Status Codes** window.
2. Choose **New** from the **File** menu. A new row appears for the new Status Code you want to add.
3. Enter a new **Status Code** number. The number you enter is sorted into ascending order with the other status codes when you save and reopen the Status Codes window.

   Codes entered between any two predefined codes, such as 101 to 199, or 201 to 299 are included in the workflow associated with the predefined status code with the same first digit. For example, if you enter the code 110, it becomes part of the workflow associated to Code 100. If you enter a code number 699, it becomes part of the workflow associated to Code 600. Predefined status codes are shown in a table at the end of this task. Required.
4. Enter a brief explanation of the new Status Code in the **Description** field. Required.
5. Enter the information that you want to display on the Status field for the Status Code in the **Meaning** field. Required.
6. The **Enable Version** check box determines whether the status code entered is set up for version control. Any modification made to an operation, routing, formula, or recipe while it is set to the status entered in the Meaning field initiates or bypasses activation of a new version depending on the selection you make here, and the value entered for the appropriate version control profile option.

- Select the check box if you want the status code to enable version control when a modification is made to an operation, routing, formula, or recipe. The appropriate version control profile option must be set to Yes or Optional.
- Clear the check box if you want the status code to bypass version control when a modification is made to an operation, routing, formula, or recipe.

7. Save the window.
8. Click **Details** to enter Status Details as described in the *Entering Status Details* topic.

The following are the required predefined status codes:

Code	Meaning	Description	Version Enabled
100	New	Formulation stage. Can make changes at any time, assuming security access.	Yes
200	Request Approval for Laboratory Use	Submitted for approval of use in Laboratory runs.	No
300	Revise for Laboratory	Approval has failed and rework is required	No
400	Approved for Laboratory Use	Can be used in Laboratory batches and cost rollups for Laboratory	Yes
500	Request Approval for General Use	Submitted for final approval	No
600	Revise for General Use	Approval has failed and rework is required	Yes
700	Approved for General Use	Can be used for production batches, cost rollups	Yes
800	On Hold	Object cannot be used until status is changed	No
900	Frozen	Prevents further changes to object and any dependent data. Object can still be used.	No
1000	Obsolete/Archived	Object can no longer be used unless status is changed.	No

To edit an existing status code:

1. Navigate to the **Status Codes** window.
2. Edit the following fields as required:
   - **Description**, to change the explanation of the status code.
   - **Meaning**, to change the information displayed on the Status field in the application.
3. The **Enable Version** check box determines whether the status code entered is set up for version control. Any modification made to an operation, routing, formula, or recipe while it is set to the status entered in the Meaning field initiates or bypasses activation of a new version depending on the selection you make here, and the value entered for the appropriate version control profile option.
   - Select the check box if you want the Status Code to enable version control when a modification is made to an operation, routing, formula, or recipe. The appropriate version control profile option must be set to Yes or Optional.
   - Clear the check box if you want the Status Code to bypass version control when a modification is made to an operation, routing, formula, or recipe.
4. Click **Details**. The **Status Details** window displays.
5. Edit the following fields as required:
   - **Target Status**, to change the code that appears as the destination status on the **Change Status** window.
   - **Rework Status**, to change the destination for the listed status code when it is not accepted and must be reworked.
   - **Pending Status**, to change the destination of the listed status code when it enters the approval workflow, and is pending approval.

   Required.
6. Edit the **Workflow Indicator** by selecting:
   - **Enable or Disable Workflow** to indicate that the fields listed in the row enable or disable the workflow.
   - **Workflow Approval** to indicate that the fields listed in the row require workflow approval.

- **No Workflow Approval** to indicate that the fields listed in the row do not require workflow approval.

  Required.

7. Click **OK**.
8. Save the window.

Entering Status Details

The Status Details window enables you to enter a target status for a new status code. You can optionally enter rework status, pending status, and assign a workflow indicator.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

To enter status details:

1. Enter a **Target Status** for the new Status Code. This is the code that appears as the destination status on the **Change Status** window. You have the ability to enter several Target Status destinations for each Status Code. They must be entered on separate lines. Required.
2. Optionally, enter a **Rework Status** for the new Status Code. The Rework Status code defines the destination for the listed Status Code when it is not accepted and must be reworked.
3. Optionally, enter a **Pending Status** for the new Status Code. The Pending Status code defines a destination of the listed Status Code when it enters the approval workflow and is pending approval.
4. Select one of the following as **Workflow Indicator**:

   - **Enable or Disable Workflow** to indicate that the fields listed in the row enable or disable the workflow.
   - **Workflow Approval** to indicate that the fields listed in the row require workflow approval.
   - **No Workflow Approval** to indicate that the fields listed in the row do not require workflow approval.

   Required.
5. Click **OK**.

6. Save the window.

Finding a Status Code

The Find Status Codes window lets you find a status code by code number, description, version enabled, or mark for purge status.

To find a status code:

1. Navigate to the **Find Status Codes** window.
2. Enter one or more of the following fields to narrow your search:
   - **Status Code**, to find a specific code number.
   - **Description**, to find a specific status code description.
   - The **Version Enabled** check box determines whether the status code entered is set up for version control. Any modification made to an operation, routing, formula, recipe, or validity rule while it is set to the status entered in the Meaning field initiates or bypasses activation of a new version depending on the selection you make here, and the value entered for the appropriate version control profile option.
     - Select the check box if you want to find the status codes that enable version control when a modification is made to an operation, routing, formula, recipe, or validity rule. The appropriate version control profile option must be set to Yes or Optional.
     - Clear the check box if you do not want to find the status codes that bypass version control when a modification is made to an operation, routing, formula, recipe, or validity rule.
   - The **Mark For Deletion** list box lets you find status codes with the status:
     - **Yes** indicating the status code has been marked for purge
     - **No** indicating that the status code has been undeleted.
3. Click **Find** to display the results of your query.
4. Click the down arrow to display all status codes that were found.
5. Optionally, click **New** to enter a new status code. The **Status Codes** window displays.

Understanding Version Control

Some businesses require version control to generate an audit trail. By monitoring version changes you define rules for modifying recipes, formulas, routings, operations, and quality specifications. The Product Development Version Control function lets you determine if an existing version can be modified, or if a new version must be created. Product Development lets you:

- Force the creation of new versions so that transaction sources stay intact.
- Deliver a combination of forced version creation and no version control.
- Provide no version control.

These decisions are made at the organization level with proper assignment of user responsibilities. Changes to a formulas or routings creates new versions when the current status is checked for versioning.

Version control is called:

- If you add or change edit text data on any Product Development window.
- If you add or change data on any of the tab regions on the Recipe Organization Details window, with the exception of the Validity Rules tab.

Version control is not called:

- For status changes on any Product Development window.
- For mark for purge or undelete on any Product Development window.
- If you add or change validity rule related information on the Recipe Details window.
- If you add or change information on the Recipe Step Material Association window.
- If you add or change routing step dependency information on the Routing Details window.

How Does Version Control Work?

Profile options for Version Control are:

- GMD: Recipe Version Control
- GMD: Formula Version Control
- GMD: Routing Version Control

- GMD: Operation Version Control

Refer to the *Oracle Process Manufacturing Implementation Guide* for specific details on setting profile options.

Setting Up Version Control at the Organization and Responsibility Level

You must be associated with valid organizations in order to create transactions and perform certain functions in Product Development. You must be linked to appropriate Responsibilities in order to access specific workbenches. If new Responsibilities are implemented as described in the following example, you can achieve Version Control by association to an organization through a link to a specific Responsibility within the organization. Here is an example of how to set up Version Control:

Users are defined as:

ABC for Formulator ABC

JKL for Formulator JKL

XYZ for Formulator XYZ

Organizations are:

OA for Oracle Applications

OPM for Oracle Process Manufacturing Company, consisting of:

PLT1 for Plant1

PLT2 for Plant2

PLT3 for Plant3

Responsibilities are:

Formulator for PLT1

Formulator for PLT2

Formulator for PLT3

User-Organization Associations are:

ABC for PLT1

JKL for PLT1

XYZ for PLT1

User-Responsibility Associations are:

ABC for Formulator PLT1

JKL for Formulator PLT2

XYZ for Formulator PLT3

Profile Settings are:

GMD: Formula Version Control is set to Y for the Responsibility of Formulator PLT1

At logon, User ABC is presented with a list of Responsibilities for Formulator PLT1. Menus and windows associated with the Formulator Responsibility are accessible to User ABC, and they are configurable. Specific windows and functions can be enabled or disabled within Menus and Responsibilities. Since the user organization association for User ABC is limited to PLT1, and the Formula Version Control profile option is enabled for this Responsibility, any modifications made to a formula during the session for User ABC requires a new version of a formula for PLT1.

If User ABC were to change to a Responsibility where Version Control was set to N, modifications to a formula in that session would not require a new formula version to be created.

If User ABC were to change to a Responsibility where Version Control was set to O, modifications to a formula in that session would notify User ABC that Version Control was optional. Prior to saving a change, User ABC is asked whether or not to change the existing formula version.

2

Setting Up

This topic provides the setup requirements in other applications, and setup required in Product Development. You must set up responsibilities and menu access. Depending on your individual requirements you set up formula classes, operation classes, routing classes, activities, resources, plant resources, laboratories, technical parameters, technical parameter sequences, and technical class and subclass category sets.

The following topics provide the information required to set up Product Development:

Setting Up in Other Applications

Set up these prerequisites prior to running the Product Development application:

Setting Up Profile Options in OPM System Administration

In the System Administration Responsibility, set up the following profile options:

- GMD: Allow Ingredient Zero Qty
- GMD: Automatic Generation Of Step Dependency Attributes
- GMD: Automatic Step Number Generation
- GMD: Byproduct Active
- GMD: Default Consumption/Yield Type
- GMD: Default Dependency Type
- GMD: Default Lab Organization
- GMD: Default Step Release Type
- GMD: Density
- GMD: Designer Category Set
- GMD: Designer Display New Item Window
- GMD: Display Step Qty In Routing Graph
- GMD: Display Transfer Pct In Routing Graph
- GMD: Display Transfer Qty In Routing Graph
- GMD: Enforce Step Dependency
- GMD: Formula Version Control
- GMD: Operation Version Control
- GMD: Process Instruction Paragraph
- GMD: Formula Security
- GMD: Recipe Version Control
- GMD: Routing Version Control
- GMD: Scrap Factor Type
- GMD: Technical Parameter Category Set

- GMD: UOM Mass Type
- GMD: UOM Volume Type
- GMD: User Name for ALL
- GMD: Workflow Timeout (in Days)
- GMD: Yield Type

Set up the following:

- Units of Measure
- Units of Measure Classes
- Units of Measure Conversion

Use a common predefined unit of measure for the step quantity and charges calculation process. This approach provides better performance. Conversions must be defined for individual items between the item unit of measure and the common unit of measure. This eliminates the requirement to set up item conversions between the item unit of measure and the associated operation unit of measure.

Setting Up the GMD: Process Instruction Paragraph Profile Option

Many windows in OPM applications let you associate text with any record of the edited document. For example, you can attach text to a specific ingredient line in a formula. In the Recipe Designer, paragraphs are structures that are used to store and categorize text. The standard application has the General Text paragraph as the one default paragraph stored for each database table.

In order to provide the Recipe Designer with a means to distinguish between Process Instructions and other text types that are stored, your System Administrator needs to define a paragraph code for process instructions. Text that is displayed in the Process Instruction Sheet of the Recipe Designer is the text defined for the paragraph code specified by the GMD: Process Instruction Paragraph profile option.

◗ To define a paragraph code for process instructions:

1. Create a new paragraph code with a **Sub Code**, sub-paragraph code, equal to zero for the following tables:
   - FM_MATL_DTL, the Formula Material detail table
   - FM_ROUT_DTL, the Routing Detail table
   - GMD_RECIPE_ROUTING_STEPS, the Recipe Routing Steps table

- GMD_RECIPE_STEP_MATERIALS, the Operation Step and Material Association table

2. Specify the paragraph code defined in step 1 as the value for the new GMD: Process Instruction Paragraph profile option. The Recipe Designer reads the GMD: Process Instruction Paragraph profile option to determine the paragraph code used to retrieve and store process instructions.

Refer to the *Oracle Process Manufacturing Implementation Guide* and the *Oracle Process Manufacturing System Administrator User's Guide* for additional information.

See Also

Oracle Workflow

Setting Up OPM Inventory Control

In the OPM Inventory Control application, set up the following:

- Items and item attributes for every raw material, intermediate, and end item.
- Unit of measure conversions for each item, between the item's primary inventory unit of measure and the unit of measure you use in the formulas, if different. This is entered on the Item/Lot Sublot Conversions window.

Unit of measure types, units of measure, unit of measure conversions, and specific conversions such as item lot and sublot conversions are synchronized with corresponding Oracle Process Manufacturing Financials data.

See Also

Oracle Process Manufacturing Inventory Management User's Guide

Oracle Inventory User's Guide

Setting Up Cost Management

In the Cost Management application, set up the following:

- Cost analysis codes
- Cost calendar

See Also

Oracle Process Manufacturing Cost Management User's Guide

Setting Up Process Planning

In the OPM Capacity Planning application, set up the following:

- Resources
- Plant Resources

See Also

Oracle Process Manufacturing Capacity Planning User's Guide

Setting Up Oracle Applications System Administrator

The Recipe Designer uses a Thin Client Framework, or TCF technology. Two profile options are set up during the implementation:

- TCF:HOST
- TCF:PORT

Refer to the "Profile Options in Oracle Application Object Library" topic in the *Oracle Applications System Administrator's Guide* for a detailed discussion of these profile options.

Setting Up Security Profiles

Depending on your security profile, some of the information on certain windows may not be available to you. Contact your Product Development Security Manager or Product Development Security Profile Manager if you require access to this information.

Setting Up Responsibilities and Menu Access

Set up Workbench Responsibilities for each user. The following are menu and submenu selections available to each listed Workbench Responsibility:

- Formulator
  - Formulator Workbench
  - Formulas
  - Recipes
  - Mass Search and Replace
  - Simulator
  - Inventory Items
  - Indented Formulas
  - Formula Inquiry
  - Validity Rules - Product
  - Validity Rules - Recipe
  - Technical Data: Technical Parameters
  - Technical Data: Technical Parameter Sequences
  - Technical Data: Item Technical Data
  - Formula Analysis: Parameters
  - Formula Analysis: Analysis
  - Setup: Formula Class
  - Setup: Status Codes
- Process Engineer
  - Engineering Workbench
  - Routings
  - Operations
  - Recipes
  - Mass Search and Replace
  - Setup: Routing Classes

- Setup: Operation Classes
- Setup: Activities
- Setup: Generic Resources
- Setup: Plant Resources
- Setup: Alternate Resources
- Setup: Status Codes

- Product Development Security Manager
- Product Development Security Profile Manager

Setting Up Formula Classes

Formula Classes group formulas with similar characteristics and requirements for reporting purposes. For example, use a formula class to classify all formulas for ACRYLIC paints, or to classify all formulas for ORGANIC paints. Food seasoning formulas could be grouped under a SEASONINGS class. You specify the formula class on the Formula Details window. Defining formula classes is optional.

Prerequisites

- ❑ Analyze all formulas for common properties that are used to classify them.

◗ To set up formula classification codes:

1. Navigate to the **Formula Classes** window.
2. Enter the **Class** code that identifies formulas with similar characteristics or requirements. Required.
3. Enter a brief **Description** of the classification you are adding. Required.
4. Save the window.

Setting Up Operation Classes

Group operations with similar characteristics and requirements for reporting purposes. For example, you could set up classes for MIXING, HEATING, DRYING, or GRINDING. Defining operation classes is optional.

Prerequisites

- ❑ Analyze all operations for common properties that are used to classify them.

◗ To set up operation classification codes:

1. Navigate to the **Operation Classes** window.
2. Enter the **Class** code that identifies operations with similar characteristics or requirements. Required.
3. Enter a brief **Description** of the classification you are adding. Required.
4. Save the window.

Setting Up Routing Classes

Routings are sequenced sets of operations that must be performed in order to complete a production batch. It is useful to set up routing classes to group routings with similar characteristics and requirements for reporting purposes. Defining routing classes is optional. The UOM in the routing class window is required if the theoretical process loss is defined for the routing class.

Prerequisites

- ❑ Analyze all routings for common properties that are used to classify them.

◗ To set up routing classification codes:

1. Navigate to the **Routing Classes** window.
2. Enter the **Class** code that identifies routings with similar characteristics or requirements. Required.
3. Enter a **Routing Class Description** for the Class code entered. Required.
4. Enter the **UOM** for the Class code.
5. Click **Theoretical Process Loss** to display the **Theoretical Process Loss** window. Theoretical Process Loss is discussed in the Routings topic.
6. Save the window.

See Also

Routings

Setting Up Activities

Activities are actions performed during production. For example, mixing and cooling are activities. Activities are usually set up so that they divide a manufacturing process into logical breakpoints. By analyzing and refining the granularity of activities, businesses can improve their work methods and reduce time to manufacture so that activities performed in operations are completed in the shortest possible time with the least effort to deliver the appropriate level of quality.

Cost analysis codes are assigned to activities so that proper cost calculations can be performed.

Prerequisites

- ❑ Set up cost analysis codes.

◗ To set up activities:

1. Navigate to the **Activities** window.
2. Enter an **Activity Code** for the name of the activity. Activities are the components that make up an operation. Required.
3. Enter a brief **Description** of the activity. Required.
4. Enter the cost **Analysis Code**. This code is set up in Cost Management application. Required.
5. Save the window.

See Also

Oracle Process Manufacturing Cost Management User's Guide

Setting Up Laboratory Organizations

After meeting the prerequisites for setup in other applications, define laboratory organizations. Laboratories are used to group technical parameters.

Most organizations manufacture a variety of similar products that are often grouped into product lines or families. The same technical parameters are likely to be relevant to the products within a product family and to the ingredients used to manufacture those products. For example, viscosity is likely to be relevant to all lubricants, while opacity or contrast ratio is likely to be relevant to all paints.

When you set up an organization as a laboratory, verify that you select Laboratory as the Plant type on the Organizations window in the System Administration application. This laboratory organization defaults into the Organization field on each window where you can enter Technical Parameters. A laboratory organization is required for local technical parameters and for generation of a density technical parameter. Set the laboratory organization to the GMD: Default Lab Organization profile option. In addition, set the GMD: UOM Mass Type and the GMD: UOM Volume Type profile options for converting density in the Simulator calculations. Density is defined as Mass/Volume.

Although production batches can be generated from a plant or a lab, you can view local technical parameters that are linked from a lab to a production batch produced in a plant.

See Also

Oracle Process Manufacturing Implementation Guide

Oracle Process Manufacturing System Administration User's Guide

Setting Up Technical Parameters

Technical parameters are those characteristics of items that you want to measure and calculate. There are several types of technical parameters. For example, a gravimetric technical parameter for percent solids by weight (w/w) is Weight%. Technical Parameters can function as expressions, numeric ranges, list values, character values, or link to quality tests. Technical parameters can be linked to a specific lab organization, or can be global in nature.

For each type of technical parameter, specify certain constraints on the data that can be entered for that parameter, such as the minimum and maximum values.

When using global technical parameters across multiple labs, technical parameters must be independent of the lab organization. To create a global technical parameter, do not enter an organization. The organization field displays the default organization defined in the profile GMD: Default Lab Organization.

Prerequisites

- ❏ Define a laboratory organization.
- ❏ Determine the hierarchy of technical parameters to be set up. For example, density, gram percent, gram molecular weight, formula weight, and osmolality. These must be developed so that they can be sequenced in a hierarchy that can be rolled up to the product level.

◗ To use expressions in technical parameters:

The following functions are supported for defining expressions, and the mathematical operators to use:

- Addition (+)
- Subtraction (-)
- Multiplication (*)
- Division (/)
- Power
- Square Root (SQRT)
- Common Logarithm (LOG)
- Natural Logarithm (LN)

For example, if you are defining a technical parameter that is calculated by multiplying two other technical parameters, PARM1 and PARM2, enter the following:

```
PARM1*PARM2
```

To take the square root of PARM1, enter the following:

```
SQRT(PARM1)
```

You cannot put spaces (blanks) in the name of a technical parameter that you use in an expression. For example, (PARM 1) * (PARM 2) cannot be calculated because there is an extra space before and after the * operator.

To use fixed expressions in technical parameters:

Certain technical parameters are fixed expressions that can be summed up for all ingredients in a formula. This is called a formula rollup.

The following technical parameter types are available:

- Weight Percent is calculated as the quantity Sigma t_i multiplied by w_i minus the quantity Sigma t_j multiplied by w_j divided by the quantity Sigma w_i minus the quantity Sigma w_j.
- Volume Percent is calculated as the quantity Sigma t_i multiplied by v_i minus the quantity Sigma t_j multiplied by v_j divided by the quantity Sigma v_i minus the quantity Sigma v_j.
- Specific Gravity is calculated as the quantity Sigma t_i multiplied by v_i minus the quantity Sigma t_j multiplied by v_j divided by the quantity Sigma v_i minus the quantity Sigma v_j.
- Cost is calculated as the quantity Sigma t_i multiplied by I_i minus the quantity Sigma t_j multiplied by I_j.
- Equivalent Weight is calculated as the the quantity Sigma T_i minus the quantity Sigma T_j divided by the quantity Sigma $T_i$divided by t_i minus the quantity Sigma T_j divided by t_j.
- Quantity per Unit is calculated as the quantity Sigma t_i multiplied by I_i minus the quantity Sigma t_j multiplied by I_j.

where:

- Sigma is summation over "i" ingredients or "j" byproducts
- t_i is the value of the technical parameter for the "i-th" ingredient

- t_j is the value of the technical parameter for the "j-th" byproduct
- w_i is the weight of the "i-th" ingredient in the base unit of measure for mass
- w_j is the weight of the "j-th" byproduct in the base unit of measure for mass
- v_i is the volume of the "i-th" ingredient in the base unit of measure for volume
- v_j is the volume of the "j-th" byproduct in the base unit of measure for volume
- I_i is the quantity of the "i-th" ingredient in its primary inventory unit of measure
- I_j is the quantity of the "j-th" byproduct in its primary inventory unit of measure
- T_i is the quantity of the "i-th" ingredient in the units specified for the technical parameter
- T_j is the quantity of the "j-th" byproduct in the units specified for the technical parameter

The following table displays the previously described calculations used for each of the listed technical parameter types.

Technical Parameter Type	Calculation
Weight Percent	$[(\Sigma t_i \cdot w_i)-(\Sigma t_j \cdot w_j)]/[(\Sigma w_i)-(\Sigma w_j)]$
Volume Percent	$[(\Sigma t_i \cdot v_i)-(\Sigma t_j \cdot v_j)]/[(\Sigma v_i)-(\Sigma v_j)]$
Specific Gravity	$[(\Sigma t_i \cdot v_i)-(\Sigma t_j \cdot v_j)]/[(\Sigma v_i)-(\Sigma v_j)]$
Cost	$(\Sigma t_i \cdot I_i)-(\Sigma t_j \cdot I_j)$
Equivalent Weight	$[(\Sigma T_i)-(\Sigma T_j)]/[(\Sigma T_i/A_i)-(\Sigma T_j/A_j)]$
Quantity per Unit	$(\Sigma t_i \cdot I_i)-(\Sigma t_j \cdot I_j)$

Expressions are equations you define that use mathematical operators and previously defined technical parameters.

For example, define a technical parameter as a percent solvent, with each ingredient in a formula contributing a differing portion of its weight to a product as solvent. Use the Technical Parameters window to set up various quantitative relationships between individual parameters. The application finds the weight of solvent contributed by each ingredient and calculates the sum of these contributions. After determining the total formula weight, the application expresses the ratio of percent solvent for each product.

Calculations such as total weight and total volume are available for use in expressions. When a technical parameter is used within an expression, the product total value of the parameter may be required rather than individual ingredient values. A Product Expression data type defines technical parameters that are to be rolled up to the product value.

Two functions, ISUM and BSUM are provided that indicate a total rollup sum to perform on ingredients and byproducts, respectively.

Variables QTY$ and VOL$ are used and refer to ingredient or by product weights and volumes. QTY$ is the ingredient or by product quantity in the standard UOM of the UOM class defined by the profile GMD: UOM Mass Type. VOL$ is the ingredient or by product quantity in the standard UOM of the UOM class defined by the profile GMD: UOM Volume Type. If you do not have the correct UOM conversions set up for your items between mass and volume, then calculations on the Simulator will not be correct.

In addition to the technical parameters that you define on the Technical Parameters window, OPM creates a technical parameter for density when you define a laboratory organization. The application uses this density technical parameter for conversions from mass units of measure to and from volume units of measure. It does not use the item specific unit of measure conversions set up on the Item Lot/Sublot Std Conversion window. It does, however, use the regular unit of measure conversions for formulas. Enter data for the DENSITY technical parameter for all items where you must convert mass to volume or volume to mass.

If this parameter is not set properly, then Simulator calculations are inaccurate.

GMD: Density defines the density technical parameter.

If a technical parameter is associated with a quality test, then the data type of the parameter defaults to the test data type. If the test data type is numeric, then you can change the data type to weight percent, volume percent, equivalent weight, or quantity per unit.

To set up technical parameters:

1. Navigate to the **Technical Parameters** window.
2. Enter the code for the laboratory **Organization** where you are defining a technical parameter. A description of this laboratory displays. To define a local technical parameter, use the GMD: Default Lab Organization profile option value.
3. Enter the name of the technical **Parameter Name**. Required.
4. Enter a **Description** or statement about what the technical parameter represents. Required.
5. If you are linking this technical parameter to a test in the Quality Management application, then enter the name of the **Test**. Otherwise, leave this field blank.
6. Select the **Data Type** to be associated with this technical parameter. Supply the required information listed in the table at the end of this task. Only specific gravity, equivalent weight, and expressions are not validated against the units entered in the Quality Control application. Quality Control units of measure are for notational purposes only, and are not used in calculations. **Product Expression** data type is used to define technical parameters that are to be rolled up to the product values. Only parameters having a data type of Weight%, Volume%, Equivalent Wt, or Quantity Per Unit can be used for optimizing formulas and batches.
7. Enter the **Unit** of measure for the technical parameter. Technical parameters for specific gravity and equivalent weight use the units of measure set up in the System Administration or Oracle Inventory applications. All other technical parameters use the units of measure set up on the Units window in the Quality Control application. With the exception of equivalent weight, this unit of measure is not used in any calculations.
8. For **Numeric Range** test data types:
   - Enter the lower limit of the **Numeric Range** in the first field. Enter the upper limit of the range in the second field. For example, an entry of 20 through 30 represents a Numeric Range from 20 to 30.
   - Enter the number of **Significant Digits** to display for numeric expressions and calculations.
9. Save the window.

Data Type	Required Information
0 - Character	Enter the minimum and maximum valid character strings based on ASCII sort sequence and maximum length.
1 - Numeric	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.
2 - Validation List	■ Enter the Unit of Measure in the Unit field. ■ Enter a list of valid values in the Validation List fields.
3 - Boolean	No additional definition is required. The entry is unitless.
4 - Expression	■ Enter the Unit of Measure in the Unit field. ■ Enter the mathematical expression for calculating the technical parameter in the Expression field.
5 - Weight Percent	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.
6 - Volume Percent	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.
7 - Specific Gravity	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.
8 - Cost	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.

Data Type	Required Information
9 - Equivalent Weight	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.
10 - Quantity Per Unit	■ Enter the Unit of Measure in the Unit field. ■ Enter the minimum and maximum valid values in Numeric Range fields. ■ Enter the number of significant digits required in the Significant Digits field.
11 - Product Expression	■ Enter the Unit of Measure in the Unit field. ■ Enter the mathematical expression for calculating the technical parameter in the Expression field.

Setting Up Technical Parameter Sequences

After entering the technical parameters for a laboratory organization, specify the order displayed as the technical parameter sequences.

The Technical Parameter Sequences window establishes which technical parameters to use for a simulation, and the order in which they display. All technical parameters that were defined locally for the laboratory organization are available, but can be deleted on an individual basis. Global technical parameters, as well as technical parameters grouped as item category sets, can be selected for the simulation from this window. There are three levels of flexibility in defining technical parameter sequences: Organization, Organization Item, and Organization Item Category.

When specifying a category, the category list displays all categories defined for the category set assigned to the GMD: Technical Parameter Category Set profile option.

Expression type technical parameters that refer to other technical parameters must come after the technical parameters they reference in the sequence. For example, if PARM_3 is calculated by multiplying PARM_1 by PARM_2, PARM_3 must come after PARM_1 and PARM_2 in the technical parameter sequences. By default, the DENSITY technical parameter, or its equivalent is 1. Do not change this.

Prerequisites

- ❑ Determine if two or more technical parameters are required in a calculation. If they are, verify their proper order prior to sequencing them in the Technical Parameter Sequences window. For example, if you want to determine a Brix-to-Acid ratio, first enter the Brix calculation, then the Acid calculation, and finally, the Brix/Acid calculation.

◗ To set up technical parameter sequences:

1. Navigate to the **Technical Parameter Sequences** window.
2. Enter the code for the laboratory **Organization** where you are setting up the technical parameter sequences. The **Organization Description** displays.
3. Enter the **Item** to display technical parameters associated with that item.
4. Enter **Category** to display technical parameters associated with the item class. The **Category Description** displays.

Parameter Sequence

5. Enter the code for a technical **Parameter** associated with the laboratory organization entered. For example, enter GMW for gram molecular weight.
6. **Global** is selected when a global parameter is chosen.
7. Enter a **Sort** number between 1 and 9999 to determine where in the list of technical parameters this parameter is displayed. When entering technical parameter data, the technical parameters are displayed in numerical order based on the number entered in this field.

   The numbers do not have to be sequential. For example, you could enter 10, 20, 30, and so forth to accommodate for the future addition of technical parameters.
8. When **Quality Control** is selected, the technical parameter is linked to a quality test. If Quality Control is not selected, then the technical parameter is not linked to a test.
9. The **Description** displays a brief statement about what the technical parameter represents, and is entered from the Test Description in the Quality Management application.
10. Save the window.

Entering Item Technical Data

Once you have specified a sequence for technical parameters, you are ready to enter the technical parameter data. The data represents technical parameter values for your items. Use this window to assign parameter values at the item; item and lot; item, lot, and sublot; batch; or formula levels. Any changes made to item parameter values also change properties of the simulation.

Entering Density for Raw Materials

The application uses the DENSITY technical parameter for unit of measure conversions. Set up the GMD: Density profile option before entering item technical information. Refer to "Appendix B Product Development Profile Options." Enter values for this technical parameter for all your raw materials. If you set up item technical data, then a density value must be entered for items, and each lot and sublot of an item.

If you receive a unit of measure conversion error on the Simulator, then check that you entered density information for all of your raw materials.

Density values must be entered as a ratio between the base unit of measure for the mass unit of measure type and the base unit of measure for the volume unit of measure type.

The base unit of measure for each UOM type is the first unit of measure set up for that UOM type. For example, if the base unit of measure for mass is kilograms and the base unit of measure for volume is liters, then enter the density in kilograms per liter rather than pounds per gallon.

You can determine the units of measure that are the base units for mass and volume by entering an item specific UOM conversion between mass and volume on the Item Lot/Sublot Std Conversion window in the Inventory Control application. The units that display beneath the word Conversion are the base units used for mass and volume.

If you need to enter Item Technical Data for products, then be aware that if you recalculate those technical parameter values on the Simulator and update technical parameters, the data that you entered on the Item Technical Data window is overwritten.

Item Technical Data associates Technical Parameters at the item, formula, lot, and sublot levels. Item Technical Data also associates technical parameters with batches.

Prerequisites

❑ Set up technical parameters.

- ❑ Set up technical parameter sequences.

◗ To define technical data for items:

1. Navigate to the **Item Technical Data** window.
2. Enter the **Organization** where you are defining item technical parameter data. The **Organization Description** displays. Enter data only for the technical parameters associated with this organization. Required.
3. Enter the **Item** code you are entering technical parameter data for. Required.
4. If you are entering technical parameter data for a specific lot, enter the **Lot** code.
5. If you are entering technical parameter data for a specific sublot, enter the **Sublot** code.
6. **Unit of Measure** displays the unit of measure for the item. You cannot edit this field.
7. Enter the **Formula** and **Version** for entering formula specific technical data, or enter **Plant** and **Batch** number for entering batch specific technical data.

Details

8. The name of each technical **Parameter** defined by the sort sequence for the laboratory organization displays. You cannot edit these fields.
9. Enter the **Value** for each technical parameter. You cannot enter or edit this field if the technical parameter value is calculated by the application.

   For example, you cannot enter or edit this field if the Value is an Expression or if it is derived from a quality test.

   The value you enter must satisfy the validation parameters displayed at the bottom of the window if entering a numeric value. Otherwise, the value must be in the LOV if the Validation List method is selected as the Data Type.
10. Displays the **Unit** of measure for the technical parameter. Specific gravity and equivalent weight use the units of measure set up on the Unit of Measure window in the OPM System Administration application. All other technical parameters use the units of measure set up on the Units window in the OPM Quality Management application. With the exception of equivalent weight, this unit of measure is not used in any calculation.
11. The **Quality Control** indicator is display only, and displays the following:

- If the indicator is selected, then the Value for a technical parameter comes from an OPM Quality Management test or result.
- If the indicator is cleared, then the Value for a technical parameter does not come from an OPM Quality Management test or result.

12. The **Data Type** displays. You cannot edit this field.
13. If **Calculate** is selected, then the value for a technical parameter is calculated by the application. If Calculate is cleared, then the value for a technical parameter is not calculated by the application. The selected technical parameter **Range** displays.
14. The number of **Significant Digits** for the Value displays.
15. Save the window.

Setting Up Technical Classes and Subclasses

The following procedures set up Technical Classes and Technical Subclasses for items. You can access the Key Flexfield Segments window from the System Administrator responsibility or from the Oracle Process Manufacturing Inventory Control application. In formula analysis, you can view results for the contribution of Technical Class or Technical Subclass in either weight or volume.

See: *Oracle Applications User's Guide* and O*racle Applications Flexfields Guide*.

Prerequisites

- ❑ Determine whether Technical Class and Technical Subclass key flexfields are already created.

◗ To create key flexfields for Technical Class and Technical Subclass:

1. Navigate to the **Key Flexfield Segments** window.
2. Choose **Find...** from the **View** menu to find all Key Flexfield Segments entered for the Oracle Inventory Item Categories Flexfield Title. Technical Class and Technical Subclass are Item Categories that belong to the Oracle Inventory application. The **Key Flexfield Segments** window displays all flexfields defined for the Flexfield Title of Item Categories.
3. Insert a new row to create the Technical Class and Technical Subclass definition.
4. Enter the **Code** as TECH_CLASS_SUB_CLASS. The Title defaults to the Code.
5. Enter the **Title** and **Description** as Technical Class & Subclass.
6. Click **Segments**. The **Segments Summary** window displays for Technical Class & Subclass.
7. Enter two segments with the following values, and leave the Value Set blank:
   - **Technical Class**, with a Window Prompt of Technical Class and a Column of SEGMENT1.
   - **Technical Subclass**, with a Window Prompt of Technical Subclass and a Column of SEGMENT2.
8. Save your work.
9. Click **Value Set**. The **Value Sets** window displays.
10. Enter the **Value Set Name** as TECHNICAL_CLASS.
11. **Description** displays Technical Class.

12. Enter a **Maximum Size** of 8.
13. Choose **Save and Proceed**.
14. The TECHNICAL_SUB_CLASS **Value Set Name** displays.
15. **Description** displays Technical Subclass.
16. Enter a **Maximum Size** of 8.
17. Save your work.
18. The **Segments Summary (Item Categories) - Technical Class & Subclass** window displays the entries for Technical Class and Technical Subclass.
19. Find a **Value Set** of TECHNICAL_CLASS for Technical Class.
20. Find a **Value Set** of TECHNICAL_SUB_CLASS for Technical Subclass.
21. Save your work.
22. Return to the **Key Flexfield Segments** window to freeze the flexfield definitions.
23. Select **Freeze Flexfield Definition**. A Caution message displays to indicate that flexfields can be unfrozen, but that doing so can cause problems once you have entered data in the flexfield.
24. Click **OK**.
25. Click **Compile** to establish the flexfield structure. The following Note displays:

    Compiling flexfield definition.
26. Click **OK**.
27. After compilation, a concurrent request is submitted to generate a flexfield view. The following Note displays:

    The flexfield was compiled successfully. Submitted request to generate flexfield view...
28. Click **OK**.
29. Check completion of the concurrent program by viewing submitted requests.
30. Define Technical Class & Subclass values.

◗ To define Technical Class & Subclass values:

1. Navigate to the **Segment Values** window.

2. Enter the following in the **Find Key Flexfield Segments** window:
   - Enter Oracle Inventory as **Application**.
   - Enter Item Categories as **Title**.
   - Enter Technical Class & Subclass as the **Name** of the Structure created.
3. Click **Find**.
4. Query **Technical Class** as the Independent Segment.
5. Enter an appropriate **Value**, **Translated Value**, and **Description** for Technical Class. For example, enter:
   - Binder as Value, Translated Value, and Description.
   - Solvents as Value, Translated Value, and Description.

   The values entered appear as allowable values for the Technical Class LOV.
6. Select **Enabled**.
7. Choose **Save & Proceed**.
8. Query Technical Subclass as the **Independent Segment**.
9. Enter an appropriate **Value**, **Translated Value**, and **Description** for Technical Subclass. For example, enter:
   - Acrylic as Value, Translated Value, and Description
   - Alkyd as Value, Translated Value, and Description
   - Epoxy as Value, Translated Value, and Description
   - Organic as Value, Translated Value, and Description

   The values entered appear as allowable values for the Technical Subclass LOV.
10. Select **Enabled**.

To define Categories:

1. Navigate to the **Codes** window. The **Find Categories** window displays.
2. Click **New**.
3. Enter **Technical Class & Subclass**.
4. Enter each **Category** multisegment flexfield structure to assign meaning to each segment. For example, enter:

- Binder.Acrylic for an acrylic binder.
- Binder.Alkyd for an alkyd binder.
- Binder.Epoxy for an epoxy binder.

5. Enter an appropriate **Value** for each Segment.
6. Click **OK**. Return to the **Categories** window.
7. Enter a unique **Description** for each Category. For example, Binder.Acrylic could have the Description Binder/Acrylic.
8. Save the window.

To define Category Sets:

1. Navigate to the **Category Sets** window.
2. Select the appropriate **Inventory Organization**.
3. Click **OK**.
4. Enter a unique **Name** and **Description** for the Category Set. For example, enter:
   - Technical Classification as Name.
   - Component Technical Classification as Description.
5. Enter the **Flex Structure** created. For example, enter Technical Class & Subclass.
6. Verify that the Category Set is controlled at the **Master Level**. This lets you assign the same Category Value in all organizations where it is assigned.
7. Enter the Default Category. For example, enter Binder.Acrylic. The default is used when assigning an item to the Category Set.
8. Determine if you want to **Enforce a List of Valid Categories**:
   - Select this check box if you want to assign items only to Categories defined as valid for the current Category Set. Enter each of the Valid Categories.
   - Clear this check box if you want to assign an item to any Category that has the same flexfield structure as the current Category Set.
9. Click **Assign**. The **Item Assignments (OPM) Technical Classification, Master Level** window displays.
10. Query the **Item** you want to assign to the Category Set.
11. Select the **Category** and enter the Segments.

12. Repeat steps 9 and 10 for each additional **Item** you want to assign.
13. Click **Accept**.

To assign Category Sets to a Process Manufacturing Class:

1. Navigate to the **OPM Category Sets** window.
2. Select the **Category Set** for the appropriate Process Manufacturing Class. Enter **Technical Classification** as Category Set.
3. Save the window.

See Also

Oracle Process Manufacturing Inventory Control User's Guide

3

Formulas

This topic shows you how to define the formulas that drive your manufacturing process. It includes a basic understanding of formula setup. You are shown how to enter item technical data and use the Simulator for laboratory simulations. You are introduced to setting up formula information including how to use formula phantoms, methods available to scale formulas, and to find formulas. In addition to entering formula details, you are shown how to define and maintain formulas at the header and line levels. Methods for determining where ingredients are used, the Indented Bill of Materials Report, and formula inquiry help you locate formula information rapidly.

The following topics provide a basic understanding of formulas:

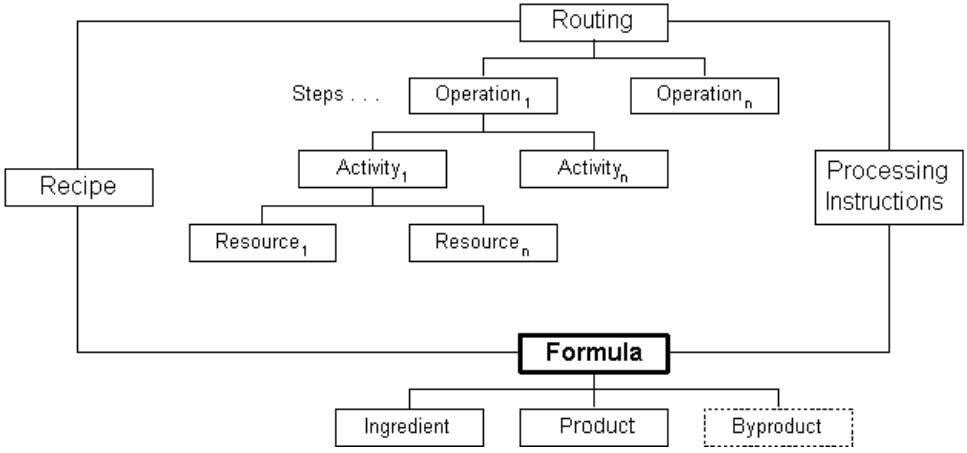
- Displaying the Formula Byproduct Summary
- Displaying the Formula Ingredient Summary
- Displaying a Summary of Formula Product Lines
- Editing Formula Product Lines
- Editing a Formula Product Line
- Displaying a Summary of Formula Byproduct Lines
- Editing Formula Byproduct Lines
- Editing a Formula Byproduct Line
- Displaying a Summary of Formula Ingredient Lines
- Editing Formula Ingredient Lines
- Editing a Formula Ingredient Line
- Using Computer-Aided Formulation
- Loading Formulas and Batches onto the Simulator
- Using the Simulator
- Using the Optimizer
- Using the Workpad
- Optimizing Lot Quantities
- Running the Indented Bill of Materials Report
- Using Formula Inquiry
- Interpreting a Formula Inquiry
- Analyzing a Formula
- Displaying Formula Analysis Results
- Finding a Formula Analysis
- Overriding Default Explosion Rules

Understanding Formula Setup

This topic explains how to define the formulas that drive your manufacturing process. Formulas are lists of ingredients and products with their associated quantities and processing instructions. In some cases, you can refer to a formula as a process manufacturing bill of material. Production batches are based on formulas defined in Product Development. Formulas are also used for planning, managing costs, and scheduling.

Formulas are depicted hierarchically in the following diagram that shows the:

- Routing composed of a series of Operations organized in Steps.
- Operations composed of Activities containing Resources.
- Formula composed of Ingredient, Product, and possibly Byproduct.
- Recipe linking the Routing and Formula together with Processing Instructions.



Requirements

Following are some requirements that customers have for formulas in Product Development. The answers are explained in detail in the Solutions topic.

Can multiple versions of a formula be managed at the same time?

Yes. Depending on how version control is implemented, a version number can be assigned to multiple versions of a formula.

Can the formula approval process be managed efficiently?

Yes. Use the formula Status field to manage formula approvals quickly and efficiently. By activating the Status Approval Workflow, the application manages each step of the approval process with a minimal requirement for intervention.

You can configure e-records and e-signatures as a part of the formula management process.

Is there multilingual support for formulas?

Yes. Use Description and Comments fields to enter translations for each of the installed languages.

Can both standard and packaging formulas be created?

Yes. Use the Formula Details window to create both standard and packaging formulas. The window has a Packaging indicator that identifies a formula as a packaging formula.

Can formulas from third party applications be imported into the Product Development application?

Yes. Use Formula APIs to create new formula headers and details from applications not produced by Oracle. For existing Oracle applications migration scripts are supplied.

Can formulas be modeled and created based on the technical properties of its components?

Yes. Using Computer-Aided Formulation, you can model and create formulas based on any number of characteristics associated with ingredients.

Can a laboratory be set up for many product lines with different technical characteristics?

Yes. Use technical parameters that are specific to an organization to set up individual product lines with differing technical characteristics.

Is it possible to predict the characteristics of a product based on ingredient composition?

Yes. Use the Simulator to model new formulas and predict formula composition based on individual components added.

Is it possible to model catalysts and starter cultures, or any other item that does not change batch size?

Yes. Formula ingredients can be scaled using rules that specify whether or not an ingredient contributes to yield.

Can Standard Operating Procedures (SOPs) be linked to a transaction or record?

Yes. SOPs created using Oracle Tutor can be linked to any Oracle Applications transaction or record using Oracle E-Records, or Oracle iHelp. Refer to the *Oracle Tutor* product documentation for details.

Solutions

Product Development provides solutions to help resolve issues at every stage of the product development process. The following represent some of the key performance solutions for formulas.

Manage Multiple Versions of a Formula If Version Control is enabled, then a change to any formula component requires a new formula to be created consisting of the same formula name with a different version number. This is not required for status changes, Mark for Purge, or Undelete operations. If Version Control is off, then any change to a formula can be made without requiring a new version. Version Control helps manage multiple versions of a formula.

Let Formula Status Indicate Formula Approval Use the Status field in each formula to determine where the formula is in an approval cycle. Activate the Status Approval Workflow to control the approval process. Workflow presents each Approver with an electronic notification so that action can be taken immediately.

OPM Product Development supports e-signatures and e-records. When a status change is requested, required signatures can be captured online while the event is happening in the window. Any users responsible for additional required signatures receive workflow notifications informing them that their e-signature must be entered before the status of the formula is changed to the requested status. This expedites the overall approval process.

Use the Description and Comments Text Fields for Multilingual Support for Formulas Two descriptive text fields in the header of a formula allow entry of a formula Description and Comments for each of the installed languages. Text is displayed in the session specific language.

Use the Formula Details Window to Create Both Standard Formulas and Packaging Formulas The Formula Details window allows entry of the formula header and all its products, ingredients, and byproducts. To set up a packaging formula, enter the packaged item itself as product. Then enter the bulk item, packaging container, and package label as ingredients.

Bridge Collaborative Environments with Formula APIs To bridge collaborative formulation environments, an integrated set of Applications Programming Interfaces (APIs) such as legacy systems, spreadsheets, or third party systems. These Formula APIs create, reconcile or update formulas, their components, and their validity rules.

Use Computer-Aided Formulation to Model and Create Formulas Process manufacturing industries produce products made up of chemical and physical properties that can be predicted using algorithms. With the correct algorithms, you can alter the amount of one or more raw materials and the application calculates the ultimate effect on the product. Alternately, by selecting target finished good properties such as a prescribed value for Volatile Organic Compound (VOC), or a desired cost, the quantities of raw materials in a formula can be altered to produce the target product values. The availability of modeling features in an environment that is separate from the working formula allows formulators to simulate changes without affecting current production.

Define Technical Parameters for Rapid Calculations Product Development allows setup of technical parameters as quality control tests. You can use quality results in the calculations. This can be done on an organization specific basis or globally across all organizations. After establishing a formula for laboratory use, and entering its technical data for all appropriate ingredients, the application displays technical parameters within the laboratory formula to see how to roll it up into a recipe. It also enables use of experimental items for evaluation or testing purposes, and the recording of all information and text as detailed notes or comments.

Simulate Formulas and Analyze Their Components The Simulator provides what-if scenario testing, enables simulation of the quantity and technical parameter values for all formula components, and calculates product technical parameters automatically. Formulators can rearrange and adjust quantities of the ingredients and byproducts. The Simulator provides the ability to save formula variations as possible new products.

Formula analysis explodes the ingredients and reports on contributing components of a formula. You can simulate the contribution of formula components in a product by weight or by volume. This flexibility enables testing of different scenarios during reformulation and provides a rapid evaluation of the results.

Provide Comprehensive Formula and Ingredient Scalability Product Development delivers full manufacturing scalability. The amounts of material produced or used by a formula can be scaled using methods that fix or vary each ingredient. Scalability provides production cycle flexibility and virtually eliminates the need to recalculate ingredient amounts manually.

Deliver Complete Standard Operating Procedures (SOPs) Product Development enables formulators and process engineers to link SOPs created through Oracle Tutor to transactions and records using Oracle E-Records, or Oracle iHelp. This eliminates the need to transfer information manually. It improves product quality

and consistency. Procedures are defined in one or more languages at various levels of the organization to meet quality requirements. This information supports compliance to ISO 9000.

Setting Up Formula Information

Setting Up Header Information

To create a new formula, enter formula header information including formula name, version, and product on the Formula Details window. Formula header information is that information that applies to the entire formula. The Formula Header Summary window lists all formula header information entered.

Formulas can also be created using the Recipe Designer. Refer to "Creating a Formula in the Recipe Designer."

Setting Up Product and Coproduct Information

Use the Formula Product Lines window to enter each product or coproduct component. For example, skim milk is a coproduct in the production of cream.

Setting Up Ingredient Information

Use the Formula Ingredient Lines window to enter each ingredient component.

Setting Up Byproduct Information

If skim milk were further processed into a fat free cottage cheese product, you could consider the liquid whey as a byproduct. You do not plan for byproducts, but they must be accounted for in the formula.

If the formula produces byproducts, enter these byproducts and their respective quantities on the Formula Details window. Byproducts, like products and coproducts, are items produced by a formula. They differ from products in that you do not plan your production to make byproducts. For example, in the production of applesauce you produce apple peels. These peels are not something you plan to manufacture as a product. You would never schedule a batch in order to produce apple peels. Depending on the facility, however, these peels can have no monetary value and can require disposal, or they can be sold as raw material for apple cider vinegar. In either case, enter apple peels as a byproduct of your applesauce formula.

OPM does not calculate the cost of production of byproducts. Any items produced by formulas that you want to calculate costs for must be entered as products. They must not be entered as byproducts.

Set up the byproduct type as:

- Rework if the material generated requires rework.

- Sample if the material generated is used as a sample for quality inspection. Refer to the *Oracle Process Manufacturing Quality Management User's Guide* for more information quality inspection.
- Waste if the material is a waste product.
- Yield if the byproduct is material that is yielded for use in another process.

Specifying the Set of Technical Parameters to Use

When you enter an item that is a product of one or more laboratory formulas, you can specify the appropriate formula containing the Item Technical Data. Since the item is a product in formulas, its technical parameter values are calculated from specific formulas. Calculated values can be different in each formula.

For example, suppose your company can make orange juice using either of two valid formulas. Each formula uses a different orange juice concentrate. If you use orange juice to make an orange drink, then verify that the technical parameter values are selected for the formula you decide to use, since calculated technical parameter values can be different in each formula. Assign formula technical parameters from the Formula Details window.

Adding Text to a Formula

Add text to a formula by selecting Edit Text from the Actions menu. You can do this at the header or line level. Text that is associated with a formula is copied to batches that are based on the formula if the GME: Copy Formula Text profile option is set to 1.

See Also

Oracle Process Manufacturing System Administration User's Guide

Using Formula Phantoms

Phantoms are intermediate formulas that are not manufactured as products. Since phantoms are intermediates, they are sometimes referred to as transient subassemblies.

You enter phantoms as formula ingredients, and then explode them when you enter batch tickets. Phantom functionality is a fixed method of multibatch management. Once several batches are linked by a production order number and phantom type dependency, you can manage them as a single production event. There are two fundamental tasks associated with using phantoms:

- Identify one or more ingredients in a formula as phantoms. Use the Phantom Type field to indicate that an item is a phantom.
- Build a formula for each phantom. The method for building a formula that generates a phantom is the same method used to build a formula for a regular batch. However, the formula ingredient must be defined as a phantom.

There are two types of phantoms:

- Automatic Generation type creates phantom batches automatically. When you use this function with automatic document numbering, the application automatically creates a dependent phantom batch, and then generates a production identification number to associate all related batches.
- Manual Generation type requires manual intervention to create phantom batches. When you use manual generation, you need to explode each phantom ingredient by selecting the Phantom. When you release a production batch that has phantoms in its formula, a message displays to indicate that the phantom has not been exploded. This advice is given for one of two reasons:
  - It is a manual phantom that you need to explode.
  - There is some problem with the phantom.

Phantoms You Make

You use a basic bread dough for a number of kinds of bread. You do not sell it or keep it in inventory, however you need to track its ingredients. Your formulas for bread contain #BASICBREAD plus whatever other ingredients are needed to turn plain white bread into other kinds of bread such as rye, whole wheat, and pumpernickel.

In this case, you need only one version of the #BASICBREAD formula.

Phantoms You Never Actually Make

You make a number of products that use apples. Each product has a different formula, but all of them use apples. And, there are many varieties of apples. Flavor, texture, and sugar content vary significantly among these apple varieties. Price and availability can vary depending on season or other factors. Therefore, you decide to use an intermediate called #APPLEBLEND that is made up of two or more apple varieties. You do not actually make #APPLEBLEND. However, you use its ingredients in a batch.

Scaling Formulas

You can scale formulas up or down by input or by output:

- If the formula input ingredients are scaled, a specific scaling factor is applied to all scalable ingredients. A calculated output scale factor is applied to all scalable outputs.
- If the formula outputs are scaled, a factor is applied to all scalable outputs. A calculated input scale factor is applied to all scalable ingredients.

In order for this approach to be successful, you need to specify whether the quantities of each item in the formula are fixed or scalable.

Proportional scaling is the least complex scaling type since the given and calculated factors are applied appropriately to the scalable item inputs or outputs. In order to scale formulas properly, specify whether the ingredients need to be increased using fixed or proportional scaling.

Scale Type Definitions

The quantities of items which are fixed scale are not altered when a formula is scaled. For example, if a formula has a fixed scale ingredient with a quantity of 10 kg and the formula is scaled by a factor of two, then the quantity remains fixed at 10 kg.

Items that are proportionally scaled have their quantities changed when a formula is scaled up or down. With proportional scaling, the scaling is continuous in that the scaled quantities can contain decimals. Proportionally scaled items may or may not contribute to yield.

While proportional scaling makes sense for many items in process industries, it does not make sense for all items.

The following lists the types of formula scaling available in Product Development:

- Type 0 is Fixed scaling.
- Type 1 is Proportional scaling.
- Type 2 is Integer scaling.

The following lists the Contribute to Yield types available in Product Development:

- Yes indicates that an ingredient contributes to yield.
- No indicates that an ingredient does not contribute to yield.

Understanding Scale Type Rules

The following summarizes the business rules in effect for scale types:

- The Contribute to Yield type for ingredients can be set to Yes or No.
- Products and byproducts cannot have an Integer scale type.
- Ingredients are assigned a scale type of Fixed, Proportional, or Integer.
- If an ingredient is assigned a scale type of Integer, then it must also be assigned a:

– Scale Multiple, to specify the multiple in which the ingredient can be used in a formula. For example, a Scale Multiple of 30 indicates the ingredient is used in quantities of 30, 60, or 90, and so forth.

– Rounding Direction, to specify whether the quantity of material must be rounded up to the next higher scale multiple of material, down to the next lowest scale multiple of material, or if the material can be rounded up or down. If the material can be rounded up or down, then it is rounded to the nearest multiple.

Fixed Scale

To scale a formula with fixed scale items, the application must convert the quantities of ingredients, products, and byproducts to a common unit of measure. The unit of measure used for this calculation is the base unit of measure specified by the GMD: Yield Type profile option. This is usually mass. All items in the formula that contribute to yield must be convertible to this unit of measure.

If the formula contains fixed quantity ingredients that contribute to yield, then the scalable ingredients are scaled by an amount necessary to produce the new product quantity, not by the percent entered as the scale factor. If all products are set to fixed quantity, then no quantities in the formula are changed.

Fixed Scale With Yield Contribution The quantities of items for this scale type are not altered when a formula or batch step is scaled. If a formula has a fixed scale ingredient with a quantity of 2000 kg and the formula output is scaled by a factor of 2, then the quantity remains fixed at 2000 kg.

These quantities are taken into account when calculating the factor to apply to the scalable ingredients so that the yield ratio is preserved. In the example that follows, the ratio is 115:120 before scaling and 230:240 after scaling the output by a factor of 2.

Item	Formula Quantity	Quantity After Scaling
Product A	11500 kg	23000 kg
Ingredient A, Proportional Scaling	5000 kg	11000 kg
Ingredient B, Proportional Scaling	5000 kg	11000 kg
Ingredient C, Fixed and Contributing	2000 kg	2000 kg

Fixed Scale Without Yield Contribution The quantities of items for this scale type are also not altered when a formula is scaled. This is the same as the previous example, however the item quantities are not considered when scaling the remaining ingredients. These quantities have no effect on scaling at all. For example, in the following, formula Ingredient C is fixed scale without yield contribution. If the product is scaled by a factor of 2, then the quantities after scaling appear as if ingredient C were not included.

Item	Formula Quantity	Quantity After Scaling
Product A	10000 kg	20000 kg
Ingredient A, Proportional Scaling	5000 kg	10000 kg
Ingredient B, Proportional Scaling	5000 kg	10000 kg
Ingredient C, Fixed and Noncontributing	2000 kg	2000 kg

See: *Oracle Process Manufacturing Inventory Management User's Guide*

Proportional Scale

If the formula contains proportionally scalable ingredients, then the scalable ingredients are increased in a direct ratio to produce the new product quantity. In the following example, Product A is proportionally scaled from 10000 kg to 20000 kg.

Item	Formula Quantity	Quantity After Scaling
Product A	10000 kg	20000 kg
Ingredient A, Proportional Scaling	5000 kg	10000 kg
Ingredient B, Proportional Scaling	5000 kg	10000 kg

With proportional scaling, Ingredient A and Ingredient B are multiplied by a factor of 2.

Examples of Single and Mixed Scale Types

The following discussion compares different scale types:

Single Type Scaling If a formula consists solely of proportionally scalable items, then scaling the output or the input scales everything in the same ratio. It is also possible to construct a formula from items that are all fixed scale. This formula is ineligible for scaling.

Mixed Type Scaling: Fixed and Proportional With Yield Contribution If a formula contains both fixed and proportionally scaled items, then the factor applied to the scalable quantities is not the same as the overall scaling factor. Consider a formula that yields 3000 kg of scalable product by converting 1000 kg of fixed scale Ingredient 1 and 2000 kg of scalable Ingredient 2. If the product is scaled by a factor of 2 to produce 6000 kg, then 5000 kg of Ingredient 2 is required, not 4000 kg. The factor applied to the Ingredient 2 quantity is therefore 2.5 rather than 2. If the inputs are scaled by a factor of 2, then the output is 5000 kg, or 2 times 2000 kg of Ingredient 2 plus 1000 kg of Ingredient 1. The yield of the product is scaled by a factor of 1.667 rather than by a factor of 2, as shown in the following:

Item	Formula Quantity	Quantity After Scaling
Product B	3000 kg	6000 kg
Ingredient 1 Fixed and Contributing	1000 kg	1000 kg
Ingredient 2 Proportional Scaling	2000 kg	5000 kg

Mixed Type Scaling: Proportional With Yield Contribution and Fixed Without Yield Contribution If the fixed quantity of an ingredient has no effect on yield, then the yield contribution field must indicate this. When a fixed quantity item that does not contribute to yield is encountered by the scaling algorithms, the item quantity is not scaled, and is ignored when deriving the scale factor to apply to the remaining items. The formula is treated as consisting only of the remaining items.

If a formula is scaled so that 2000 kg of scalable product is made by converting 2000 kg of scalable Ingredient 1 in the presence of 1000 kg of fixed scale Ingredient 2 that does not contribute to the yield, then the output doubles. Scaling the inputs by a factor of 2 doubles the output quantity, since the fixed scale ingredient quantity is

not to be changed. It does not matter if 100 kg of Ingredient 2 is used. The same is true when outputs are scaled.

Item	Formula Quantity	Quantity After Scaling
Product C	2000 kg	4000 kg
Ingredient 1 Proportional Scaling	2000 kg	4000 kg
Ingredient 2 Fixed and Noncontributing	1000 kg	1000 kg

Understanding Integer Scaling

Some material in process industries is picked from inventory in eaches, such as a 30 pound bag of defoamant or a box of antistatic sheets. If an item is issued in 30 pound bags, then it is supplied in full bags and managed on the production floor appropriately. If the UOM used in the formula is the bag, then you must scale in whole integer increments. If you want to express the ingredient in pounds, then integer scaling is not sufficient. You need a way to specify that the ingredient must only be scaled in multiples of 30 pounds.

When materials are scaled by a multiple, a scaling direction value must be specified so that the scaled quantity is rounded properly. Scaling by a multiple results in ingredients being rounded up or down to the next whole multiple specified for the item in the formula. It is possible that the formula ingredient is not scaled as a result of not meeting the criteria to round up or down. Rounding Variance is required for integer scaling. If you do not use rounding variance, then scaling type defaults to proportional scaling.

Examples of Integer Scaling

When the Integer scale type is selected, specify the Scale Multiple, Rounding Variance, and Rounding Direction. In the following example, Product C is scaled up by 60 percent.

Simple Integer Scaling The following is a simple example of using the Integer scale type with directional rounding:

Item	Formula Quantity	Quantity After Scaling
Product Pkg1	1000 kg	2500 kg
Ingredient 1 Proportional Scaling	1000 kg	2500 kg
Ingredient 2 Integer	1 pallet	3 pallets

Ingredient 2 has a Formula Quantity of 1 pallet with the following specifications:

- Scale Multiple = 1
- Rounding Variance = 100 percent
- Rounding Direction = Either

It is not possible to use 2.5 pallets, therefore the Integer scale type rounds the requirement up to 3 pallets.

Complex Integer Scaling The following example is a more complex example of using the Integer scale type with directional rounding:

Item	Formula Quantity	Quantity After Scaling
Product C	2000 kg	3200 kg
Ingredient 1 Proportional Scaling	2000 kg	3200 kg
Ingredient 2 Integer	25 kg	40 kg

Ingredient 2 has a Formula Quantity of 25 kg with the following specifications:

- Scale Multiple = 25 kg
- Rounding Variance = 30 percent of the Formula Quantity After Scaling. This is 0.3 of 40 kg, or up to 12 kg
- Rounding Direction = Down

The decision is whether to use 25 kg or 50 kg of material to produce Product C, since Ingredient 3 is only dispensed in multiples of 25 kg. The differences between the required Formula Quantity and the Integer is 10 kg for the Up Rounding Direction, and 15 kg for the Down Rounding Direction. The Down Rounding Direction is calculated as follows:

- Lower Scale Multiple - Quality After Scaling

  = 25 - 40

  = -15 kg for the Down Rounding Direction

  Take the absolute value of any negative Rounding Direction. In this case the lower Rounding Direction has an absolute value of 15 kg.

The acceptable Rounding Variance is up to 12 kg. The Rounding Direction is Down, and the calculated absolute value for the down Rounding Direction is 15 kg,

representing 3 kg more than the acceptable Rounding Variance. It is not acceptable to round down to 25 kg, so 40 kg of Ingredient 3 must be used in the formula.

If the Rounding Direction were Up, then it is acceptable to use 50 kg of Ingredient 3, since a 10 kg difference is less than the acceptable Rounding Variance of 12 kg. The Up Rounding Direction is calculated as follows:

- Upper Scale Multiple - Quantity After Scaling

  = 50 - 40

  = 10 kg for the Up Rounding Direction.

Limitations for Repeated Scaling of an Integer Scaled Item

Scaling issues occur when an item with an Integer scale type is scaled more than once during the production cycle. Repeated scaling items by the integer scale type is a process production issue.

See: *Oracle Process Manufacturing Process Execution User's Guide*

Disabling the Scaling of a Previously Scaled Formula

This advice applies to the Formula Details window.

If you clear Scaling Allowed so that scaling is not allowed on a formula, then the following message displays:

> Unchecking 'Scaling Allowed' for this formula will change the scale type for all material lines to fixed. The minimum, maximum, and standard quantities for any existing validity rules will be changed to the product quantity in the formula.
>
> Do you wish to Continue?

If you click OK, then the associated validity rule quantities are updated and disabled, and all material line scale types are set to Fixed. If validity rules exist with a status of Pending, Frozen, or On Hold, then the formula cannot be updated, and an appropriate message displays:

> Validity Rules exist which require update due to the change in this formula's scale type. However, they can not be updated because of their current status. Please update VR status in order to save this record.

If you do not continue after clearing Scaling Allowed, then the formula is set back to allow scaling, and all material detail line scale types remain unchanged and enabled.

Changing the Scale Type of a Product Line to the Fixed Scale Type

This advice applies to the following windows:

- Formula Details
- Formula Product Lines
- Formula Product Line Edit

If you change the Scale Type of a product line to the Fixed scale type, then the following message displays:

> The minimum, maximum, and standard quantities of any existing validity rules will be changed to the product quantity in the formula. Do you wish to continue?

If you click OK, then the associated validity rule quantities are updated and disabled, and all material line scale types are set to Fixed. If validity rules exist with a status of Pending, Frozen, or On Hold, then the formula cannot be updated, and an appropriate message displays:

> Validity Rules exist which require update due to the change in this formula's scale type. However, they can not be updated because of their current status. Please update VR status in order to save this record.

This advice applies to the following windows:

- Recipe Validity Rules
- Recipe Organization Details

When you display these windows after an associated formula header had its scaling set to Fixed, then all quantities are disabled. If the associated formula header allowed scaling, but the product line did not, then the associated validity rules for that product are disabled.

If you create a new record from any of these windows, and either the associated formula header or product record is set to fixed scaling, then the quantities are set equal to the product quantity and unit of measure of the formula. Quantities are disabled after entry if formula header or product are set to fixed scaling.

Defining and Maintaining Formulas

Formulas are statements of ingredient requirements. A formula can include processing instructions and ingredient sequencing directions. The formula can also specify the quantities of each item.

Creating a New Formula

Create and define new formulas on the Formula Details window. Specify formula header information and each of the products, ingredients, and byproducts included in the formula. You can display the following windows from the Formula Details window:

- Formula Product Lines
- Formula Product Line Edit
- Formula By-Product Lines
- Formula Ingredient Lines

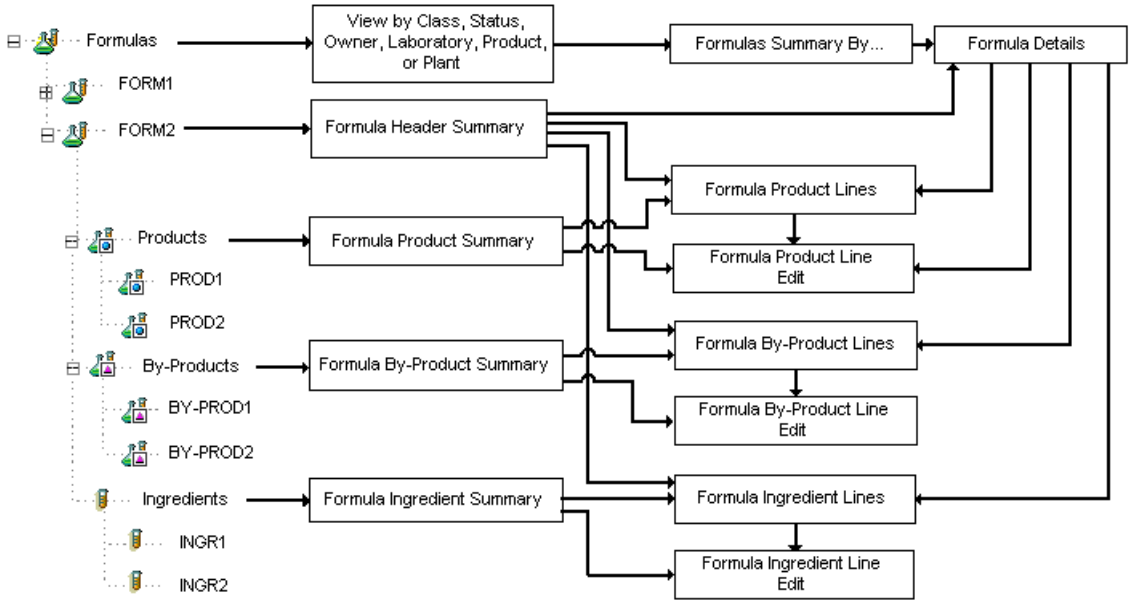
Maintaining Formulas at the Formula Header Level

Use the following windows to maintain formulas at the header level:

- Formula Summary By... to display a list of defined formulas with their individual version numbers and descriptions. These can be displayed by Class, Status, Owner, Laboratory, Product, or Plant. You can display the Formula Details window from the Formula Summary By... window.
- Formula Header Summary to display important descriptive information on a specific formula. You can display the following windows from the Formula Header Summary window:
  - Formula Details
  - Formula Product Lines
  - Formula By-Product Lines
  - Formula Ingredient Lines
- Formula Product Summary to display a summary of all formula products. You can display the following windows from the Formula Product Summary window:
  - Formula Product Lines
  - Formula Product Line Edit

- Formula Product Lines to display individual formula product lines. You can display the Formula Product Line Edit window from the Formula Product Lines window.
- Formula By-Product Summary to display a summary of all formula byproducts. You can display the following windows from the Formula By-Product Summary window:
  - Formula By-Product Lines
  - Formula By-Product Line Edit
- Formula By-Product Lines to display individual formula byproduct lines. You can display the Formula By-Product Line Edit window from the Formula By-Product Lines window.
- Formula Ingredient Summary to display a summary of all formula ingredients. You can display the following windows from the Formula Ingredient Summary window:
  - Formula Ingredient Lines
  - Formula Ingredient Line Edit
- Formula Ingredient Lines to display individual formula ingredient lines. You can display the Formula Ingredient Line Edit window from the Formula Ingredient Lines window.

The following graphic depicts the previously described formula navigation flow from the Formulas node and from the Products, By-Products and Ingredients nodes:



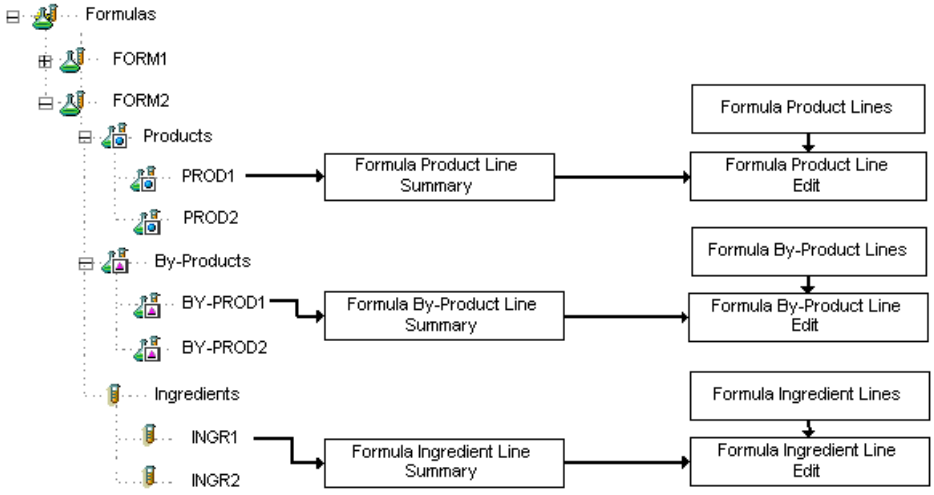
Maintaining Formulas at the Line Level

Use the following windows to maintain formulas at product, byproduct, and ingredient line level:

- Formula Product Line Summary to display a summary of the individual formula product lines, with an item number and unit of measure associated with each line. You can display the Formula Product Line Edit from the Formula Product Line Summary window.
- Formula Product Line Edit to edit individual lines in the Formula Product Line Summary.
- Formula By-Product Line Summary to display a summary of the individual formula byproduct lines, with an item number and unit of measure associated with each line. You can display the Formula By-Product Line Edit window from the Formula By-Product Line Summary window:
- Formula By-Product Line Edit to edit individual lines in the Formula By-Product Line Summary.

- Formula Ingredient Line Summary to display a summary of the individual formula ingredient lines, with an item number and unit of measure associated with each line. You can display the Formula Ingredient Line Edit window from the Formula Ingredient Line Summary window.
- Formula Ingredient Line Edit to edit individual lines in the Formula Ingredient Line Summary.

The following graphic depicts the previously described formula navigation flow from an individual product node (PROD 1), byproduct node (BY-PROD1), and ingredient node (INGR1).



Creating a Packaging Formula

In addition to defining the way bulk items are produced, formulas can be used to define the way items are packaged. To set up a packaging formula, enter the packaged item itself as product. Then enter the bulk item, packaging container, and package label as ingredients. Select the Packaging indicator in the formula header.

Migrating Formulas from Another Application

Use the Oracle Process Manufacturing Formula API to migrate formulas to the current release.

See Also

Oracle Process Manufacturing Formula API User's Guide

Finding a Formula

The Find Formulas window enables you to find a specific formula. You can find formulas and display summary windows from the workbench.

Prerequisites

❑ Enter and save formulas.

◗ To find a formula:

1. Navigate to the **Find Formulas** window.
2. Enter as many parameters as needed to complete the search:
   - Enter search parameters in the **Standard** region for: **Formula**, **Version**, **Description**, **Class**, **Product**, or **Ingredient**.
   - Enter search parameters in the **Advanced** region to enter a specific: **Item**, **Condition**, or **Value**.
3. Click **Find**.
4. Review the results of the search.
5. Close the window.

Displaying the Formula Summary

The Formula Summary window presents a list of formulas associated with the View By... option selected. The window displays individual versions and a brief description of the formula, and can be viewed by Class, Status, Owner, Laboratory, Product, or Plant.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❏ Optionally, enter and save formula classes.
- ❏ Enter and save formulas.
- ❏ Use the View By list to select how you want to view the summary of formulas. Select one of the following:
  - Class to display the list by formula class
  - Status to display the list by formula status
  - Owner to display the list by formula owner
  - Laboratory to display the list by laboratory
  - Product to display the list by primary product
  - Plant to display the list by plant

◗ To display a list of all defined formulas:

1. Navigate to the **Formula Summary By...** window.
2. The following fields are display only:
   - **Formula** determines the code assigned to the formula.
   - **Version** determines the version of the Formula.
   - **Description** determines a brief explanation of the Formula.
   - **Product** determines the primary product associated with the Formula.
   - **Quantity** determines the amount of material associated with the Formula.
   - **UOM** determines the primary unit of measure for the material associated with the Formula.

3. Click **Details** to display the **Formula Details** window.
4. Close the window.

Displaying the Formula Header Summary

The Formula Header Summary window displays important descriptive header information on a specific formula.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❑ Optionally, enter and save formula classes.
- ❑ Enter and save formulas.

◗ To display a summary of formula headers:

1. Navigate to the **Formula Header Summary** window.
2. Select the appropriate **Formula**.
3. The following fields are display only:
   - **Status** determines the status of the Formula.
   - **Formula** determines the code assigned to the formula.
   - **Version** determines the version of the Formula.
   - **Description** determines a brief explanation of the Formula.
   - **Comments** determines the remarks or notes entered for the Formula.
   - **Class** determines an optional classification assigned to the Formula.
   - **Class Description** determines an optional classification description assigned to the Formula.
   - **Main Product** determines the end item for the listed Formula.
   - **Product Description** displays a description Main Product.
   - **Owner** determines a code for the owner of the Formula.
   - **Owner Name** determines the complete name of the Owner of the Formula.
   - **Scaling Allowed** indicates whether or not the Formula allows scaling. If selected, scaling is allowed. Refer to the "Scaling Formulas" topic for details.
   - **Packaging Formula** indicates whether or not the Formula is a packaging type. If selected, the Formula is a packaging formula.

4. Click **Products** to display the **Formula Product Line Summary** window. Drill down to individual formula product lines on the **Formula Product Line Edit** window.
5. Click **By-products** to display the **Formula By-Product Line Summary** window. Drill down to individual formula byproduct lines on the **Formula By-Product Line Edit** window.
6. Click **Ingredients** to display the **Formula Ingredient Line Summary** window. Drill down to individual formula ingredient lines on the **Formula:Ingredient Line Edit** window.
7. Click **Details** to display the **Formula Details** window.
8. Close the window.

Entering Formula Details

The Formula Details window lets you enter the details for a specific formula. When creating a new formula on the Formula Details window, the LOV for the Formula field enables you to select or query the product from the item master. When you select a product name to use as a formula name, the formula Description field has the item description entered automatically. The product UOM and product description continue to be entered automatically. For automatic product and description entry, you must select a valid item. If the item description changes subsequently, the formula description does not change. It must be updated manually. When you modify formula details, you cannot delete the last remaining product or ingredient in a formula.

You can use folders and flexfields with this window. Refer to *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

E-record and E-signature Approvals

There may be an e-signature event associated with this window. Refer to "Appendix D Oracle E-Records Events in Product Development" for additional information on e-record and e-signature approvals associated with this window.

Prerequisites

❑ Optionally, enter and save formula classes.

To enter formula details:

1. Navigate to the **Formula Details** window.
2. Enter the code for the **Formula**. Required.
3. Enter the Formula **Version**. Required.
4. After entering all relevant information and saving the Formula with the default Status of **New**, return to this window if you need to change Formula Status by selecting **Change Status** from the **Actions** menu. Depending on whether Workflow is enabled, a different set of statuses is available.

   Select a **Status** for the Formula you are entering from one of the following:

   - **Approved for Laboratory Use** to indicate that the Formula is approved for laboratory use.
   - **Approved for General Use** to indicate that the Formula is approved for use in production.

- **Obsolete/Archived** to indicate that the Formula is no longer approved for use and is obsoleted, archived, or both.

If Workflow is enabled, when you select:

- **Approved for Laboratory Use**, Status changes to **Request Approval for Laboratory Use** until all approvers have accepted the Formula, then its Status changes to Approved for Laboratory Use.
- **Approval for General Use**, Status changes to **Request Approval for General Use** until all approvers have accepted the Formula, then its Status changes to Approved for General Use.

Refer to the Understanding the Status Approval Workflow topic for additional information.

5. Enter a **Description** that briefly explains the Formula. Required.
6. Enter **Comments** that need to accompany this Formula. For example, you could enter CUSTOM PROPRIETARY FORMULA. DO NOT COPY. This field also allows multilingual entries.
7. Enter a **Class** for the Formula to identify how it is categorized. The **Class Description** assigned to the Formula displays.
8. **Organization** displays the name of the organization responsible for the Formula. The **Organization Description** assigned to the organization displays.
9. Enter the **Owner** of the Formula. The **Owner Description** displays.
10. **Scaling Allowed** indicates whether or not the Formula allows scaling.
    - Select indicate that scaling is allowed.
    - Clear to indicate that scaling is not allowed.

    Refer to the "Scaling Formulas" topic for details.
11. **Packaging** indicates whether or not the Formula is a packaging formula.
    - Select to indicate that the Formula is a packaging formula.
    - Clear to indicate that the Formula is not a packaging formula.

Products

12. The **Line** number for each product listed displays. These fields cannot be edited.

13. Enter the **Product** code for each item produced by this Formula. If the formula code you entered is the same as an item code, then that item code displays as the default for the first product line. A minimum of one product is required for a formula. Required.
14. The **Description** of the Product entered displays. This defaults from the Item Master table.
15. Enter **Quantity** of the Product that this Formula yields. The quantity entered in this field is the default standard quantity used for the recipe. Required.
16. Enter the **UOM** for the Quantity entered. The inventory unit of measure for the item is the default. If you enter a different unit of measure, set up a unit of measure conversion between the default and the unit of measure you decide to enter. Conversions between units of measure of the same unit of measure type are defined when the unit of measure is defined in System Administration. Conversions between different unit of measure types must be defined for each item on the Item Lot/Sublot Standard Conversion window in Inventory Management. Required.
17. Select the **Scale Type** as:
    - **Fixed** if the product is not scalable.
    - **Proportional** if the product is scalable.

    Required. Refer to the "Scaling Formulas" topic for advice.
18. Select the **Yield Type** to indicate the type of product yield as:
    - **Automatic** when products are yielded automatically when the batch is completed.
    - **Manual** when products are yielded manually.
    - **Incremental** when product yield is calculated by incremental backflushing.
    - **Automatic by Step** when products are yielded automatically as the step is completed.

    Required.
19. **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.
20. Click **Edit Line** to display the **Formula Product Line Edit** window.
21. Click **Products** to display the **Formula Product Lines** window.
22. Click **By-Products** to display the **Formula By-Product Lines** window.

23. Click **Ingredients** to display the **Formula Ingredient Lines** window.

By-Products

24. The **Line** number for each byproduct listed displays. This field cannot be edited.
25. Enter the **By-Product** code for byproduct items produced by this Formula. Byproducts are not required for a formula.
26. The **Description** of the byproduct entered displays. This defaults from the Item Master table.
27. Enter the **Quantity** of the byproduct that this Formula yields. The quantity entered in this field is the default standard quantity used for the recipe. It can be changed at the recipe level. Required if you enter one or more byproducts for the Formula. Required.
28. Enter the **UOM** for the Quantity entered. The inventory unit of measure for the Item is the default. If you enter a different unit of measure, set up a unit of measure conversion between the default and the unit of measure you decide to enter. Conversions between units of measure of the same unit of measure type (for example, both mass) are defined when the unit of measure is defined in System Administration. Conversions between different unit of measure types must be defined for each item on the Item Lot/Sublot Standard Conversion window in Inventory Management. Required if you enter one or more byproducts for the Formula. Required.
29. Select the **Scale Type** as:
    - **Fixed** if the byproduct is not scalable.
    - **Proportional** if the byproduct is scalable.

    Required. Refer to the "Scaling Formulas" topic for advice.
30. Select the **Yield Type** to indicate the type of byproduct yield as:
    - **Automatic** when byproducts are yielded automatically when the batch is completed.
    - **Manual** when byproducts are yielded manually.
    - **Incremental** when byproduct yield is calculated by incremental backflushing.
    - **Automatic by Step** when byproducts are yielded automatically as the step is completed.

Required.

31. Enter the following **By-product Type**:
    - **Rework** if the material generated requires rework.
    - **Sample** if the material generated is used as a sample for quality inspection.
    - **Waste** if the material is a waste product.
    - **Yield** if the byproduct is material that is yielded for use in another process.
32. Click **Edit Line** to display the **Formula By-Product Line Edit** window.
33. Click **Products** to display the **Formula Product Lines** window.
34. Click **By-Products** to display the **Formula By-Product Lines** window.
35. Click **Ingredients** to display the **Formula Ingredient Lines** window.

Ingredients

36. The **Line** number for each ingredient listed displays. This field cannot be edited.
37. Enter the **Ingredient** code for each item required by this formula. A minimum of one ingredient is required for a formula. Required.
38. The **Description** of the ingredient entered displays. This defaults from the Item Master table.
39. Enter **Quantity** of the ingredient that this Formula requires. The quantity entered in this field is the default standard quantity used for the recipe. It can be changed at the recipe level. Required.
40. Enter the **UOM** for the Quantity entered. The inventory unit of measure for the Item is the default. If you enter a different unit of measure, you set up a unit of measure conversion between the default and the unit of measure you decide to enter. Conversions between units of measure of the same unit of measure type (for example, both mass) are defined when the unit of measure is defined in System Administration. Conversions between different unit of measure types must be defined for each item on the Item Lot/Sublot Standard Conversion window in Inventory Management. Required.
41. Select the **Scale Type** as:
    - **Fixed** if the ingredient is not scalable.
    - **Proportional** if the ingredient is scalable.

- **Integer** if the ingredient is scalable by multiples.

Required. Refer to the "Scaling Formulas" topic for advice.

42. Enter the **Scale Multiple** as the scaling increment for the ingredient.
43. Enter the **Scale Rounding Variance**.
44. Enter the **Rounding Direction** as:
    - **Down** if the acceptable rounding direction is down to the nearest multiple.
    - **Either** if the acceptable rounding direction is up or down to the nearest multiple.
    - **Up** if the acceptable rounding direction is up to the nearest multiple.
45. Select the **Consumption Type** to indicate the type of ingredient consumption as:
    - **Automatic** when ingredients are consumed automatically when the batch is completed.
    - **Manual** when ingredients are consumed manually.
    - **Incremental** when ingredient consumption is calculated by incremental backflushing.
    - **Automatic by Step** when ingredients are consumed automatically as the step is completed.

    Required.
46. **Contribute to Yield** indicates whether the material contributes to the yield.
    - Select **Yes** if the Line contributes to yield.
    - Select **No** if the Line does not contribute to yield.

    Required.
47. **Contribute to Step Qty** indicates whether the material contributes to the step quantity.
    - Select **Yes** if the Line contributes to step quantity.
    - Select **No** if the Line does not contribute to step quantity.
48. Select the **Phantom Type**:
    - **Not a Phantom** indicates the ingredient is not a phantom item.
    - **Automatic Generation** indicates the ingredient is a phantom item that is exploded automatically.

- **Manual Generation** indicates that the ingredient is a phantom item that requires manual explosion.

Required.

49. **Buffer** specifies those ingredients that are used to maintain the target quantity while working with a formula or batch on the Simulator. The Calculate indicator on the Optimizer window is the default for all the ingredients selected as buffer in the formula.
50. Enter the **Scrap Factor** as the anticipated amount of ingredient lost in the manufacturing process as a percentage. For example, if the Scrap Factor is 10 percent, an additional 10 percent of material is added to accommodate for this loss. Required.
51. **Required Qty** displays the result of multiplying the Formula Quantity by the quantity one plus the Scrap Factor expressed as a percent. For example, if the Scrap Factor is 10 percent and the Formula Quantity is 100 pounds, the Required Quantity is 110 pounds. It represents the planned quantity plus the scrap.
52. Click **Edit Line** to display the **Formula Product Line Edit** window.
53. Click **Products** to display the **Formula Product Lines** window.
54. Click **By-Products** to display the **Formula By-Product Lines** window.
55. Click **Ingredients** to display the **Formula Ingredient Lines** window.
56. Save the window.

To scale the formula:

1. Choose **Scale** from the **Actions** menu. The **Scale Formula** window displays.
2. Select one of the following:
   - **Percent** to scale by a percentage. Enter the value in the **Factor** field.
   - **Item Quantity** to scale by a specific quantity. Enter the **New Quantity**.
3. Click **OK**. The window displays the scaled formula.

To mark the formula for deletion:

1. Choose **Mark for Purge** from the **Actions** menu.
2. The record is marked for deletion.
3. Save the window.

To change the formula status:

1. Choose **Change Status** from the **Actions** menu.
2. Change the **Current Status** displayed by selecting a different status from the **Change Status To** list.
3. Click **OK**. The **Formula Details** window displays the revised **Status** for the Formula.

To edit the formula text:

1. Choose **Edit Text** from the **Actions** menu.
2. Make the appropriate edits to formula text.
3. Save the window.

To access the Samples window:

1. Choose **Samples** from the **Actions** menu. The **Samples** window displays.
2. Evaluate production samples.
3. Close the window.

To display the Specifications window:

1. Choose **Specifications** from the **Actions** menu. The **Specifications** window displays.
2. Evaluate specifications.
3. Close the window.

To select technical data:

1. Select an intermediate ingredient line with technical parameters.
2. Choose **Technical Data Selection** from the **Actions** menu. The **Technical Data Selection** window displays.
3. Evaluate technical data.
4. Close the window.

To display product technical parameters:

1. Select the **Line** where you want to display technical parameters.

2. Choose **Product Technical Parameters** from the **Actions** menu. The **Product Technical Parameters** window displays.
3. Evaluate the technical parameters for the product.
4. Close the window.

To list experimental items:

1. Choose **List Experimental Items** from the **Actions** menu. The **List Experimental Items** window displays.
2. Evaluate the list for the **Laboratory Formula** and **Laboratory Version** displayed. The **Experimental Item** and a brief **Description** are displayed for each component in the list.
3. Close the window.

To display theoretical yield:

1. Choose **Theoretical Yield** from the **Actions** menu. The **Theoretical Yield** window displays.
2. Evaluate the **Yield Percent.**
3. Click **OK** to close the window.

To duplicate a record:

1. Retrieve the **Formula Details** record you want to duplicate.
2. Choose **New** from the **File** menu.
3. Choose **Duplicate Record Above** from the **Edit** menu.
4. Enter a new **Formula** name and **Version** number.
5. Save the window.

To display the E-record Details window:

1. Choose **E-record Details** from the **Actions** menu. The **E-record Generic Query** displays if this option is implemented in your application.
2. Refer to "Appendix D Oracle E-Records Events in Product Development" for information on e-records.
3. Close the window.

Scaling a Formula

The Scale Formula window enables you to scale a formula by a percent or by an item quantity.

Using a Percent to Scale a Formula

Enter a percentage to scale any scalable ingredient up or down by a percent of the displayed quantity. For example, if you enter 100 percent, the quantity of the selected item is scaled up by 100 percent, or doubled, and the other quantities are increased accordingly. If you enter -50, or negative fifty percent, the item quantity is decreased by half.

Using an Item Quantity to Scale a Formula

This is the simplest method to scale any scalable ingredients. Enter a new quantity of material.

To scale a formula by a percentage:

1. Select the material **Line** you want to scale. For example, select a product.
2. Choose **Scale** from the **Actions** menu. The **Scale Formula** window displays.
3. Select the **Percent** radio button.
4. Enter a percentage for the scaling **Factor**. For example, to double the material, enter 100.
5. Click **OK**.

To scale a formula by entering a new quantity:

1. Choose **Scale** from the **Actions** menu. The **Scale Formula** window displays.
2. Select the **Item Quantity** radio button.
3. The following fields are display only:
   - **Line** displays the line number of the material on the **Formula Details** window.
   - **Item** displays the item code listed on the **Formula Details** window.
   - **Description** displays a brief description of the Item.
   - **Old Quantity** displays the quantity you want to rescale with its **UOM**.
4. Enter a **New Quantity** for the material.

5. Click **OK**.

Displaying Ingredient Technical Parameters

To display ingredient technical parameters:

1. Choose **Ingredient Technical Parameters** from the **Actions** menu. The **Ingredient Technical Parameters** window displays.
2. Evaluate technical parameters for selected ingredients and make necessary changes.
3. Close the window.

Using the View Menu to Find a Formula

The Find selection on the View menu enables you to find a formula.

To find a formula from the View menu:

1. Choose **Find** from the **View** menu.
2. Enter as many parameters as needed to complete the search:
   - **Status**
   - **Formula**
   - **Version**
   - **Description**
   - **Product**
   - **Formula Class**
   - **Owner**
   - **Organization**
   - **Scaling Allowed**
   - **Marked for Deletion**
3. Click **Find**.
4. Review the results of the search.
5. Close the window.

Displaying the Formula Product Summary

The Formula Product Summary window enables you to display a summary of products listed in a formula.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Enter and save formulas.

◗ To display the formula product summary:

1. Navigate to the **Formula Product Summary** window.
2. The following fields are display only:
   - **Line** determines the line sequence for products listed in the Formula.
   - **Item No** determines the item code for products listed in the Formula.
   - **Quantity** determines the amount for products listed in the Formula.
   - **Description** determines a brief explanation of the product entered. This defaults from the Item Master table.
   - **UOM** determines the unit of measure for products listed in the Formula.
   - **Yield Type** to indicate the type of product yield as:
   - **Automatic** if the line is automatically released or completed when subsequent lines are released or completed.
   - **Manual** if the line must be released and completed manually.
   - **Incremental** if the line must be released by incremental backflushing.
   - **Automatic by Step** when products are yielded automatically as the step is completed.
   - **Required Qty** displays planned quantity plus the scrap.
   - **Scale Type** displays whether the scaling is Fixed or Proportional. Refer to the "Scaling Formulas" topic for advice.
   - **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.

3. Click **Edit Line** to display the **Formula Product Line Edit** window.
4. Close the window.

Displaying the Formula Byproduct Summary

The Formula By-Product Summary window enables you to display a summary of byproducts listed in a formula.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Enter and save formulas.

◗ To display the formula byproduct summary:

1. Navigate to the **Formula By-Product Summary** window.
2. The following fields are display only:
   - **Line** determines the line sequence for byproducts listed in the Formula.
   - **Item No** determines the item code for byproducts listed in the Formula.
   - **Quantity** determines the amount for byproducts listed in the Formula.
   - **Description** determines a brief explanation of the byproduct entered. This defaults from the Item Master table.
   - **UOM** determines the unit of measure for byproducts listed in the Formula.
   - Select the **Yield Type** to indicate the type of byproduct yield as:
   - **Automatic** when byproducts are yielded automatically when the batch is completed.
   - **Manual** when byproducts are yielded manually.
   - **Incremental** when byproduct yield is calculated by incremental backflushing.
   - **Automatic by Step** when byproducts are yielded automatically as the step is completed.
   - **Scale Type** displays whether the scaling is Fixed or Proportional. Refer to the "Scaling Formulas" topic for advice.
   - **By-product Type** displays whether the byproduct is Rework, Sample, Waste, or Yield. Refer to the "Setting Up Formula Information" topic for more information.

3. Optionally, click **Edit Line** to display the **Formula By-Product Line Edit** window.
4. Close the window.

Displaying the Formula Ingredient Summary

The Formula Ingredient Summary window enables you to display a summary of ingredients listed in a formula.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Enter and save formulas.

◗ To display the formula ingredient summary:

1. Navigate to the **Formula Ingredient Summary** window.
2. The following fields are display only:
   - **Line** determines the line sequence for ingredients listed in the Formula.
   - **Item No** determines the item code for ingredients listed in the Formula.
   - **Quantity** determines the amount for ingredients listed in the Formula.
   - **Description** determines a brief explanation of the ingredient entered. This defaults from the Item Master table.
   - **UOM** determines the unit of measure for ingredients listed in the Formula.
   - **Consumption Type** indicates the type of ingredient consumption as:
   - **Automatic** if the line is automatically released or completed when subsequent lines are released or completed.
   - **Manual** if the line must be released and completed manually.
   - **Incremental** if the line must be released by incremental backflushing.
   - **Automatic by Step** when ingredients are consumed automatically as the step is completed.
   - **Contributes to Step Qty** indicates whether the Line contributes to step quantity, and displays:
   - **Yes** if the ingredient contributes to the step quantity.
   - **No** if the ingredient does not contribute to the step quantity.
   - **Scrap Factor** displays the anticipated amount of ingredient loss during manufacturing as a percentage. For example, if the Scrap Factor is 10

percent, an additional 10 percent of material is added to accommodate for this loss.

- **Required Qty** displays the planned quantity plus the scrap.
- **Scale Type** displays whether the scaling is Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice.
- **Phantom Type** determines whether the ingredient is not a phantom, is an autogenerated phantom, or is a manually generated phantom.

3. Click **Details** to display the **Formula Ingredient Line Edit** window.
4. Close the window.

Displaying a Summary of Formula Product Lines

The Formula Product Line Summary window enables you to display formula product lines.

Prerequisites

- ❑ Set up the GMD: Zero Quantity profile option.
- ❑ Enter and save formulas.

◗ To display the formula product line summary:

1. Navigate to the **Formula Product Line Summary** window.
2. The following fields are display only:
   - **Line** determines the line sequence for each product listed in the Formula.
   - **Item** determines the item code for each product listed in the Formula.
   - **Description** displays a brief explanation of the product entered. This defaults from the Item Master table.
   - **Quantity** determines the amount for each product listed in the Formula.
   - **UOM** determines the unit of measure for quantities of product listed in the Formula.
   - **Yield Type** to indicate the type of product yield as:
   - **Automatic** if the line is automatically released or completed when subsequent lines are released or completed.
   - **Manual** if the line must be released and completed manually.
   - **Incremental** if the line must be released by incremental backflushing.
   - **Automatic by Step** when products are yielded automatically as the step is completed.
   - **Scale Type** displays whether the scaling is Fixed or Proportional. Refer to "Scaling Formulas" for details.
   - **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.
3. Click **Details** to display the **Formula Product Line Edit** window.
4. Close the window.

Editing Formula Product Lines

The Formula Product Lines window enables you to edit formula product lines.

You cannot delete the last remaining product or ingredient in a formula. You cannot delete a product from a formula that has a validity rule saved for the formula and product combination.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide,* respectively.

Prerequisites

❑ Enter and save formulas.

◗ To edit the formula product lines:

1. Navigate to the **Formula Product Lines** window.
2. **Line** displays the line sequence for each product listed in the Formula.
3. Enter the **Item No** as the item code for each product listed in the Formula. Required.
4. Enter the **Quantity** as the amount for each product listed in the Formula. Required.
5. **Description** displays a brief explanation of the product entered. This defaults from the Item Master table.
6. Enter the **UOM** as the unit of measure for the Quantity. Required.
7. Select the **Yield Type** to indicate the type of product yield as:
   - **Automatic** if the line is automatically released or completed when subsequent steps are released or completed.
   - **Manual** if the line must be released and completed manually.
   - **Incremental** if the line must be released by incremental backflushing.
   - **Automatic by Step** when products are yielded automatically as the step is completed.

   Required.
8. Enter the **Scale Type** to indicate whether the scaling is Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice.

9. **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.
10. Save the window.
11. Optionally, click **Edit Line** to edit a selected **Line Number**. The **Formula Product Line Edit** window displays.

Editing a Formula Product Line

The Formula Product Line Edit window enables you to edit formula product lines.

Prerequisites

❑ Enter and save formulas.

◗ To edit a formula product line:

1. Navigate to the **Formula Product Line Edit** window.
2. The following fields are display only:
   - **Line** determines the line sequence for each product listed in the Formula.
   - **Item** determines the item code for each product listed in the Formula.
   - **Description** determines a brief explanation of the product entered. This defaults from the Item Master table.
3. Enter the **Quantity** for the product Line listed in the Formula. Required.
4. Enter the **UOM** for the Quantity. Required.
5. Select the **Yield Type** to indicate the type of product yield as:
   - **Automatic** if the line is automatically released or completed when subsequent steps are released or completed.
   - **Manual** if the line must be released and completed manually.
   - **Incremental** if the line must be released by incremental backflushing.
   - **Automatic by Step** when products are yielded automatically as the step is completed.

   Required.
6. Select the **Scale Type** as Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice. Required.
7. **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.
8. Save the window.

Displaying a Summary of Formula Byproduct Lines

The Formula By-Product Line Summary window enables you to display a summary of formula byproduct lines.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

❑ Enter and save formulas.

◗ To display a summary of formula byproducts:

1. Navigate to the **Formula By-Product Line Summary** window.
2. The following fields are display only:
   - **Line** determines the line sequence for each byproduct listed in the Formula.
   - **Item** determines the item code for each byproduct listed in the Formula.
   - **Description** determines a brief explanation of the byproduct entered. This defaults from the Item Master table.
   - **Quantity** determines the amount for each byproduct listed in the Formula.
   - **UOM** determines the unit of measure for the quantity.
   - Select the **Yield Type** to indicate the type of byproduct yield as:
   - **Automatic** when byproducts are yielded automatically when the batch is completed.
   - **Manual** when byproducts are yielded manually.
   - **Incremental** when byproduct yield is calculated by incremental backflushing.
   - **Automatic by Step** when byproducts are yielded automatically as the step is completed.
   - **Scale Type** displays whether the scaling is Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice.
   - **By-product Type** displays whether the byproduct is Rework, Sample, Waste, or Yield. Refer to the "Setting Up Formula Information" topic for more information.

3. Click **Details** to display the **Formula By-Product Line Edit** window.
4. Close the window.

Editing Formula Byproduct Lines

The Formula By-Product Lines window enables you to edit formula byproduct lines.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Enter and save formulas.

◗ To edit the formula byproduct lines:

1. Navigate to the **Formula By-Product Lines** window.
2. **Line** displays the line sequence for each byproduct listed in the Formula.
3. Enter the **Item No** as the item code for each byproduct listed in the Formula. Required.
4. Enter the **Quantity** as the amount for each byproduct listed in the Formula. Required.
5. **Description** displays a brief explanation of the byproduct entered. This defaults from the Item Master table.
6. Enter the **UOM** as the unit of measure for the quantity. Required.
7. Select the **Yield Type** to indicate the type of byproduct yield as:
   - **Automatic** when byproducts are yielded automatically when the batch is completed.
   - **Manual** when byproducts are yielded manually.
   - **Incremental** when byproduct yield is calculated by incremental backflushing.
   - **Automatic by Step** indicates that the byproduct is released automatically as the step is completed.

   Required.
8. Select the **By-product Type** as:
   - **Rework** when the byproduct requires rework.
   - **Waste** when the byproduct is a waste material.

- **Sample** when the byproduct is a sample for quality testing.
- **Yield** when the byproduct generated is yielded to another process or step.

Required.

9. Enter the **Scale Type** to indicate whether the scaling is Fixed or Proportional. Refer to the "Scaling Formulas" topic for advice.
10. Save the window.
11. Optionally, click **Edit Line** to edit a selected **Line Number**. The **Formula By-Product Line Edit** window displays.

Editing a Formula Byproduct Line

The Formula By-Product Line Edit window enables you to edit formula byproduct lines.

Prerequisites

❑ Enter and save formulas.

◗ To edit a formula byproduct line:

1. Navigate to the **Formula By-Product Line Edit** window.
2. The following fields are display only:
   - **Line** determines the line sequence for each byproduct listed in the Formula.
   - **Item** determines the item code for each byproduct listed in the Formula.
   - **Description** determines a brief explanation of the byproduct entered. This defaults from the Item Master table.
3. Enter the **Quantity** for the byproduct Line listed in the Formula. Required.
4. Enter the **UOM** for the quantity. Required.
5. Select the **Yield Type** to indicate the type of byproduct yield as:
   - **Automatic** when byproducts are yielded automatically when the batch is completed.
   - **Manual** when byproducts are yielded manually.
   - **Incremental** when byproduct yield is calculated by incremental backflushing.
   - **Automatic by Step** indicates that the byproduct is released automatically as the step is completed.

   Required.
6. Enter the **Scale Type** as Fixed or Proportional. Refer to the "Scaling Formulas" topic for advice. Required.
7. Enter the **By-product Type** as Rework, Sample, Waste, or Yield. Refer to the "Setting Up Formula Information" topic for more information.
8. Save the window.

Displaying a Summary of Formula Ingredient Lines

The Formula Ingredient Line Summary window enables you to display formula product lines.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

❑ Enter and save formulas.

◗ To display a summary of formula ingredients:

1. Navigate to the **Formula Ingredient Line Summary** window.
2. The following fields are display only:
   - **Line** determines the line sequence for each ingredient listed in the Formula.
   - **Item** determines the item code for each ingredient listed in the Formula.
   - **Description** determines a brief explanation of the ingredient entered. This defaults from the Item Master table.
   - **Quantity** determines the amount for each ingredient listed in the Formula.
   - **UOM** determines the unit of measure for the quantity.
   - Select the **Consumption Type** to indicate the type of ingredient consumption as:
   - **Automatic** when ingredients are consumed automatically when the batch is completed.
   - **Manual** when ingredients are consumed manually.
   - **Incremental** when ingredient consumption is calculated by incremental backflushing.
   - **Automatic by Step** when ingredients are consumed automatically as the step is completed.
   - **Scale Type** displays whether the scaling is Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice.
   - **Phantom Type** indicates whether the ingredient is not a phantom, is an autogenerated phantom, or is a manually generated phantom.
   - **Contributes to Step Qty** displays:
   - **Yes** if the ingredient contributes to the step quantity.

- **No** if the ingredient does not contribute to the step quantity.

- **Scrap Factor** indicates the anticipated amount of ingredient lost in the manufacturing process as a percentage. For example, if the Scrap Factor is 10 percent, an additional 10 percent of material is added to accommodate for this loss.

- **Required Quantity** displays the result of multiplying the Formula Quantity by the quantity one plus the Scrap Factor expressed as a percent. For example, if the Scrap Factor is 10 percent and the Formula Quantity is 100 pounds, the Required Quantity is 110 pounds.

3. Click **Details** to display the **Formula Ingredient Line Edit** window.
4. Close the window.

Editing Formula Ingredient Lines

The Formula Ingredient Lines window enables you to edit formula ingredient lines.

You cannot delete the last remaining product or ingredient in a formula.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide,* respectively.

Prerequisites

❑ Enter and save formulas.

◗ To edit the formula ingredient lines:

1. Navigate to the **Formula Ingredient Lines** window.
2. **Line** displays the line sequence for each ingredient listed in the Formula.
3. Enter the **Item No** as the item code for the ingredient listed in the Formula. Required.
4. Enter the **Quantity** as the amount for each ingredient listed in the Formula. Required.
5. **Description** displays a brief explanation of the ingredient listed in the Formula.
6. Enter the **UOM** as the unit of measure for the quantity. Required.
7. Select the **Consumption Type** to the type of ingredient consumption as:
   - **Automatic** when ingredients are consumed automatically when the batch is completed.
   - **Manual** when ingredients are consumed manually.
   - **Incremental** when ingredient consumption is calculated by incremental backflushing.
   - **Automatic by Step** when ingredients are consumed automatically as the step is completed.

   Required.

8. **Contributes To Step Qty** indicates whether the material contributes to the step quantity.
   - Select **Yes** if the ingredient contributes to the step quantity.
   - Select **No** if the ingredient does not contribute to the step quantity.

   Required.
9. **Contribute to Yield** indicates whether the material contributes to the yield.
   - Select **Yes** if the Line contributes to yield.
   - Select **No** if the Line does not contribute to yield.
10. Enter the **Scrap Factor** as the anticipated amount of ingredient lost in the manufacturing process as a percentage. For example, if the Scrap Factor is 10 percent, an additional 10 percent of material is added to accommodate for this loss. Required.
11. **Required Qty** displays the result of multiplying the Formula Quantity by the quantity one plus the Scrap Factor expressed as a percent. For example, if the Scrap Factor is 10 percent and the Formula Quantity is 100 pounds, the Required Quantity is 110 pounds. It represents the planned quantity plus the scrap.
12. Enter the **Scale Type** displays whether the scaling is Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice.
13. Enter the **Phantom Type** to indicate whether the ingredient is not a phantom, is an autogenerated phantom, or is a manually generated phantom. Required.
14. Save the window.
15. Optionally, click **Edit Line** to edit a selected **Line Number**. The **Formula Ingredient Line Edit** window displays.

To find a formula line:

1. Choose **Find...** from the **View** menu. The **Find Formula Line** window displays.
2. Enter one or more of the following to narrow your search:
   - **Formula No** as the formula code number.
   - **Formula Version** as the formula version number.
   - **Line Type** as **Automatic**, **Manual**, or **Incremental** release.
3. Click **Find**.

4. Review the results of your search.
5. Optionally, click **New** to enter a new formula line.

Editing a Formula Ingredient Line

The Formula Ingredient Line Edit window enables you to edit formula ingredient lines.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

❑ Enter and save formulas.

◗ To edit a formula ingredient line:

1. Navigate to the **Formula Ingredient Line Edit** window.
2. The following fields are display only:
   - **Line** determines the line sequence for each ingredient listed in the Formula.
   - **Item** determines the item code for each ingredient listed in the Formula.
   - **Description** determines a brief explanation of the ingredient entered. This defaults from the Item Master table.
3. Enter the **Quantity** for the ingredient Line listed in the Formula. Required.
4. Enter the **UOM** for the quantity. Required.
5. Select the **Consumption Type** to indicate the type of ingredient consumption as:
   - **Automatic** when ingredients are consumed automatically when the batch is completed.
   - **Manual** when ingredients are consumed manually.
   - **Incremental** when ingredient consumption is calculated by incremental backflushing.
   - **Automatic by Step** when ingredients are consumed automatically as the step is completed.

   Required.
6. Enter the **Scale Type** as Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice. Required.
7. Enter the **Phantom Type** to indicate that this Line is not a phantom, is an autogenerated phantom, or is a manually generated phantom. Required.

8. Select **Contributes To Step Qty** if the Line contributes to step quantity. Clear if the Line does not contribute to step quantity.
9. Enter the **Scrap Factor** as the anticipated amount of ingredient lost in the manufacturing process as a percentage. For example, if the Scrap Factor is 10 percent, an additional 10 percent of material is added to accommodate for this loss. Required.
10. **Required Quantity** displays the result of multiplying the Formula Quantity by the quantity one plus the Scrap Factor expressed as a percent. For example, if the Scrap Factor is 10 percent and the Formula Quantity is 100 pounds, the Required Quantity is 110 pounds.
11. **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.
12. Save the window.

Using Computer-Aided Formulation

Process manufacturing industries produce products that have chemical and physical properties that can be predicted by algorithms. These algorithms use the individual raw material quantities and properties to predict properties of finished goods. With the correct algorithms, you can alter the amount of one or more raw materials, and the application calculates the effect on the product. Alternatively, by selecting target finished good properties, such as a prescribed value for Volatile Organic Compound (VOC), or a desired cost, the application can alter the quantities of raw materials in a formula to produce the target product values. The availability of modeling features in an environment which is separate from the production formula lets formulators simulate changes without affecting current formulas and recipes.

Following are stages for using Computer-Aided Formulation:

- Setting Up for Computer-Aided Formulation
- Using the Simulator
- Optimizing Formulas and Batches

Setting Up for Computer-Aided Formulation

Following are the setup steps for using computer-aided formulation:

Step 1: Defining a laboratory organization Laboratories are used to group technical parameters. Common technical parameters are loaded to the Simulator and Optimizer windows through the laboratory organization. See: "Setting Up Laboratory Organizations."

If you intend to create quality data for items owned by the laboratory organization, then assign a quality document type of SMPL to the laboratory organization. If you intend to use quality data for a formula simulation or laboratory batch, then create quality data that is owned by the laboratory. As an optional step, if quality data is already defined for the production batch items at the plant level, then the simulation will call the plant quality data.

See Also

Oracle Process Manufacturing Implementation Guide

Oracle Process Manufacturing System Administration User's Guide

Step 2: Assigning the laboratory to the user organization Assigning the laboratory to the user organization gives you access to the laboratory for defining, updating, and querying data.

See Also

Oracle Process Manufacturing Implementation Guide

Oracle Process Manufacturing System Administration User's Guide

Step 3: Assigning a value to the GMD: Default Lab Organization profile option Assign the current laboratory organization as the user default value. This step sets the default value for the laboratory organization in the Technical Data windows and the Simulator window. This step is required for automatic creation of the density technical parameter for the laboratory organization.

Step 4: Setting profile options Optional. In the System Administration Responsibility, set up the following profile options:

- GMD: Density
- GMD: UOM Mass Type
- GMD: UOM Volume Type

These profile options are required for converting density values in the Simulator window.

See Also

Oracle Process Manufacturing System Administration User's Guide

Step 5: Defining technical parameters for the laboratory organization Technical parameters are those characteristics of items that you want to measure, optimize, or rebalance for a formula or batch. You can use quality tests as technical parameters. This can be done on an organization specific basis or globally across all organizations. Refer to "Setting Up Technical Parameters" for details. If a quality test is numeric or numeric range with display labels, then the data type on the Technical Parameters window can remain numeric, or changed to weight%, volume%, equivalent weight, or quantity per unit. This applies to numeric quality tests, and you cannot change other quality tests.

See: *Setting Up Technical Parameters*

Step 6: Sequencing technical parameters The Technical Parameter Sequences window establishes which technical parameters to use for a simulation, and the order in

which they display on the Simulator. If you do not sequence the parameters, then the technical parameters do not appear on the Simulator or Optimizer windows. If you do not want a parameter to display on a simulation, then remove the sequence number.

Technical parameter sequences can be organized using sort orders or groupings as follows:

1. Organization + Product
2. Organization + Category
3. Organization

You can sequence using multiple groups within the same laboratory.

See Also

Setting Up Technical Parameter Sequences

Step 7: Define item technical data If assigning specific parameter values at the item, item and lot, or item, lot, sublot, batch, or formula levels, then item technical data setup is required. Changing specific item parameter values changes the properties of the simulation. When using the Optimizer, items having a parameter value appear on the Contributing tab on the Optimizer window. Items without a parameter value appear on the Non Contributing tab on the Optimizer window. Changes to these specific item parameter values change the properties of the optimization or rebalancing calculations.

Step 8: Loading the formula or batch to the Simulator Use the Load Simulator window to load formulas and batches to the Simulator. You can update a formula or batch from the Simulator, or from a saved simulation.

Step 9: Loading the formula or batch to the Optimizer Use the Optimizer window to maximize material usage and fulfill product specifications. Once you load a formula or batch onto the Simulator, you can load the formula or batch to the Optimizer by clicking Optimizer in the Simulator window.

Loading Formulas and Batches onto the Simulator

Use the Load Simulator window or Query by Example from the View menu to load formulas and batches onto the Simulator.

The header region in the Simulator window is query only. Search for a formula, batch, or a saved simulation using the query enter mode or by choosing Find from the View menu to open the Load Simulator window. Once the header is called, the corresponding details display.

The intermediate formula is selected with a defined hierarchy to obtain the proper formula for intermediates. Simulator business rules use the following hierarchy:

- If a technical formula is at the ingredient level, then it is used to get the appropriate technical parameter value.
- If a technical formula is not at the ingredient level, but a validity rule with a Status of Approved for Laboratory Use is defined for the ingredient, then the formula entered at the validity rule is used to get the appropriate technical parameter value.
- If a validity rule with a Status of Approved for General Use is defined for the ingredient, then it is used to get the technical parameter value. Item technical parameter values defined at the item level for the intermediate are used.

In the Details region, you can add new simulations or delete existing simulations, and expand the material lines to view all the associated lots and their corresponding values.

Each region displays with its appropriate information:

- Ingredients displays the Item and lot, Quantity, Unit of Measure, Grade, Secondary Quantity, Expiry Date, Days Remaining, Age, and Step for each product. Technical parameters display to the right of each product.
- Byproducts displays the Item and lot, Quantity, Unit of Measure, and Grade for each byproduct. Technical parameters display to the right of each byproduct.

You can work with item technical data for the ingredient lots by loading a batch onto the Simulator. You can predict the properties of a specific batch based on the exact lot properties and quantities of the ingredients making up the batch.

Prerequisites

❏ Set up formulas, recipes, and validity rules.

❏ Set up or verify that quality data exists.

- ❑ Create required production batches.
- ❑ Define technical parameters.
- ❑ Define technical parameter sequences.
- ❑ Define item technical data values.

To load a formula onto the Simulator:

1. Navigate to the **Simulator** window.
2. Choose **Find** from the **View** menu.
3. Enter a **Formula** name, or select a formula from the LOV.
4. Optionally, enter a **Version** for the formula.
5. Click **Find**.

To load a batch onto the Simulator:

1. Navigate to the **Simulator** window.
2. Choose **Find** from the **View** menu.
3. Enter a **Batch** name, or select a batch from the LOV.
4. Click **Find**.

Using the Simulator

The Simulator window displays each ingredient, product, and byproduct in a formula with the quantity and technical parameter values for each. The Simulator manages ingredients and byproducts, and the quantities and technical parameter values for each ingredient and byproduct. Technical parameter values for the product are only calculated for the first product in a formula. When working with a formula in the Simulator, select ingredients by item; item and lot; item, lot, and sublot. When selecting a specific lot or sublot, the item technical parameters for the selected lot and sublot are loaded into the Simulator.

Use the Simulator to display and edit formulas and the technical parameter values of the items in the formula, and to display the effects that changes to ingredient values have on the product values.

Updating Formulas in the Simulator

Making changes to a formula on the Simulator does not change that formula as it is stored in the database. Use the Update Formula command if you want the formula changes you make on the Simulator to be saved to the formula in the database. If you make changes to the items or the item quantities on the Simulator, and later retrieve the formula on the Formula Details window, then you do not see the changes you made. This is true even if you saved the simulation. This prevents you from accidentally making permanent changes to a laboratory formula based on scenarios you investigate on the Simulator.

Calculated values for a product are not saved to the Item Technical Data table until you recall the formula on the Simulator window and update technical parameters. If that product is an ingredient in other formulas, then values are not visible or available for use in other formulas.

Prerequisites

- ❏ Set up formulas, recipes, and validity rules.
- ❏ Optionally, set up or verify that quality data exists.
- ❏ Define technical parameters.
- ❏ Define technical parameter sequences.
- ❏ Define item technical data values.

◗ To update formulas on the Simulator:

1. Navigate to the **Simulator** window.

2. Enter the **Formula** code to calculate on the Simulator.
3. Enter the Formula **Version** to calculate on the Simulator. A **Description** of formula and version displays. The Description field allows multilingual entries.
4. The current **Organization** displays. You cannot edit this field.
5. The first set of **Technical Parameters** display. You can change values on the Simulator.
6. Click **Recalculate** to recalculate the values displayed on the Simulator. The current **Organization** displays. You cannot edit this field.

Details

7. The following fields are display only:
   - **Type** code displays for each ingredient or byproduct. You can add, change, or delete these values. The item values initially display. Click the + that precedes the rollup indicator to display the item and lot, or item, lot, and sublot parameter values if they exist.
   - **Item/Lot** displays for each ingredient or byproduct. You can add, change, or delete these values.
   - **Quantity** displays for each item. You can edit these quantities.
   - **UOM** for the quantity displays. You can edit the unit of measure.
   - **Grade** displays. You can select a grade from a list of values.
   - **Description** of the ingredient displays on the selected line.
   - **Secondary Qty** displays the quantity when the item is dual unit of measure controlled.
   - **UOM** displays the secondary unit of measure.
   - **Expiry Date** displays the expiration date of the item.
   - **Days Remaining** displays the days remaining before this item expires.
   - **Age** calculates the age of the lot.
   - **Step** of batch displays.

   Columns labeled with names for each technical parameter display. The value of each technical parameter for each item displays.

8. If you change the technical parameter values for ingredients, then click **Recalculate** to assess the effect on each of the listed ingredient technical parameters.
9. An **Expression** used to calculate the technical parameter value displays.

Updating Batches in the Simulator

You can work with all of the item technical parameters for the ingredient lots by loading a batch onto the Simulator. If there are no batch steps, then the ingredient items sort according to their order on the formula.

Like formulas, quantities can be adjusted until you are satisfied with the results. If you decide that the allocation and ingredient changes can be used to update the batch, then the Update Batch option is available for pending and WIP batches. Using Process Execution APIs, the Simulator updates the batch. If e-records and e-signatures are enabled for the allocations, then standard signature windows display requesting the user signature.

Prerequisites

- ❏ Set up formulas, recipes, and validity rules.
- ❏ Optionally, set up or verify that quality data exists.
- ❏ Create required production batches.
- ❏ Define technical parameters.
- ❏ Define technical parameter sequences.
- ❏ Define item technical data values.

◗ To update a batch:

1. Navigate to the **Simulator** window.
2. Load a batch to the Simulator by choosing **Find** from the **View** menu, or query on batches.
3. Choose **Update Batch** from the **Actions** menu.
4. Choose **Yes** to update the batch.

Adding Lot and Sublot Information

You can add additional lot and sublot information to the existing lots that display on the Simulator.

Prerequisites

- ❑ Define lot, or lot and sublot values.
- ❑ Assign technical parameters.

◗ To add lot and sublot information:

1. Navigate to the **Simulator** window.
2. Open a simulation.
3. Choose **Add Lot/Sublot** from the **Actions** menu.
4. Enter a **Lot** code from the list of values. Required.
5. Enter a **Sublot** from the list of values.
6. Enter the allocated **Quantity**. Required.
7. Click **OK**.

Adding Lot and Sublot Information from a Batch

When a simulation is loaded from a batch, new lots can be added to the existing displayed lots on the Simulator by accessing the Add Lots option from the Actions menu.

Prerequisites

- ❑ Define lot, or lot and sublot values.
- ❑ Assign technical parameters.

◗ To add lot and sublot from a batch:

1. Navigate to the **Simulator** window.
2. Load a batch to the Simulator using **Find** from the **View** menu, or query on batches.
3. Choose **Add Lot/Sublot** from the **Actions** menu.
4. Enter a **Lot** code. Required.

5. Enter a **Sublot** code.
6. Enter a **Warehouse**. Required.
7. Enter a valid **Location**. Required only if the warehouse and item are location controlled.
8. Enter the **Allocated Qty**. Required.
9. Enter a **Secondary Qty**.
10. Click **OK**.

Displaying Parameters on the Simulator

Use the drill-down on the Simulator window to view all technical parameters for a particular material line. This is a query-only window that displays all material lines and corresponding technical parameters which contribute to the product rollup value.

Displaying Calculation Errors

Display calculation errors for a product, ingredient, or byproduct.

Prerequisites

- ❏ Set up formulas, recipes, and validity rules.
- ❏ Optionally, set up or verify that quality data exists.
- ❏ Define technical parameters.
- ❏ Define technical parameter sequences.
- ❏ Define item technical data values.

◗ To display calculation errors:

1. Navigate to the **Simulator** window.
2. Choose **Calculation Errors** from the **Actions** menu.
3. Select one of the following:
   - **Product** to display product calculation errors.
   - **Ingredient** to display ingredient calculation errors.
   - **By-product** to display byproduct calculation errors.

4. The following fields are display only:
   - **Type** determines whether the error displayed is for the product, ingredient, or byproduct.
   - **Item/Lot** determines whether the technical parameter calculation error is for a product, ingredient, or byproduct.
   - **Technical Parameter** displays the code of the technical parameter where an error occurred.
   - **Error Message** determines a description for the calculation error.
   - **Expression** determines the location where the error occurred. A carat (^) points to the approximate location where the error occurred.
5. Click **OK**.

Saving a Simulation

Use the Save Simulation window to save a simulation for comparison purposes.

Prerequisites

- ❑ Set up formulas, recipes, and validity rules.
- ❑ Optionally, set up or verify that quality data exists.
- ❑ Define technical parameters.
- ❑ Define technical parameter sequences.
- ❑ Define item technical data values.

◗ To save a simulation in the Simulator:

1. Choose **Save Simulation** from the **Actions** menu, or choose **Save** from the **File** menu.
2. Enter a **Name** for the simulation to save.
3. Click **OK**.

Finding a Saved Simulation

You can find a saved simulation using Query by Example from the View menu, or from the Load Simulator window.

Prerequisites

- ❏ Set up formulas, recipes, and validity rules.
- ❏ Optionally, set up or verify that quality data exists.
- ❏ Define technical parameters.
- ❏ Define technical parameter sequences.
- ❏ Define item technical data values.
- ❏ Define a simulation.

◗ To find a saved simulation:

1. Navigate to the **Simulator** window.
2. Select **Find** from the **View** menu.
3. Choose a **Simulation** from the LOV.
4. Click **OK** from the **Simulations** window.
5. Click **Find** from the **Load Simulator** window.

Using the Optimizer

Formula and batch optimization methods are necessary for using raw materials efficiently while meeting product specifications.

The fundamental requirement of formula optimization is the same across industries, although different businesses implement optimization differently. For example, paint manufacturers typically optimize formulas, not batches. Specific grades of raw materials are ordered from an approved list of vendors and the lots they receive are usually stable. Therefore, the batch does not usually require optimization at the lot level. Laboratory batches are an exception to this and can be optimized while the formula is in the experimental phase.

Alternatively, raw materials used in the dairy industry vary from lot to lot, and properties such as percent butterfat must be balanced with other ingredients to yield a specific quantity with the appropriate properties. The food and beverage industries are sensitive to the characteristics of materials and require a consistent product with a specified shelf life.

Pharmaceutical and biotech companies must yield products with consistent technical characteristics. It is important that each raw material lot be tested for potency and other factors, and that each finished product meet specifications. The FDA influences these industries, and the high cost associated with materials make profitability an important element for requiring formula and batch optimization. The ability to optimize batches using lot specific data in a simulated environment provides time and cost savings.

Using the Workpad

The Workpad window displays a hierarchical view of all ingredients and lots selected for optimization. You can use the Workpad to easily view and select ingredients and lots for calculating in the Optimizer window. The Workpad window contains two navigator panes. The Calculate pane displays ingredients and corresponding lots that have been selected for optimization. The Fixed pane displays all ingredients and lots with fixed quantities. Use the left and right arrows to add or remove selected nodes to or from the Calculate pane. You can expand, expand all, collapse, collapse all, and find nodes in each navigator pane. Click OK to apply changes and updates in the Optimizer window. Click Cancel to roll back all changes that were entered on the Workpad window.

Prerequisites

- ❏ Set up formulas, recipes, and validity rules.
- ❏ Set up or verify that quality data exists.
- ❏ Create required production batches.
- ❏ Define technical parameters.
- ❏ Define technical parameter sequences.
- ❏ Define item technical data values.
- ❏ Load a formula or batch to the Simulator.

◗ To access the Workpad:

1. Navigate to the **Simulator** window.
2. Load a formula or batch to the Simulator using **Find** from the **View** menu.
3. Click **Optimizer**.
4. Click **Workpad**.
5. Click left (<<) and right (>>) arrows to move nodes between the **Calculate** and **Fixed** panes for optimization.
6. Click **OK** to return to the **Optimizer** window.

Optimizing Lot Quantities

If the Optimizer is loaded from a batch, then you can use the Allocations window to adjust lot quantities and parameter values associated with the batch. Lot quantity optimization is available only when the simulation is associated with a batch.

Prerequisites

- ❑ Set up formulas, recipes, and validity rules.
- ❑ Create required production batches.
- ❑ Define technical parameters.
- ❑ Define technical parameter sequences.
- ❑ Define item technical data values.
- ❑ Load a batch to the Simulator.

◗ To adjust lot quantities and parameter values:

1. Navigate to the **Simulator** window.
2. Load a batch to the Simulator using **Find** from the **View** menu.
3. Click **Optimizer**.
4. Click **Allocations**.
5. Select the **Calculate** indicator. If selected, then the application calculates the quantity for the ingredient lot. If this field is not selected for any ingredient, then the optimization uses the lot level values for calculating the parameter values.
6. Enter **Qty** for the lot.
7. Enter a **Lot Parameter Value**.
8. Click **OK** to calculate lot quantities and return to the **Optimizer** window, or **Cancel** to return **Optimizer** window.

Optimizing Formulas and Batches

Use formula and batch optimization to maximize material usage and fulfill product specifications. Optimize formulas and batches from the Simulator window based on technical parameter values associated with material lines. After calculating the optimized quantities, update the formula with the optimized results.

Optimization calculates ingredient quantities based on the following constraints:

- Subset of ingredient quantities
- Technical parameter values
- Output quantity

Following are steps for optimizing formulas and batches:

Step 1: Loading a formula or batch onto the Simulator Use the Load Simulator window or choose Query by Example from the View menu to load formulas and batches onto the Simulator.

Step 2: Opening the Optimizer window Click Optimizer in the Simulator window to open the Optimizer window. The Optimizer window displays the formula, batch, or saved simulation details. The header displays product, quantity, and unit of measure information. The Product Parameters region displays the following parameter types:

- Weight%
- Volume%
- Equivalent Weight
- Quantity Per Unit

Product parameter values are set in the Product Parameters region and can be optimized for Range or Value.

Ingredient Lines display ingredient information. Items that have a parameter value display on the Contributing tab. Items without parameter values display on the Non Contributing tab. Changes to ingredient quantities or ingredient parameter values are made in the Ingredient Lines detail region.

Step 3: Using the Workpad to view all ingredients and associated lots that have been selected for optimization The Workpad displays ingredients and lot allocations for calculation and rebalancing.

Step 4: Adjusting lot quantities and associated parameters If you load a batch to the Simulator, then you can adjust lot quantities and the associated parameters on the Allocations window.

Step 5: Calculating ingredient quantities Click Calculate from the Optimizer window to calculate the required ingredient quantities based on the constraints. Results display

on the Optimizer, and you can accept or discard the changes. If you click Apply from the Optimizer window, then changes are applied to the Simulator.

The following optimization examples require the following setup:

1. Define a laboratory organization.
2. Assign the laboratory organization to the User Organizations window.
3. Assign the laboratory organization as the GMD: Default Laboratory profile user value.
4. Define the following ingredient items for a formula:
   - RCM (Attributes = Lot Only)
   - MILK (Attributes = Lot Only)
   - CREAM (Attributes = Lot Only)
   - PROTEIN (Attributes = None)
5. Define the following product item for a formula:
   - STD MILK (Attributes = None)
6. Define a formula for Product STD MILK.
7. In the Formula Details window, enter ingredients and quantities as follows:
   - RCM qty = 94 kg
   - MILK qty = 3.75 kg
   - CREAM qty = 2.25 kg

   The Buffer indicator displays on the Ingredients tab and is selected for ingredients RCM and MILK.
8. Change formula status to Approved for General Use.
9. Define a recipe to be used for a production batch.
10. Define local recipe validity rules to the plant and laboratory.
11. Create batches from the recipe. Create both Pending and WIP batches.
12. Define the following technical parameters;
    - FAT - Weight% (data type = Weight%)
    - SNF - Saturated Fat Content of Milk (data type = Weight%)

These parameters can be defined globally or locally. See: "Setting Up Technical Parameters."

13. Define Technical Parameter Sequences
14. Define Item Technical Data at the item, lot, and batch levels.

Optimizing Ingredient Quantities Based on Other Items

Batch rebalancing lets you optimize a dependent ingredient in a formula by recalculating quantities of other ingredients required to adjust it in order to achieve a target component value within the production batch.

In the following example, a product parameter value changes. Appropriate ingredients quantities are adjusted to account for the parameter value change. The ingredient quantity remains the same.

To optimize ingredient quantities after changing an ingredient property while maintaining output yield:

1. Create a formula for this example containing the following ingredients and quantities:

Ingredient	Formula Quantity
RCM	94.00
MILK	3.75
CREAM	2.25

2. Parameter sequences exist for the following parameters:
   - DENSITY = 1
   - FAT = 2
   - SNF = 3

   Parameters without a sort sequence do not display on the Simulator.
3. Assign the following item technical data values:

Ingredient	FAT Value	SNF Value
MILK	20	25

Ingredient	FAT Value	SNF Value
CREAM	Null	Null
RCM	4	8

Items that have a parameter value display on the **Contributing** tab of the Optimizer. Items without a parameter value display on the Non Contributing tab.

4. Load the formula onto the **Simulator**.
5. Click **Optimizer** in the **Simulator** window. The Optimizer displays. The optimize values in the Product Parameters region default to None for both rows. FAT has a value of 4.51, and SNF has a value of 8.46. When you open the Optimizer window, the cursor is located in the upper region of the window, and the following ingredients and values display on the Contributing tab:

Items	Qty	FAT Values
RCM	94	4
MILK	3.75	20

6. The Non Contributing tab displays the following ingredient values:

Item	Qty	FAT Value
CREAM	2.25	NULL

7. From the **Optimizer** window, click **Workpad** to open the Workpad window and select the ingredients for calculation. The Workpad displays a hierarchical view of all ingredients and associated lots that have been selected for optimization.
8. Select **MILK** in the **Fixed** navigator and click the left arrow to move the item to the Calculate navigator. Repeat this procedure for the item CREAM and click **OK**. MILK and CREAM are now selected for calculation.

   The Optimizer window displays, and the Calculate indicator for MILK on the Contributing tab is selected. The Calculate indicator for CREAM on the Non Contributing tab is also selected.

9. Change the FAT parameter value for MILK on the Contributing tab from 20 to 25. In the Product Parameters region, change the Optimize field for the FAT parameter to Value.
10. Click **Calculate** on the **Optimizer**. The optimization was completed successfully as follows:
    - The new optimized quantity for ingredient MILK is 3 KGM and displays on the Contributing tab.
    - The new optimized quantity for ingredient CREAM is 3 KGM and displays on the Non Contributing tab.
    - The product parameter value for FAT remains 4.51.
    - The product parameter value for SNF changes to 8.27.

    In this example, we changed an ingredient property and the formula optimized successfully while maintaining product yield. The ingredient property was the FAT parameter value of MILK.
11. Click **Apply** on the **Optimizer** to apply the results to the simulation, or **Cancel** to discard optimization results and return to the **Simulator** window. Optimization results are not automatically applied to the simulation.

Recalculating Quantities and Physical Properties

Certain physical properties of products may require target values for regulatory compliance or customer specifications. For example, Formulators can specify the percent solids that are required in a product, and the application can reformulate to meet this specification. Volume, mass, and units can be updated to meet batch size specifications.

Recalculating Quantities and Physical Properties of Ingredients Based on Target Quantity and Properties of Products

If one or more ingredient quantity is fixed in order to have a specified impact on the batch yield, then you can lock these ingredients, specify the product targets, and have the other ingredient quantities recalculated to meet the target quantity and properties.

Examples of this include Batch Rebalancing, and Compensation and Refraction. Batch Rebalancing is a scenario where the potency of one ingredient determines the quantity used of that ingredient. If the inventory quantity of this ingredient changes and the product output must remain the same, then quantity of another buffer ingredient increases or decreases to meet the expected output quantity.

Compensation and Refraction is a scenario where a formulation contains two similar and interchangeable ingredients that always sum to the same quantity. If the quantity of one ingredient changes, then the quantity of the other ingredient increases or decrease to meet the desired total input quantity.

To optimize ingredient quantity after specifying product property values while keeping the yield constant:

1. Create a formula for STD MILK with the following items and values:

Item	Parameter	Value	QTY
RCM	FAT and SNF	4 and 8	94
MILK	SNF	25	2
CREAM	FAT	25	4

The product parameter values are:

- FAT = 4.76
- SNF = 8.02

2. Load the formula to the **Simulator**.
3. Click **Optimizer** to open the **Optimizer** window. The Product Parameters region displays the following:
   - Optimize fields default to None for FAT and SNF parameters.
   - FAT has a default value of 4.76.
   - SNF has a default value of 8.02.
   - The Calculate indicator is not selected for any ingredients.

   If the ingredient lines Buffer indicators on the Formula Details window are not selected, then the ingredients Calculate indicators on the Optimizer are not selected.
4. Click **Workpad** on the **Optimizer** window to open the **Workpad** window and select the ingredients RCM, MILK, and CREAM for calculation. If you select the ingredients for calculation on the Workpad, then the Calculate indicators on the Optimizer are selected.
5. On the **Optimizer** window, select the FAT row in the Product Parameters region. Change the Optimize field to Value, and change the parameter Value to

4.9. The Contributing tab displays the RCM and CREAM ingredients, and the Calculate indicators are selected. The Non Contributing tab displays the Milk ingredient, and the Calculate indicator is selected.

In this example, optimize quantities by modifying two product property values. Use a Value and Range combination while keeping the output yield.

6. Select the SNF row in the **Product Parameters** region.
7. Change the **Optimization** field to **Range**.
8. Enter the parameter **Value** as 7.
   - The **Contributing** tab displays the RCM and MILK ingredients, and the Calculate indicators are selected.
   - The **Non Contributing** tab displays the CREAM ingredient, and the Calculate indicator is selected.
9. Click **Calculate**.
10. Select the FAT parameter in the **Product Parameters** region:
    - FAT Value remains at 4.9.
    - On the Contributing tab, RCM quantity changed to 95.69 and the CREAM quantity changed to 4.29.
    - On the Non Contributing tab, MILK quantity changed to 0.02.
11. Select the SNF parameter in the **Product Parameters** region:
    - SNF Value changed to 7.66.
    - On the Contributing tab, RCM quantity changed to 95.70 and the MILK quantity changed to 0.02.
    - On the Non Contributing tab, the CREAM quantity changed to 4.29.
12. Click **Apply** on the **Optimizer** window to apply the results to the simulation, or click **Cancel** to discard optimization results and return to the **Simulator** window.

Optimizing Lot Quantities While Maintaining Output Yield

If product parameters are dependent on the lot attributes, then you can use Lot and Sublot values when formulating and optimizing. You can enter lots with a formula and use the same optimization functionality. Batches can also be entered onto the Simulator to optimize batch material allocations. Consider a dairy industry. The

production process is the standardization of milk. The quality of milk and cream can vary depending on the lot. A batch is required for this scenario and can be updated with changes made from the Optimizer.

To optimize a lot quantity after specifying product property values while maintaining yield

1. Create a SMP inventory item. This item does not require any attributes.
2. Create a formula for STD MILK with the following items:

Ingredient	Quantity
RCM	94 KGM
CREAM	3.5 KGM
SMP	2.5 KGM

3. Verify that ingredients RCM and CREAM each have two lots that contain inventory. RCM has lots R1 and R2. CREAM has lots C1 and C2.
4. Create a recipe with this formula, and include a routing.
5. Create a validity rule that is local to the plant and set the status to Approved for General Use.
6. Create and release a batch from the recipe. During WIP, allocate a partial quantity of 0.1 KGM for ingredient RCM to lot R1. Do not allocate CREAM. It is not necessary to allocate SMP. Record the batch number.
7. Verify the following item parameter values for FAT:

Item or Item/Lot	Fat Value	SNF Value
RCM	4	8
Lot R1 of RCM	4.3	8.2
CREAM	20	25
Lot C1 of CREAM	20	35

8. Load the batch to the **Simulator**.
9. Verify the following ingredient values on the **Simulator**:

Item	FAT	SNF	Batch Qty
RCM	4	8	94
CREAM	20	25	3.5
SMP	Null	Null	2.5

10. Verify the following product values:

Item	FAT Value	SNF Value
STD MILK	4.46	8.4

11. Make a partial line allocation for CREAM in the **Simulator**. Select the CREAM row in the product parameters region.
12. Choose **Pick Lots/Locations** from the **Actions** menu.
13. On the **Pick Lots/Locations** window, select **Allocated Qty** of lot C2 and enter a quantity of 0.1.
14. Click **OK** and return to the **Simulator**.
15. Choose **Update Batch** from the **Actions** menu to create the line allocation transaction. A decision window displays.
16. Click **OK**. A partial line allocation is made to lot C2 of ingredient CREAM, and the batch was updated.
17. Click **Optimizer** to open the **Optimizer** window.
18. Verify the following **Product Parameters** region values:
    - The Optimize fields default to None for FAT and SNF parameters.
    - FAT has a value of 4.46.
    - SNF has a value of 8.4.
19. Select the FAT row in the product parameters region and verify the Contributing tab. Select the SNF row in the product parameters region and verify the Contributing tab as follows:

Items	Batch Qty	FAT	SNF
RCM	94	4	8

Items	Batch Qty	FAT	SNF
CREAM	3.5	20	25

20. Verify the **Non Contributing** tab for FAT and SNF. Only ingredient SMP defaults to the Non Contributing tab, and SMP has no parameter values.
21. Select the FAT row in the product parameters region and change the **Optimize** field to **Value**.
22. Select the **Calculate** indicator for items RCM and CREAM.
23. Select the RCM row in the ingredient lines region. **Allocations** is activated when the Optimizer displays batch values. Allocations is disabled for formula values.
24. Click **Allocations** and note the partial allocation of 0.1 KGM for lot R1. The FAT value for lot R1 must be 4.3.
25. Select the **Calculate** indicator for lot R1 on the **Allocations** window.
26. Click **Close** to return to the **Optimizer** window.
27. Select the CREAM row in the Ingredient Lines region and click **Allocations**. Note the partial allocation of 0.1 KGM for lot C2. The FAT value for lot C2 must be 20.
28. Select the **Calculate** indicator for lot C2 on the **Allocations** window, and verify the results.
29. Click **Close** to return to the **Optimizer** window.
30. Select the SNF row in the product parameters region and change the **Optimize** field to **Value.** The Calculate indicator is selected for items RCM and CREAM.
31. Choose the **Non Contributing** tab and select the **Calculate** indicator for ingredient SMP. Be sure that the Optimize field in the Product Parameters region is set to Value for both FAT and SNF parameters.
32. Click **Calculate** on the **Optimizer** window, and verify the results.
33. Select the FAT row in the **Product Parameters** region. The following values display:
    - FAT Value changed to 4.46.
    - On the Contributing tab, RCM Quantity changed to 88.15, and CREAM Quantity changed to 3.35.

- On the Non Contributing tab, SMP Quantity changed to 8.50.

34. Click **Allocations** for RCM and CREAM:
    - Allocations changed from 0.1 KGM to 88.15 for lot R1 of RCM.
    - Allocations changed from 0.1 KGM to 3.35 for lot C2 of CREAM.
35. Select the SNF row in the **Product Parameters** region. The following values display:
    - SNF Value changed to 7.89
    - On the Contributing tab, RCM Quantity changed to 88.15, and CREAM Quantity changed to 3.35
    - On the Non Contributing tab, SMP Quantity changed to 8.50
36. Click **Allocations** for RCM and CREAM:
    - Allocations changed from 0.1 KGM to 88.15 for lot R1 of RCM
    - Allocations changed from 0.1 KGM to 3.35 for lot C2 of CREAM
37. Click **Apply** on the **Optimizer** to apply the results to the simulation, or **Cancel** to discard optimization results and return to the **Simulator** window.

Ingredient Distribution Rules Used in Optimization

Within the header region of the Optimizer window, you can choose to maintain the ratio between ingredients, or maintain the output yield after the calculation. If you choose to maintain ratios, then the optimization process distributes quantity changes evenly across the affected ingredients. This feature is important in cases where chemical interactions rely heavily on certain materials being balanced.

If you choose the maintain output yield indicator, the application maintains final output yield while calculating ingredient properties.

Using the Buffer Indicator

The Formula Details window contains a Buffer indicator that specifies ingredients used to maintain target quantities while working with a formula or batch on the Simulator.

Ingredients such as water and starch are commonly used to modify the volume in a batch without affecting the overall chemical composition. When optimizing a batch that uses a formula, the Simulator adjusts the quantities of these buffer ingredients

to achieve the target quantities. There may be one or more buffer ingredients in a formula.

When you set the item Buffer indicator in the Formula Details window, the Calculate indicator on the Optimizer window is the default. If an ingredient is added to a formula from the Optimizer window, then you can override the buffer indicator in the Optimizer window.

Running the Indented Bill of Materials Report

The Indented Bill of Materials (IBOM) report is also called the Indented Formulas report and displays ingredients and ingredient quantities used to produce a product. You can specify the formula, item, or range of formulas for the report. Other parameters such as formula, status, recipe use, effective date, and UOM type can be used as selection criteria. The Organization field is available for entry when you select the Single option for the Validity Organization. This value defaults from the GMA: Default Organization profile value. You can change it to organizations that you can access. Intermediates are exploded into their individual ingredient components. Circular references are allowed one level deep so that an item can be both an ingredient and a product in a formula. Circular references beyond one level, however, are identified with an error message.

The Indented Bill of Materials Report window has two modes of operation:

- Interactive, where the application initially displays a list of all of the validity rules that meet the parameters entered. For example, if you enter an item and batch quantity and there are several valid formulas for making the specified quantity and effective date for the item, then the application lists each of those formulas. Select the appropriate formula and the IBOM report is generated for that formula.
- Noninteractive, where the application picks the validity rule to use based on the effective date preference. If two or more validity rules have the same preference level, then the application uses the most recent one.

If formula security is enabled, then you can submit requests for an IBOM report for any formula with view or update access. The formula must be assigned to a recipe with a valid validity rule.

Prerequisites

- ❑ Enter and save formulas.
- ❑ Enter and save validity rules.

◗ To run the report:

1. Navigate to the **Indented Bill of Materials Report** window.

Selection Range

2. Determine how to explode formulas:

- Select **Interactive** to use the interactive mode. This enables you to select from a list of validity rules.
- Deselect **Interactive** to use the noninteractive mode. This uses the most recent validity rule.

3. When you run an IBOM report for the first time, the report explodes a formula regardless of the selection indicated in this field. Determine if you want to reexplode formulas that have already been exploded in previous reports:
   - Select **Re-Explode** to reexplode formulas that appear in the report. The application expands all product, coproduct, and byproduct components and stores the reexplosion for future reference. If a formula was recently modified, then this selection ensures that the most recent changes are in the IBOM report.
   - Deselect **Re-Explode** if you do not want to reexplode formulas that appear in the report. The application uses previously stored formula explosions.
4. Enter **Formula status** to limit the IBOM report to formulas with a specific status. Refer to "Understanding the Status Approval Workflow" for additional information.
5. Select one of the following:
   - **Single Formula** to print the IBOM for a specific formula. Enter the **Formula** and **Version**. Required when selected.
   - **Single Item** to print the IBOM for a specific product. Enter the **Item** code for the product. Required when selected. Enter the **Batch Qty** and **UOM** of this product to determine the validity rule to use. The validity rule must be valid for this quantity for proper ingredient scaling.
   - **Formula Range** to print IBOMs for a range of formulas. If you are using the interactive mode, then you cannot enter a formula range. Enter the starting formula in the **From** field and ending formula in the **To** field. One concurrent process starts for each formula entered in the contiguous range specified. Each formula has its own separate report. Required when selected.

Request Options

6. **Language** displays the language used for the IBOM report. To change this entry, click **Languages...** to display a list of available languages, select the appropriate language required and click **OK**.

Other Options

7. Enter **Scale By** as the appropriate scaling percent. The default is 100. Required.
8. Enter the number of **Levels** to print on the report. The default is All.
9. Select a **Recipe Use** to use as the basis of the report. You can select production, planning, costing, or technical. Required.
10. Select one of the following for **Validity Organization**:
    - **Single** to base the formula explosion on the validity rules defined for the organization specified or a set of global validity rules when the organization is not specified.
    - **User Access** to base the formula explosion on the validity rules defined for organizations you can access or a set of global validity rules when the organization is not specified.
    - **All** to base the formula explosion on any effective validity rule.

    Required.
11. Enter the **Effective Date** and time for the formula. Only formulas that are effective on this date and time are used as the basis for the report. Required.
12. **Organization** is the formula owner organization based on the validity organization selection.
13. Select the **UOM Type** as:
    - **Formula** if you want the formula unit of measure type used.
    - **Inventory** if you want the inventory unit of measure type used.

    Required.

Print Options

14. Enter the number of report **Copies** to print. If you selected a range of formulas, then each IBOM is printed this number of times. Required.
15. Enter the code identifying the **Printer** to use.
16. Click **OK**.
17. The **Submission History** window displays:
    - **Name** is Indented Bill of Materials Report.
    - **Parameters** is the number of parameters.

- **Request ID** is the request number.

18. Record the **Request ID**.
19. Click **OK**.

To display the output of the IBOM report:

1. Run the **Indented Bill of Materials Report**.
2. Choose **Requests** from the **View** menu.
3. Select **All My Requests**.
4. Click **Find**.
5. Choose the indicator next to the requested **Indented Bill of Materials Report** to display. Ensure that the report phase has completed without errors.
6. Click **View Output**. The report displays.

To interpret the IBOM report:

1. Run the **Indented Bill of Materials Report**.
2. The following fields are display only:
   - **Report Date** displays the date the report was run.
   - **Page** displays the report page number. The total pages included in the report appear after the slash mark (/).
   - **Formula** is the code for the formula used for the IBOM report. A colon appears before the formula version number. A description of the formula and the version displays.
   - **Recipe Use** indicates whether the formula is used for production, planning, costing, or technical purposes.
   - **Effective Date** displays the date the formula was first used as an approved formula.
   - **Validity Rule Organization** displays:
     - **Single** when you base the formula explosion on the validity rules defined for the organization specified or a set of global validity rules when the organization is not specified.

  - **User Access** when you base the formula explosion on the validity rules defined for organizations you can access or a set of global validity rules when the organization is not specified.
  - **All** when you base the formula explosion on any effective validity rule.
- **Status** indicates the status of the formula, if one was specified. All indicates that all statuses were considered.
- **Scale Percent** indicates the scaling percent for the formula. A scale percent of zero indicates that a formula is not scaled and is the same as the scale percent of 100.
- **Max Explode Levels** indicates the maximum number of levels to explode formulas.
- **Exploded Date** is the date the formula was exploded.
- **Products** produced by the first level formula. Coproducts display before products in the body of the report. The product item code displays with its description. To the right of each product item code, two numbers appear in parentheses. Each number is separated by a slash mark. The first number displays the batch quantity of the product. This number is either the product quantity multiplied by the scale or the batch quantity entered in the Batch Quantity field. The second number is the product quantity from the formula. The unit of measure for the batch quantity and formula quantity follows in parentheses.
- **Ingredient -- Description** indicates the item code for each ingredient in the exploded formula followed by the ingredient description. Byproducts, coproducts, and ingredients in the formula that produces the intermediate are indented separately from the ingredients in the main formula. Once the indentation ends, the items that begin at the left margin of the report are ingredients in the main formula listed at the top of the report page.
- **Levels** of indentation display for item lines from the main formula listed at the top of the report page. The highest level is level one identified by a 1. Intermediates are at level two identified by 2. The indentation progresses for each of the defined levels. The maximum number of levels is 25.
- **Batch Quantity** is the amount of ingredient necessary to produce the batch quantity of the product. For byproduct or coproduct lines, this is the quantity of the byproduct or coproduct that is produced when the batch quantity of the main product is produced.

- **Formula Quantity** is the amount of ingredients, byproducts, and coproducts in the formula.
- **Standard Quantity** of product is the amount of material used to produce intermediates. If the quantity of an intermediate needed in the main formula is different from this standard quantity, then the intermediate formula is scaled automatically. The scaled product quantity and scaled ingredient quantities are shown in the Batch Quantity column.
- **UOM** is the unit of measure for the standard quantity.

Using Formula Inquiry

The Formula Inquiry Selection window is the starting point for Formula Inquiry queries. Using a selection range to narrow the search of formula information, you have the ability to display a summary list of formulas that fit the parameters you specify. The inquiry delivers a Formula Inquiry Summary View window where you display parent level and intermediate level formula information.

Prerequisites

❑ Enter and save formulas.

◗ To perform a formula inquiry:

1. Navigate to the **Formula Inquiry Selection** window.
2. Select the **Formula Status** or **All** to query all active and inactive formulas.
3. Select one of the following for the **Validity Rules** field:
   - **Defined** to query components with defined validity rules.
   - **Undefined** for components with undefined validity rule.
   - **Both** to query all components.

Recipe Used In

4. Select one, all or any combination of the following uses:
   - **Production** for use in production.
   - **Planning** for use in planning.
   - **Costing** for use in cost management.
   - **Technical** for use in formula analysis. Technical Class is a category used to identify and group ingredients where the overall contribution of specific technical characteristics of the ingredients is significant.

Selection Range

5. Determine whether you want to display a specific **Formula**, a range of formulas, or all formulas. To select a specific Formula, enter the same formula in the **From** and **To** fields. To select a range of formulas, enter different formula numbers in the **From** and **To** fields. To select all formulas leave the fields blank.
6. Determine whether you want to display a specific **Formula Version**, a range of versions or all versions. To select a specific version, enter the same version

number in the **From** and **To** fields. To select a range of formula versions, enter different version numbers in the **From** and **To** fields. To select all versions leave the fields blank. Required.

7. Determine whether you want to display a specific **Routing**, a range of routings or all routings. To select a specific routing, enter the same routing number in the **From** and **To** fields. To select a range of routings, enter different routing numbers in the **From** and **To** fields. To select all routings leave the fields blank.
8. Determine whether you want to display a specific **Routing Version**, a range of routing versions or all routing versions. To select a specific routing version, enter the same routing number in the **From** and **To** fields. To select a range of routing numbers, enter different routing numbers in the **From** and **To** fields. To select all routing numbers leave the fields blank.
9. Determine whether you want to display formulas for a specific **Organization**, a range of organizations or all organizations effective for your user code. To select a specific organization, enter the same Organization in the **From** and **To** fields. To select a range of organizations enter different organizations in the **From** and **To** fields. To select all organizations leave the fields blank.
10. Determine whether you want to display the formulas for a specific **Effective Date**, a range of effective dates or all effective dates. To select a specific date, enter the same date in the **From** and **To** fields. To select a range of dates, enter different dates in the **Range From** and **To** fields. To select all dates leave the fields blank.
11. Determine whether you want to display formulas for a specific **Customer**, a range of customers or all customers. To select a specific customer, enter the same customer code in the **From** and **To** fields. To select a range of customers, enter different customer numbers in the **Range From** and **To** fields. To select all formulas leave the fields blank.
12. Enter the **Product** item number in this field to display formulas for a specific product.
13. Enter the **Effective Qty** of the item produced by the formula. This field becomes available if you indicate a specific formula and version or a specific item produced. The unit of measure displays.
14. Enter the **Ingredient** used to display formulas that contain it.
15. Click **OK**. The **Formula Inquiry Summary View** window displays.
16. Refer to the *Interpreting a Formula Inquiry* topic for a complete explanation of using the **Formula Inquiry Summary View** window.

Interpreting a Formula Inquiry

The Formula Inquiry Summary View is the first window displayed after you make entries in the Formula Inquiry window. It lists formulas that meet the entered parameters.

From this window, you can obtain additional information for any formula. Formula Inquiry Summary consists of two window areas. The top area is scrollable and lists the organization, formula number and version, routing, and minimum and maximum quantity from the formula effectivity record. The bottom area of the window is synchronized with the line that is selected in the upper area and lists the Start and End Dates, the Formula Status, the Standard Quantity, the Customer, and Formula Use.

Formulas you are not permitted to access are shown with a # symbol in the far left column.

You can use flexfields with this window. See *Oracle Applications User's Guide* and O*racle Applications Flexfields Guide*.

Prerequisites

❑ Complete the appropriate entries in the Formula Inquiry window to display the Formula Inquiry Summary View.

◗ To interpret the Formula Inquiry Summary:

1. Navigate to the **Formula Inquiry Summary View** window.
2. The following fields are display only:
   - **Organization** where the formula is effective. You can only display formulas effective to organizations linked to your user code. A # sign indicates you cannot display the formula.
   - **Formula** code for each formula.
   - **Version** number for each Formula.
   - **Routing** number for each Formula Version.
   - **Version** number for each Routing.
   - **Minimum Qty** as the minimum quantity where the Formula is valid.
   - **Maximum Qty** for as the maximum quantity where the Formula is valid.
   - **UOM** listed for each Formula.

3. The following fields display data that is specific to the formula selected:
   - **Effective Dates** lists the dates that formulas and versions are valid.
   - **Formula Status** indicates the current formula status.
   - **Standard Qty** is the typical quantity that is produced by each formula.
   - **Customer** is the name of the individual or company who buys the listed formulas.
   - **Recipe Use** displays the intended use for the Formula in production, planning, costing, or technical.
   - **Customer** displays the customer who uses the selected formula.
4. Close the window.

Displaying Details from a Formula Inquiry

The Formula View window enables you to display the parent formula or highest level formula. You have the ability to display intermediates from this window using the Actions menu.

◗ To display details from a formula inquiry:

1. Select the appropriate **Formula** from the **Formula View Inquiry** window.
2. Choose **Formula View** from the **Actions** menu. The **Formula View** window displays.
3. The following fields are display only:
   - **Formula** displays the unique identifying code for the formula selected.
   - **Status** indicates the status of the formula.
   - **Version** displays the version of the Formula.
   - **Description** displays the detailed descriptive information about the Formula.
   - **Comments** displays any comments that you added at the header level.
   - **Formula Class** displays how the Formula is classified at the header level.
   - **Scaling Allowed** is selected if scaling is allowed on the formula. It is cleared with scaling is not allowed. This information is taken from the formula's additional information. Refer to the "Scaling Formulas" topic for advice.

Details

4. The following fields are display only:
   - **Type** indicates whether the item is a product, byproduct, or ingredient of the formula. The drill down indicator to the left of Type lets you drill down to a subcomponent.
   - **Item** displays the item code of the product, byproduct, or ingredient of the formula.
   - **Description** displays a brief description of the item.
   - **Quantity** displays the quantity of the item used in the formula.
   - **UOM** displays the unit of measure of the item.
5. The following fields display data that is specific to the component selected:
   - **Phantom Type** indicates whether the material is not a phantom, is an autogenerated phantom, or is a manually generated phantom.
   - **Scrap Factor** indicates the anticipated amount of ingredient lost in the manufacturing process as a percentage. For example, if the Scrap Factor is 10 percent, an additional 10 percent of material is added to accommodate for this loss. Required.
   - **Scale Type** displays whether the scaling is Fixed, Proportional, or Integer. Refer to the "Scaling Formulas" topic for advice.
   - **Cost Allocation** indicates how the cost of this item is allocated for financial rollup purposes.
6. **Release Type** indicates the type of yield for products and byproducts, or **Consumption Type** for ingredients.
7. Close the window.

◗ To display formula text:

1. Choose **View Text** from the **Actions** menu.
2. The **Text Editor** window for the formula displays. If the cursor is on:
   - the formula header area, header text displays.
   - an unexpanded detail line, text associated with the ingredient displays.
   - an expanded detail line, product text displays.
3. Edit appropriate text.

4. Save the window.

Displaying an Intermediate Formula

The intermediate formula can only be displayed if the row is preceded by a + sign.

To display an intermediate formula:

1. Select a row on the **Formula View** window that is preceded by a + sign.
2. Choose **Lower Level** from the **Actions** menu.
3. The intermediate formula of the selected item or product displays on the **Intermediate Formula Inquiry Summary View** window.
4. The following fields are display only:
   - **Organization** displays the organization that owns the formula.
   - **Formula** displays the intermediate formula name.
   - **Version** displays the formula version number.
   - **Routing** displays the routing associated to the formula.
   - **Version** displays the routing version number.
   - **Minimum Qty** displays the minimum quantity of the displayed formula produced by the routing.
   - **Maximum Qty** displays the maximum quantity of the displayed formula produced by the routing.
   - **UOM** is the unit of measure for the Minimum Qty and Maximum Qty.
   - **Effective Dates** displays the dates that formulas and versions are valid.
   - **Standard Qty** displays the typical quantity that is produced by the formula.
   - **Customer** displays the name of the individual or company who buys the listed formulas.
   - **Active Formula** displays whether you are displaying an active or inactive formula.
   - **Recipe Use** displays how the recipe is used. For example, in production, planning, costing, or technical.
5. Close the window.

To condense an intermediate formula:

The cursor must be on a line preceded by a - sign. All expanded formulas that follow that line are already condensed.

1. Choose **Condense** from the **Actions** menu.
2. The window contracts the display of lower level formulas.
3. Close the window.

Analyzing a Formula

Formula analysis enables you to simulate the contribution of formula components in a product by weight or by volume. You can determine the quantities and percentages of ingredients that have been classified by a Technical Class and a Technical Subclass. For example, a Technical Class could include all volatile organic solvents in a formula. Technical Subclasses of volatile organic solvents could include mineral spirits or alcohols.

The Formula Analysis Parameters window lets you analyze a formula for Technical Class and Technical Subclass composition. You display the results of the analysis in the Formula Ingredient Contribution Analysis window.

Formula analysis is performed in the concurrent program manager so that results can be queried at your convenience. Each time this process is repeated for a specific formula in a specific organization, any previously calculated data is replaced for that formula in that organization. The log file provides status messages issued during the formula analysis calculations. Use this file to identify any errors that occur.

Prerequisites

- ❑ Set up technical parameters and appropriate sequences.
- ❑ Enter item technical data for the density of ingredients in formulas to be analyzed. This is not required for intermediate items, but it is required for their component materials.
- ❑ Set up technical classes and technical subclasses for ingredients that are included in a formula analysis. This is not required for intermediate items, but it is required for their component materials.
- ❑ Enter and save formulas. Identify the correct formula to use for any intermediates in the parent formula. You can do this either by setting the Item Technical Data Selection or by using a Recipe with Validity Rules.

◗ To analyze a formula:

1. Navigate to the **Formula Analysis Parameters** window.
2. Specify the rule to use during the explosion of formula intermediates:
   - Select **Use Production Formulas** to explode intermediates using a formula that is Approved for General Use. Experimental intermediates are exploded using a formula that is Approved for Laboratory Use. **Name** indicates the name of the Organization entered.

- Select **Use Laboratory Formulas** to explode all intermediates using a formula that is Approved for Laboratory Use.

Required.

3. Enter the code for the **Organization** where you want to analyze the formula. The organization entered retrieves and uses appropriate recipe validity rules when it explodes an intermediate. If no validity rules are available for the organization entered, global validity rules are applied. Required.
4. Enter the **Formula** to be used in the analysis. Required.
5. Enter the **Version** of the formula to be used in the analysis. Required.
6. The following fields are display only:
   - **Description** of formula entered.
   - **Status** of the formula entered.
7. Enter the **Analysis Quantity** as the total formula output required for this analysis. This value must be greater than zero. Required.
8. Enter the **UOM** for the Analysis Quantity. The unit of measure entered here must be defined in the profile option GMD: UOM Mass Type or GMD: UOM Volume Type. Required.
9. Click **Analyze**. Note the **Request ID** number.
10. Choose **View** from the menu, and choose **Requests** to view the status of your request in the concurrent program manager.
11. When your **Request ID** has completed with a **Status** of **Normal**, display the results of the analysis as described in the "Displaying Formula Analysis Results."
12. Select **View Log...** on the **Requests** window to view the explosions performed on intermediates using the rule that you specified in step 2. If any problems were encountered in the explosion, they are listed in the Log file.

Displaying Formula Analysis Results

The Formula Ingredient Contribution Analysis window displays the details of the analysis of a particular formula in a specified organization. The window consists of two separate views that display Technical Class and Technical Subclass analysis results by weight or by volume.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

- ❑ Analyze a formula as described in the Analyzing a Formula topic.

◗ To display the results of a formula analysis by weight:

1. Navigate to the **Formula Ingredient Contribution Analysis** window.
2. Query the analyzed formula.
3. Select **View By Weight**.
4. The following fields are display only:
   - **Organization** displays the facility that owns the formula analyzed.
   - **Analysis Date** displays the date of the analysis.
   - **Formula** displays the formula used in the analysis.
   - **Version** displays the version of the formula used in the analysis.
   - **Status** displays the approval Status of the formula used in the analysis. For example, Approved for Laboratory Use indicates that the formula can be used in the laboratory.
   - **Product** displays the main item in the formula analyzed.
   - **Description** displays a description of the main item in the formula analyzed.
   - **View By** displays the current type of view displayed. When View By Weight is selected, **Weight** displays in this field.
   - **Explosion Rule** displays the currently selected Explosion Rule used to explode intermediates.
   - **Technical Class** displays the Technical Class used to group ingredient contributions.

- **Direct Weight** displays the actual weight of ingredients in the selected Formula Technical Class.
- **Direct (%)** displays the Direct Weight of the Formula Technical Class as a percentage of the Total Weight.
- **Indirect Weight** displays the weight of ingredients within exploded intermediate products in the selected Formula Technical Class.
- **Indirect (%)** displays the Indirect Weight of the Formula Technical Class as a percentage of the Total Weight.
- **Total Weight** displays the sum of the Direct Weight and Indirect Weight in the selected Formula Technical Class.
- **Total (%)** displays Total Weight of the Formula Technical Class as a percent of the entire Formula weight.

Item Detail

5. The following fields are display only:
   - **Subclass** displays the Formula Technical Subclass.
   - **Item** displays the selected ingredient item in the Formula Technical Subclass.
   - **Direct Weight** displays the actual weight of ingredients in the selected Formula Technical Subclass.
   - **Direct (%)** displays the Direct Weight of the Formula Technical Subclass as a percentage of the Total Weight.
   - **Indirect Weight** displays the weight of ingredients within exploded intermediate products in the selected Formula Technical Subclass.
   - **Indirect (%)** displays the Indirect Weight of the Formula Technical Subclass as a percentage of the Total Weight.
   - **Total Weight** displays the sum of the Direct Weight and Indirect Weight in the selected Formula Technical Subclass.
   - **Class (%)** displays the percentage contribution of the selected Formula Technical Subclass to the entire Formula Technical Class.
   - **Formula (%)** displays the percentage contribution of the selected Formula Technical Subclass as a percentage of the total Formula weight.

Subtotal

6. The following fields are display only:
   - **Subclass** displays the Formula Technical Subclass.
   - **Direct Weight** displays the actual weight of ingredients in the selected Formula Technical Subclass.
   - **Direct (%)** displays the Direct Weight of the Formula Technical Subclass as a percentage of the Total Weight.
   - **Indirect Weight** displays the weight of ingredients within exploded intermediate products in the selected Formula Technical Subclass.
   - **Indirect (%)** displays the Indirect Weight of the Formula Technical Subclass as a percentage of the Total Weight.
   - **Total Weight** displays the sum of the Direct Weight and Indirect Weight in the selected Formula Technical Subclass.
   - **Class (%)** displays the percentage contribution of the selected Formula Technical Subclass to the entire Formula Technical Class.
   - **Formula (%)** displays the percentage contribution of the selected Formula Technical Subclass as a percentage of the total formula weight.

To display results of a formula analysis by volume:

1. Navigate to the **Formula Ingredient Contribution Analysis** window.
2. Query the analyzed formula.
3. Select **View By Volume**.
4. The fields displayed are calculated in terms of volume rather than weight.

Interpreting a Formula Ingredient Contribution Analysis

The following example illustrates a simple formula analysis of Formula F1. It assists you in the interpretation of results displayed on the Formula Ingredient Contribution Analysis window.

Formula F1 makes 100 pounds of Product 1. The Analysis Quantity of Formula F1 is 200.00 pounds. Formula F1 contains an intermediate, INT1. The intermediate INT1 is produced by Formula F2.

Formula F1 is composed of:

- 40 pounds of ingredient 1

    - Technical Class is Binder
    - Technical Subclass is Acrylic
- 10 pounds of ingredient 2
    - Technical Class is Solvent
    - Technical Subclass is Organic
- 50 pounds of intermediate 1

Intermediate INT1, Formula F2, is 50 pounds, and is composed of:

- 10 pounds of ingredient 1
    - Technical Class is Binder
    - Technical Subclass is Acrylic
- 25 pounds of ingredient 3
    - Technical Class is Binder
    - Technical Subclass is Acrylic
- 15 pounds of ingredient 4
    - Technical Class is Solvent
    - Technical Subclass is Alcohol

Formula Analysis of Formula F1 is:

- The application calculates the ingredient direct contributions at the formula level:
    - ING1 is scaled to 80.00 pounds
    - ING2 is scaled to 20.00 pounds
    - INT1 is scaled to 100.00 pounds
- The application calculates the ingredient contributions at the exploded lower levels. These calculations consist of exploding each intermediate found at each level of the formula. There is only one intermediate, INT1, in this example. The formula that produces this intermediate does not contain any additional intermediates. Therefore, the formula is exploded only one level. INT1 is exploded using Formula F2. Formula F2 is scaled by the quantity of INT1 consumed by F1 after scaling, or 100 pounds.

  Exploding F1 results in the following:

- 80.00 pounds of ING1 calculated from the direct contribution
- 20.00 pounds of ING1 calculated from the explosion of INT1
- 20.00 pounds of ING2 calculated from the direct contribution
- 50.00 pounds of ING3 calculated from the explosion of INT1
- 30.00 pounds of ING4 calculated from the explosion of INT1

The Formula Ingredient Contribution Analysis for this example is:

Direct Weight

Binder

- Acrylic
  - ING1 is 80.00 pounds, representing 100% of the Direct Weight contribution
  - Subclass Direct Weight is 80.00 pounds
  - Class Direct Weight Total is 80.00 pounds

Binder Class Total is 80.00 pounds

Solvent

- Organic
  - ING2 is 20.00 pounds, representing 100% of the Direct Weight contribution
  - Subclass Direct Weight is 20.00 pounds

Solvent Class Total is 20.00 pounds

Indirect Weight

Binder

- Acrylic
  - ING1 is 20.00, representing 28.60% of the Indirect Weight contribution
  - ING3 is 50.00, representing 71.40% of the Indirect Weight contribution
  - Subclass Indirect Weight is 70.00 pounds

Binder Class Total is 70.00 pounds

Solvent

- Alcohol

- ING 4 is 30.00 pounds, representing 100% of the Indirect Weight contribution

Solvent Subclass Total is 30.00 pounds

Total Weight

Binder

- Acrylic
  - ING1 is 100.00 pounds, representing 66.67% of the Class
  - ING3 is 50.00 pounds, representing 33.33% of the Class

Binder Subclass Total is 150.00 pounds, representing 100.00% of the Class and 75.00% of the formula weight

Solvent

- Organic
  - ING2 is 20.00 pounds, representing 40.00% of the Subclass

Solvent Subclass Total is 20.00 pounds, representing 40.00% of the Subclass and 10.00% of the formula weight

- Alcohol
  - ING4 is 30.00 pounds, representing 60.00% of the Subclass

Solvent Subclass Total is 30.00 pounds, representing 60.00% of the Subclass and 15.00% of the formula weight

Ingredient Contribution Summary

Binder is 75.00% of the formula weight

Solvent is 25.00% of the formula weight, with 10% Organic Subclass and 15% Alcohol Subclass

Finding a Formula Analysis

The Find Analysis window helps you find an existing Formula Ingredient Contribution Analysis.

Prerequisites

❑ Analyze formulas as described in the Analyzing a Formula topic.

◗ To find a formula analysis:

1. Navigate to the **Find Analysis** window.
2. Enter one or more of the following fields to narrow your search:
   - **Organization** where the analysis was performed.
   - **Formula** code of the formula.
   - **Version** number of the Formula.
   - **Product** as the main item in the Formula.
3. Click **Find**.
4. The **Formula Ingredient Contribution Analysis** window displays the analysis found that meets your search parameters.

Overriding Default Explosion Rules

The Item Technical Data Selection window enables you to specify the formula sources for intermediate technical parameter values, thereby overriding automatic selection.

Prerequisites

- ❏ Set up technical parameters.
- ❏ Set up technical parameter sequences.
- ❏ Enter item technical data for the density of every ingredient in formulas to be analyzed.
- ❏ Set up technical classes and technical subclasses for all ingredients that are included in a formula analysis.
- ❏ Enter and save formulas.

◗ To override default explosion rules:

1. Navigate to the **Formula Details** window.
2. Select the **Ingredient** for custom explosion rules.
3. Choose **Item Technical Data Selection** from the **Actions** menu. The **Item Technical Data Selection** window displays.

Simulation

4. This region is not used in this procedure.

Ingredient Contribution

5. Enter the **Formula** number and **Version** to be used for the explosion of the intermediate during the formula ingredient contribution analysis calculation.
6. Click **OK**.

4

Operations

This topic shows you how to define and maintain operations, activities, and resources. You are also shown to find an operation. Summaries of operations and operation headers provides an overview what is created. The process to enter operation activity details and activity-resource details is explained. You are also shown how to display activity lines and edit a summary of resource lines.

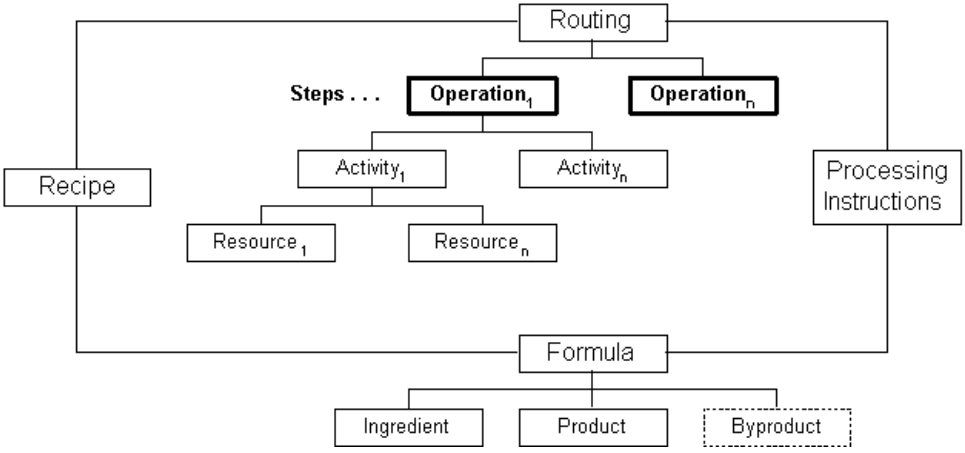
The following topics provide a basic understanding of operations:

Understanding Operations

An operation is an ordered set of activities that have to be completed for a predetermined step in a production batch. Resource requirements that are needed to perform these activities are usually specified. You build operations from activities that require resources.

Operations are depicted hierarchically in the following diagram that shows the:

- Routing composed of a series of Operations organized in Steps.
- Operations composed of Activities containing Resources.
- Formula composed of Ingredient, Product, and possibly Byproduct.
- Recipe linking the Routing and Formula together with Processing Instructions.



The assembly of several operations in a stepwise progression creates a Routing.

Requirements

Following are some requirements that customers have for operations in Product Development. The answers are explained in detail in the Solutions topic.

Does the application maximize production capacity resource usage?

Yes. By using the Charge to calculate resource usage, the application captures the number of passes required to process a step based on the maximum capacity of that step. This is derived from specific resources used and can assist in maximizing usage of production capacity resources.

Can the application simplify the repeated entry of the same data for the same activity?

Yes. Using an Activity Factor defines the number of iterations that a specific activity can be performed during an operation. The Activity Factor is considered in planning and calculating resource usage.

Solutions

Product Development provides solutions to help resolve issues at every stage of the product development process. The following represent some of the key performance solutions for operations.

Charges Refine Processing Requirements for Better Planning and Cost Management In many process manufacturing plants, the capacity of a step is determined by the equipment used. For example, a mixing tank has a maximum capacity of 1000 gallons. If more than 1000 gallons of material is added to this tank, it would overflow. This maximum capacity determines the number of charges or iterations that are required to process the ingredients required for a defined batch. The time that it takes to mix any volume of material through this operation is a fixed value. For example, one charge can require one hour of mixing. The problem arises when a batch is greater than the step capacity, and the step must be repeated several times to make a full batch volume. Proportional scaling does not always reflect the processing requirements. For example, if a batch is planned for 4500 gallons and the routing step can have a tank capacity of 1000 gallons, five charges, or mini-batches, would be required to process the full 4500 gallons. Proportional scaling results in only 4.5 hours of process time, whereas the actual required process time would be five hours. By refining the process requirements, the application delivers a better assessment of usage rates that affect planning and cost management.

Activity Factors Streamline Resource Definition An Activity Factor defines the number of times an activity is performed. For example, if a quality test must be performed at the beginning, middle, and end of a mixing time period, you must use an Activity Factor of three. Activity Factors are applied to resource usage when planning and calculating resource costs. They can be set to zero to exclude a particular activity or to select specific equipment or resources.

Defining and Maintaining Operations

Operations are composed of a sequence of activities and required resources. You enter and maintain the sequence of activities in the operation, and specify the resource, resource usage, and process quantity used for each activity. For example, a mixing activity can require one-half hour of use of a mixing system. Resource usage and cost analysis codes that are associated with each activity are used to calculate activity-based product costing.

Creating a New Operation

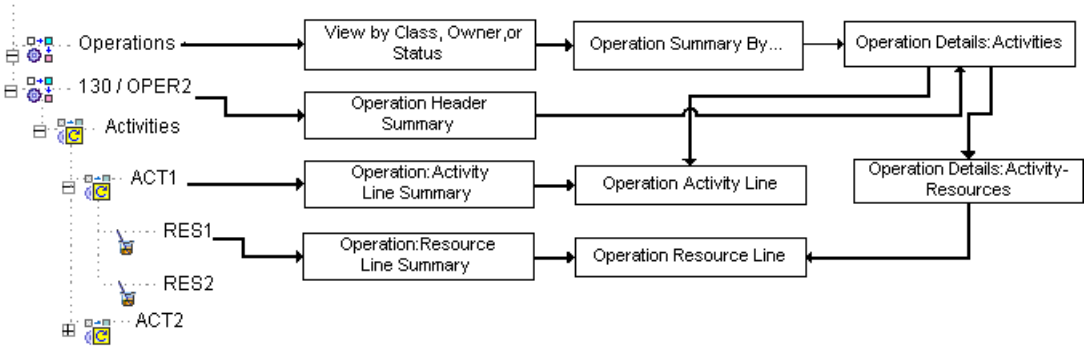
Create new operations on the Operation Details Activities window. When you define an operation, specify a combination of one or more activities performed in the production batch and assign the resources used to perform those activities. A resource can be any noninventory item that is used in production, such as a blender or a heating device.

Maintaining Operations

Use the the following windows to maintain operations:

- Operations Summary By... to display a list of all defined operations with their individual version numbers and validity rules. These are summaries by Class, Status, or Owner. Display the Operation Details Activities window from the Operations Summary By... window.
- Operation Header Summary to display descriptive information on a specific operation. Display the Operation Details Activities window from the Operation Header Summary window.
- Operation Details Activities to enter, view, and edit an operation. Display the following window from the Operation Details Activities window:
  - Operation Activity Line
  - Operation Details Activity Resources

The following graphic depicts the previously described operation navigation flow:



Defining and Maintaining Activities

Activities are the basic tasks performed at your plant such as setup, mixing, cleanup, or cooling. You combine activities with resources such as blender, oven, labor, or utilities to define operations. Basic plant activities are identified by activity codes. These codes are then combined to define the sequence of activities that can make up an operation. You can associate a cost analysis code with each activity. For example, by defining cost classes, you can categorize individual activities on whether or not they add value. Activity costs are the basic components of an activity based accounting system.

Prerequisites

❏ Set up activities.

Attaching Activities to Operations

Attach activities that were created in setup to specific operations using the Operation Details Activities window.

Maintaining Activities

You can use the the following windows to maintain activities:

- Operation Activity Line Summary to view a summary of a specific activity line including its description, process parameter, and factor. You can display the Operation Activity Line window from the Operation Activity Line Summary window.
- Operation Activity Line to view and edit pertinent information that is relevant to a specific operation line selected.

Defining and Maintaining Resources

You define and maintain resources on the Operation Activity window. Resources are the assets to produce batches, including production equipment, and employee labor. You can define each resource very generally, for example, OVENS, or specifically OVEN 1, OVEN 2 . . . OVEN n. For each resource assign a classification code for cost management purposes. You can group resources into resource classifications, for example, group OVENS and STOVES into COOKING UNITS.

Prerequisites

❏ Set up resources.

See Also

Oracle Process Manufacturing Cost Management User's Guide

Attaching Resources to Activities

Attach resources that were created in setup to activities using the Operation Activity window.

Maintaining Resources

Use the the following windows to maintain resources:

- Operation Resource Line Summary to view a summary of resource lines. You can display the Operation Resource Line window from the Operation Resource Line Summary window
- Operation Resource Line to view and edit specific resource lines.

Finding an Operation

The Find Operations window enables you to find a specific operation.

Prerequisites

❑ Enter and save operations.

◗ To find an operation:

1. Navigate to the **Find Operations** window.
2. Enter as many parameters as needed to complete the search:
   - Enter search parameters in the **Standard** region for: **Operation**, **Version**, **Description**, **Class**, **Valid From** date, **Valid To** date, **Process Quantity**, or **Status**.
   - Enter search parameters in the **Advanced** region for a specific: **Item**, **Condition**, or **Value**.
3. Click **Find**.
4. Review the results of the search.
5. Close the window.

Displaying the Operations Summary

The Operations Summary By... window displays a list of all defined operations with their individual version numbers and validity rules, by class, owner, or status. Display the Operation Details Activities window to view specific activities associated with each of the operations.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❑ Optionally, enter and save operation classes.
- ❑ Enter and save operations.
- ❑ Use the View By list to select how you want to view the summary of operations. Select one of the following:
  - Class to display the list by operation class.
  - Owner to display the list by owner.
  - Status to display the list by operation status.

◗ To display a list of all defined operations:

1. Navigate to the **Operations Summary By...** window.
2. The following fields are display only:
   - **Operation** is the name of the Operation.
   - **Version** is the version of the Operation.
   - **Valid From** is the date the Operation is effective.
   - **Valid To** is the date the Operation is no longer effective.
   - **Description** is a brief explanation of the Operation.
   - **Class** is the optional class of the Operation.
   - **Minimum Transfer Quantity** is for future use by the Oracle Advanced Planning and Scheduling application. It is intended to reduce overall lead times by defining the minimum amount of material that must be produced in a step at a specific production operation and resource before the next operation can begin. This reduces bottlenecks by letting processes transfer an interim quantity of completed material to the next step without the requirement to complete the entire step.

- **Process Quantity UOM** is the unit of measure for the process quantity associated with the Operation.

3. Click **Details** to display the **Operation Details Activities** window.
4. Close the window.

Displaying the Operation Header Summary

The Operation Header Summary window displays important descriptive information on a specific operation. Use the Operation Details Activities window to enter, view, and edit an operation.

You can use folders with this window.

See: *Oracle Applications User's Guide*.

Prerequisites

- ❏ Optionally, enter and save operation classes.
- ❏ Enter and save operations.

◗ To display a summary of the operation headers:

1. Navigate to the **Operation Header Summary** window.
2. Select the appropriate **Operation**.
3. The following fields are display only:
   - **Status** is the status of the Operation. Statuses are entered on the **Operation Details Activities** window.
   - **Operation** is the name of the Operation.
   - **Version** is the version of the Operation.
   - **Description** is a brief explanation of the Operation.
   - **Class** is the optional class assigned to the Operation.
   - **Class Description** is a brief description of the Class.
   - **Valid From** is the date the Operation is effective.
   - **Valid To** is the date the Operation is no longer effective.
   - **Min Transfer Qty** is for future use by the Oracle Advanced Planning and Scheduling application. It is intended to reduce overall lead times by defining the minimum amount of material that must be produced in a step at a specific production operation and resource before the next operation can begin. This reduces bottlenecks by letting processes transfer an interim quantity of completed material to the next step without the requirement to complete the entire step.

- **Process Qty UOM** is the unit of measure for the process quantity associated with this Operation.

4. Click **Details** to display the **Operation Details Activities** window.
5. Close the window.

Entering Operation Activity Details

Operations are a combination of one or more activities performed in a production batch and the resources used to perform those activities. The Operation Details Activities window links operations to activities. Use the Activity Factor and activity-resource association to enter an activity several times within an operation. Activity Factor simplifies data entry of the same activity several times by defining the specific number of times that an activity is performed during an operation. Activity factor is taken into consideration for planning and resource calculation purposes. Display the Operation Activity window to link one or more resources to a single activity. Go to the Operation Activity Line Edit window to edit individual activity lines.

You have the ability to save an operation that contains activities with no associated resources as long as the operation status is New. Status cannot be changed to Approved for Laboratory Use or to Approved for General Use until all activities have resources associated to them.

Understanding Sequence Dependent Operations

Sequence dependency indicates that there is an additional setup time required when products are processed through each operation in a specific sequence.

E-record and E-signature Approvals

There may be an E-Signature event associated with this window. Refer to "Appendix D Oracle E-Records Events in Product Development" for additional information on e-record and e-signature approvals associated with this window.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

- ❏ Optionally, enter and save operation classes.
- ❏ Enter and save activities.
- ❏ Enter and save resources.

◗ To enter operation details and activities:

1. Navigate to the **Operation Details Activities** window.
2. Enter a name for the **Operation** to be entered. Required.

3. After entering all relevant information and saving the Operation with the default Status of **New**, return to this window if you need to change Operation Status by selecting **Change Status** from the **Actions** menu. Depending on whether Workflow is enabled, a different set of statuses is available.

   Select a **Status** for the Operation you are entering from one of the following:

   - **Approved for Laboratory Use** to indicate that the operation is approved for laboratory use.
   - **Approved for General Use** to indicate that the operation is approved for use in production.
   - **Obsolete/Archived** to indicate that the operation is no longer approved for use and is obsoleted, archived, or both.

   If Workflow is enabled, when you select:

   - **Approved for Laboratory Use**, Status changes to **Request Approval for Laboratory Use** until all approvers have accepted the operation, when its Status changes to Approved for Laboratory Use.
   - **Approval for General Use,** Status changes to **Request Approval for General Use** until all approvers have accepted the operation, when its Status changes to Approved for General Use.

   Refer to the Understanding the Status Approval Workflow topic for additional information.

4. Enter the **Version** number for this operation. The combination of operation number and version must be unique. Required.
5. Enter a brief **Description** for the Version entered. Required.
6. Enter a **Class** for this operation to identify how it is categorized. The **Class Description** assigned to the Class displays.
7. Enter a **Valid From** date as a validity rule for this operation. The default date is the current system date. Required.
8. Enter a **To** date as a validity rule for the expiration of this Operation. If there is no expiration date for this Operation, leave the field blank.
9. Enter the **Owner Organization** for this Operation. A **Description** of the Owner Organization displays.
10. **Minimum Transfer Qty** is for future use by the Oracle Advanced Planning and Scheduling application. It is intended to reduce overall lead times by defining the minimum amount of material that must be produced in a step at a specific

production operation and resource before the next operation can begin. This reduces bottlenecks by letting processes transfer an interim quantity of completed material to the next step without the requirement to complete the entire step.

11. Enter a **Process Qty UOM** for this Operation. Required.

Activities

12. Enter an **Activity** required for this Operation. A **Description** of this activity displays.
13. Enter the **Activity Factor** to specify the number of times the activity is performed in this Operation. Required.

    For example, if a quality test must be performed at the beginning, middle, and end of a mixing time period, rather than defining the activity and associated resources three times, use the Activity Factor or multiplier to indicate the number of iterations for the same activity.

    To indicate that the activity must be performed at the beginning, middle, and end of the mixing time period, enter a factor of 3. Factors are applied to usage of a resource when planning and calculating cost. Set the Activity Factor to zero to exclude a particular activity. You can also use this to select equipment used for a production run within this specific plant.
14. **Sequence Dependency** is selected when the activity has a sequence dependent setup. It is cleared when there is no sequence dependency.
15. Enter the **Offset Interval** as the time delay from the start of the activity to the point where the resource is actually required. Required.
16. Repeat steps 11 through 13 for each Activity you need to enter for the specified Operation.
17. Save the window.
18. Click **Resources** to display the **Operation Activity** window.
19. Optionally, click **Edit Activity Line** to display the **Operation Activity Line Summary** window.

◗ To mark the operation for deletion:

1. Choose **Mark for Purge** from the **Actions** menu.
2. The record is marked for deletion.

3. Save the window.

To edit operation text:

1. Choose **Edit Text** from the **Actions** menu.
2. Make the appropriate edits to operation text.
3. Save the window.

To display the Specifications window:

1. Choose **Specifications** from the **Actions** menu. The **Specifications** window displays.
2. Evaluate specifications
3. Close the window.

To display the Samples window:

1. Choose **Samples** from the **Actions** menu. The **Samples** window displays.
2. Evaluate the samples.
3. Close the window.

To view alternate resources for the operation:

1. Choose **Operation Alternate Resources** from the **Actions** menu.
2. The window displays the alternate resources available to this Operation if any exist.
3. Close the window.

To change the operation status:

1. Choose **Change Status** from the **Actions** menu.
2. Change the **Current Status** displayed by selecting a different Status from the **Change Status To** list.
3. Click **OK**.
4. The **Operation Details Activities** window displays the revised **Status** for the Operation.

To duplicate a record:

1. Query the **Operation Details Activity** record you want to duplicate.
2. Choose **New** from the **File** menu.
3. Choose **Duplicate Record Above** from the **Edit** menu.
4. Enter a new **Operation** name and **Version** number.
5. Click **OK**.
6. Save the window.

To display the E-record Details window:

1. Choose **E-record Details** from the **Actions** menu. The **E-record Generic Query** displays if this option is implemented in your application.
2. Refer to "Appendix D Oracle E-Records Events in Product Development" for information on e-records.
3. Close the window.

Using the View Menu to Find an Operation

The Find selection on the View menu lets you to find an operation.

To find an operation from the View menu:

1. Choose **Find** from the **View** menu.
2. Enter one or more of these search parameters.
   - **Status**
   - **Operation**
   - **Version**
   - **Description**
   - **Operation Class**
   - **Activity**
   - **Resource**
   - **Mark for Deletion**
3. Click **Find**.

Entering Activity-Resource Details

The Operation Activity window assigns resources to each activity, and lets you edit a resource line once activities are associated with an operation. You access this window when you click Resources on the Operation Details Activities window.

Charge calculates resource usage by capturing the number of passes required to process a step. This is based on the maximum capacity of the step as derived from specific resources used.

You can use flexfields with this window.

See: *Oracle Applications User's Guide*.

Prerequisites

❑ Enter and save operations.

◗ To assign resources to an activity:

1. Navigate to the **Operation Activity** window.
2. Enter the **Operation** to associate activities. Required.
3. The **Status** assigned to the Operation displays.
4. The current **Version** number for the Operation displays.
5. Select the **Activity** to enter or edit a resource.
6. Click **Resources**.

Throughput

Process units of measure and usage units of measure are derived from the plant resource if one is defined. You can override these values using this window. A process quantity is converted to an operation process quantity unit of measure if needed.

7. The **Resource** and its **Description** displays.
8. Enter the planned **Process Quantity** for the Resource. Required.

   This value combined with the Usage quantity define the usage rate. For example, if a resource can mix 200 gallons per hour, enter 200 as the Process Quantity, 1 as the Usage, and the unit of measure for hours.
9. The **UOM** entered on the header displays. This is the unit of measure for the planned process quantity.

10. Enter the planned resource **Usage**. This is typically expressed in hours. Required.
11. Enter the **UOM** as the unit of measure for the Resource. Required.

Cost Information

12. The **Resource** and its **Description** displays.
13. Enter the **Component Class** code. The **Component Class Description** for the Resource displays. The Component Class is set up in the Cost Management application and defaults from the Resource. Required.
14. The **Cost Analysis Code** and **Cost Analysis Description** for the Activity displays. This code defaults from the Activity.

Scheduling Information

15. The **Resource** and its **Description** displays.
16. Select a **Plan Type**. You need to determine if this Resource is Auxiliary, Primary, or Secondary. Required.
    - Select **Auxiliary** for resources that work as companions with the primary resources to perform an activity in the Operation. These resources do not affect the rate of the Operation. For example, a primary resource in a mixing activity is a mixer with a throughput rate of 100 gallons per hour. An auxiliary resource is the worker who operates the mixer. No matter how fast or slow the worker is, the mixer rate remains at a constant 100 gallons per hour.
    - Select **Primary** to indicate that this is the rate determining resource. It limits or determines throughput. It is also referred to as the bottleneck or critical resource. There can only be one Primary per resource.
    - Select **Secondary** to indicate the resource that would replace the primary resource when it is not available. This resource performs the same task as the primary resource. It is unconstrained, and it has usage. The Advanced Planning and Scheduling application does not schedule the secondary resource.
17. Enter the **Count** as the number of resources needed for the activity entered. For example, it two blenders are used for mixing, enter a 2 in the count. Required.
18. Enter the **Offset Interval** as the time delay from the start of the activity to the point where the resource is actually required.

19. Select the **Scale Type**. You can designate whether scaling is used to determine resource quantity. Scaling is defined as the proportional increase or decrease of resources. For example, setup and cleanup activities are usually not scaled, while manufacturing activities are scaled.
    - Select **Proportional Scaling** if the resources change in a ratio that is proportional to the quantity of material being processed.
    - Select **Fixed** if the resources do not change, regardless of the quantity of material being processed.
    - Select **Fixed By Charge** if the resources change as a result of the number of charges specified.
20. Save the window.

To edit a resource line:

1. Select the appropriate **Resource** line.
2. Click **Edit Resource Line** to display the **Operation Resource Line Edit** window.
3. Make the appropriate changes to the line.
4. Save the window.

To display the Operation Resource Process Parameters window:

1. Click **Parameters**. The **Operation Resource-Process Parameter** window displays.
2. Refer to the "Displaying Operation Resource Process Parameters" topic for details.
3. Close the window.

Displaying Operation Activity Line Summary

The Operation Activity Line Summary window presents all pertinent information that is relevant to a specific operation line selected. Use this window to edit the selected activity line. To edit this information click Details to display the Operation-Activity Line Edit window.

Refer to the *Oracle Process Manufacturing Capacity Planning User's Guide* for a complete discussion of setting up process parameters.

Understanding Sequence Dependent Operations

Sequence dependency indicates that there is an additional setup time required when products are processed through each operation in a specific sequence.

You can use folders and flexfields with this window.

See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*.

Prerequisites

- ❏ Enter and save operations.
- ❏ Enter and save activities.

◗ To display information about an operation activity line:

1. Navigate to the **Operation Activity Line Summary** window.
2. The following fields are display only:
   - **Activity** indicates the activity selected for this Operation.
   - **Description** is a brief explanation of the activity.
   - **Factor** is the process factor entered for the activity. Required.
   - **Offset Interval** is the time required before the activity begins. In process operations, this is usually the number of hours from the batch step start to the start time of this activity.
3. Click **Details** to display the **Operation Activity Line** window.
4. Close the window.

◗ To edit an operation activity line:

1. Navigate to the **Operation Activity Line** window.
2. The following fields are display only:

- **Activity** displays the activity selected for the Operation.
- **Description** is a brief explanation of the activity.

3. Enter the **Factor** as the process factor for the activity. Required.
4. Enter the **Offset Interval** as the time delay from the start of the activity to when the resource is actually required.
5. **Sequence Dependency** is selected when the activity has a sequence dependent setup. It is cleared when there is no sequence dependency.
6. Save the window.

Displaying the Resource Line Summary

The Operation Resource Line Summary window presents all pertinent information that is relevant to a selected operation-activity line.

Refer to the *Oracle Process Manufacturing Capacity Planning User's Guide* for a complete discussion of setting up process parameters.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

- ❑ Enter and save operations.
- ❑ Enter and save activities.

◗ To display the resource line summary:

1. Navigate to the **Operation Resource Line Summary** window.

Resource

2. The following fields are display only:
   - **Resource** displays the resource associated to the activity with its **Description**.
   - **Quantity** displays the process amount for the resource with **Quantity UOM** as its unit of measure.
   - **Usage** displays the rate of use for the resource. **Usage UOM** is the unit of measure for the resource. This is usually specified in hours.
   - **Component Class** and **Class Description** indicate the assigned component class for the resource.
   - **Cost Analysis Code** indicates the cost code assigned to the resource with its associated **Cost Analysis Description**.
   - **Plan Type** displays whether this resource is a primary, secondary, or auxiliary resource. **Auxiliary** indicates resources that work as companions with the primary resources to perform an activity in the Operation. **Primary** indicates a the rate determining resource. **Secondary** indicates the resource that would replace the primary resource when it is not available. This resource performs the same task as the primary resource, but can have a different usage.

- **Count** indicates the number or quantity of the resource used in the specified plant where you are defining production costs and usage availability.
- **Offset** indicates the time delay from the start of the activity to the point where the resource is actually required. This lag time is used by Process Operation Control.
- **Scale Type** displays which type of scaling is used to determine resource quantity. **Proportional Scaling** indicates the resources change in a ratio that is proportional to the quantity of material being processed. **Fixed** scale type indicates the resources do not change, regardless of the quantity of material being processed. **Fixed By Charge** indicates resources change as a result of number of charges specified. With this type of scaling:

  Resource Usage = Count multiplied by Usage multiplied by Charges

Process Parameters

3. The following fields default from the process parameter set up in the planning application:
   - **Seq** is the sequence of the resource process parameter.
   - **Parameter** is the process parameter name. For example, Bath Temperature.
   - **Target** indicates the target value for the process parameter.
   - **Minimum** is the lowest acceptable value for a numeric range type of process parameter.
   - **Maximum** is the highest acceptable value for a numeric range type of process parameter.
   - **Units** is the unit of measure for the process parameter.
4. Close the window.

◗ To edit an operation resource line:

1. Click **Details** to display the **Operation Resource Line** window where you can edit individual resource lines.
2. **Resource** displays the resource associated to the activity and its **Description**.
3. Enter the **Quantity** as the process amount for the resource with **Quantity UOM** as its unit of measure. Required.
4. **Quantity UOM** displays the unit of measure for the resource. Required.

5. Enter the **Usage** as actual usage of the resource for the line. Required.
6. **Usage UOM** displays the unit of measure for the resource. This is usually specified in hours.
7. Enter the **Component Class** code. The component **Class Description** displays. The Component Class is set up in the Cost Management application and defaults from the resource. Required.
8. Enter the appropriate **Cost Analysis Code** for the resource. Required.
9. **Cost Analysis Description** displays the description of the Cost Analysis Code field.
10. Enter the **Plan Type** as:
    - **Auxiliary** to indicate the resources that work as companions with the primary resources to perform an activity in the operation.
    - **Primary** to indicate the rate determining resource. There can only be one primary per resource.
    - **Secondary** to indicate the resource that would replace the primary if it were not available. This resource performs the same task as the primary, but can have a different usage.

    Required.
11. Enter **Count** as the planned number of resources for the activity. Count indicates the number or quantity of the resource used in the specified Plant where you define production costs and usage availability. Required.
12. Enter **Offset** as the time delay from the start of the activity to the point where the resource is actually required. Required.
13. Enter **Scale Type** as the type of scaling used to determine resource quantity. **Proportional Scaling** indicates the resources change in a ratio that is proportional to the quantity of material being processed. **Fixed** scale type indicates the resources do not change, regardless of the quantity of material being processed. **By Charge** indicates resources change as a result of number of charges specified. With this type of scaling:
14. Resource Usage = Count multiplied by Usage multiplied by Charges

Process Parameters

15. The following fields default from the process parameter set up in the planning application:

- **Seq** is the sequence of the resource process parameter.
- **Parameter** is the process parameter name. For example, Bath Temperature.
- **Target** indicates the target value for the process parameter.
- **Minimum** is the lowest acceptable value for a numeric range type of process parameter.
- **Maximum** is the highest acceptable value for a numeric range type of process parameter.
- **Units** is the unit of measure for the process parameter.

16. Click **Reset Values** to remove overrides set up for a process parameter. Refer to the "Displaying Operation Resource Process Parameters" topic for a complete discussion of this feature and the hierarchy that is enforced.
17. Save the window.

Editing a Resource Line

The Operation Resource Line window enables you to edit resource lines.

Refer to the *Oracle Process Manufacturing Capacity Planning User's Guide* for a complete discussion of setting up process parameters.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

- ❏ Enter and save operations.
- ❏ Enter and save activities.

◗ To edit a resource line:

1. Navigate to the **Operation Resource Line** window.

Resource

2. **Resource** and its **Description** indicate the resource you are editing.
3. Enter the appropriate process **Quantity**. Required.
4. The **Quantity UOM** displays for the process quantity entered.
5. Enter the **Usage** as the rate of use for the Resource. This value is usually expressed in hours or partial hours. For example, one hour and 15 minutes would be entered as 1.25. Required.

   Resource Usage = Count multiplied by Usage multiplied by Charges
6. Enter the **Usage UOM** as the unit of measure the resource is measured in the specified plant. This is usually specified in hours. Required.
7. Enter the **Component Class**. The **Class Description** assigned to the Component Class displays. Required.
8. Enter the appropriate **Cost Analysis Code** for the resource. Required.
9. The **Cost Analysis Descriptor** associated with the Cost Analysis Code displays.
10. **Plan Type** indicates whether this Resource is an auxiliary, primary, or secondary resource.
    - Select **Auxiliary** for resources that work as companions with the primary resources to perform an activity in the Operation. These resources do not affect the rate of the Operation. For example, a primary resource in a mixing

activity is a mixer with a throughput rate of 100 gallons per hour. An auxiliary resource is the worker who operates the mixer. No matter how fast or slow the worker is, the mixer rate remains at a constant 100 gallons per hour.

- Select **Primary** to indicate that this is the rate determining resource. It limits or determines throughput. It is also referred to as the bottleneck or critical resource. It is recommended that the RUN-TIME activity's resource be assigned this way.
- Select **Secondary** to indicate the resource that would replace the primary resource when it is not available. This resource performs the same task as the primary resource. It is unconstrained, and it has usage. The Advanced Planning and Scheduling application does not schedule the secondary resource.

These fields are display only.

11. Enter the appropriate **Count**. This is the number or quantity of the resource used in the specified plant where you are defining production costs and usage availability. The number you enter depends on how broad a resource categorization you are defining. For example, if you define the resource as Blender 1, enter 1. If you use three blenders in the production line, and you define the resource as Blenders rather than defining each individually, enter 3. Required.
12. Enter the appropriate **Scale Type**. You can designate whether scaling is used to determine resource quantity. Scaling is defined as the proportional increase or decrease of resources. For example, setup and cleanup activities are usually not scaled, while manufacturing activities are scaled. This field defaults to Linear scaling.
    - Select **Proportional** if the resources change in a ratio that is proportional to the quantity of material being processed.
    - Select **Fixed** if the resources do not change, regardless of the quantity of material being processed.
    - Select **Scale by Charge** if the resources are scaled by charges.
13. Enter the appropriate **Offset** as the time delay from the start of the activity to the point where the resource is actually required. This lag time is used by Process Operation Control.

Process Parameters

14. The following fields default from the process parameter set up in the planning application:
    - **Seq** is the sequence of the resource process parameter.
    - **Parameter** is the process parameter name. For example, Bath Temperature.
    - **Target** is the target value for the process parameter.
    - **Minimum** is the lowest acceptable value for a numeric range type of process parameter.
    - **Maximum** is the highest acceptable value for a numeric range type of process parameter.
    - **Units** is the unit of measure for the process parameter.
15. Click **Reset Values** to remove overrides set up for a process parameter. Refer to the "Displaying Operation Resource Process Parameters" topic for a complete discussion of this feature and the hierarchy that is enforced.
16. Save the window.

Displaying Operation Resource Process Parameters

Process parameters are a component of the process instructions necessary to run resources during the batch process. They are usually machines or instruments and are the standard for executing a task. They can be generic or specific. Each industry and company uses different machines and instruments, and there are different requirements for recording process parameters.

A process parameter details information such as temperature, pressure, or time that is pertinent to the product, but does not fall into the classification of input or output. You can use process parameters as set points, comparison values, or in conditional logic.

You can use folders with this window.

See: *Oracle Applications User's Guide* and *Oracle Flexfields User's Guide*.

Prerequisites

❑ Set up process parameters.

Refer to the *Oracle Process Manufacturing Capacity Planning User's Guide* for a complete discussion of setting up process parameters.

◗ To display the Operation-Resource Process Parameters window:

1. Navigate to the **Operation-Resource Process Parameters** window.
2. The following fields are display only:
   - **Operation** displays the operation with its **Version** and **Description**.
   - **Activity** displays the activity related to the step and its **Description**.
   - **Resources** displays the resource attached to the activity and its **Description**.

Parameter Values

3. The following fields default from the process parameter set up in the planning application:
   - **Seq** is the sequence of the resource process parameter.
   - **Parameter** is the process parameter name. For example, Bath Temperature.
   - **Minimum** is the lowest acceptable value for a numeric range type of process parameter.

- **Maximum** is the highest acceptable value for a numeric range type of process parameter.
- **Units** is the unit of measure for the process parameter.

4. Click **OK** to close the window.

To reset values based on the hierarchy:

You can override certain process parameters at the operation and recipe levels. Click Reset Values to remove overrides set up for a process parameter. The following illustrates how the process parameter is reset.

The hierarchy is:

- Recipe
- Operation
- Default value from the planning application

For example, if the default for a process parameter from the planning application is set to 10, you can override it at the operation level and at the recipe level. The following values are used for illustration:

- Recipe = 20
- Operation = 15
- Default value from the planning application = 10

If you click Reset Values for the process parameter on the:

- Recipe Details window, then the process parameter value changes from 20 to 15, the next step down in the hierarchy.
- Operation Activity Details window, then the process parameter value changes from 15 to 10.

If no override exists at the operation level, and you click Reset Values at the recipe level, then the process parameter value changes to 10, which is the original default value from the planning application.

5

Routings

This topic shows you how to define and maintain routings. You are also shown how to find a routing. A summary of routings and routing headers provides an overview of the routings that are available. The processes of entering routing details and displaying the routing step line summary are explained. You are also shown how to edit routing step lines, and how to enter routing step dependencies. Procedures for displaying and editing theoretical process loss are provided.

The following topics provide a basic understanding of routings:

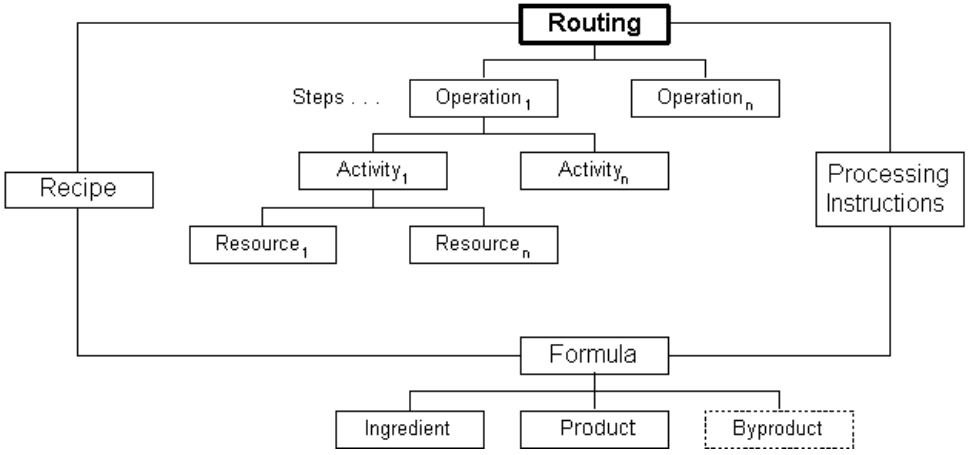
- Understanding the Routing Designer
- Using the Routing Designer

Understanding Routings

A routing is a sequenced set of operations that need to be performed to complete a production batch. The operations are presented in a series of steps that organize these operations into an orderly set of activities that have individual resources associated to them.

Routings are depicted hierarchically in the following diagram which shows the:

- Routing composed of a series of Operations organized in Steps.
- Operations composed of Activities containing Resources.
- Formula composed of Ingredient, Product, and possibly Byproduct.
- Recipe linking the Routing and Formula together with Processing Instructions.



Requirements

Following are some requirements that customers have for routings in Product Development. The answers are explained in detail in the Solutions topic.

Can a default routing be set up?

Yes. Set up a default routing with average material. Material flow can be specified at the validity rule level. By having a default routing, the expected average material throughput is defined as a benchmark.

Can process loss be captured as a cost?

Yes. Use Theoretical Process Loss to reflect a planned percentage of material that is lost for a specific routing. Calculate the actual ingredient usage from a production perspective, which accommodates for that loss in standard costing.

Does the application support automatic calculation of step quantities based on material input and output?

Yes. The application automatically calculates step quantities based on the amount of materials input and output for each step.

Can manufacturing activities and routings be managed on the manufacturing floor?

Yes. The Process Engineer workbench manages routings, operations, and recipes at the shop floor level.

Is it possible to model when ingredients are relieved from inventory?

Yes. The application provides three separate methods to update inventory: automatic release, manual release, and incremental release.

Solutions

Product Development provides solutions to help resolve issues at every stage of the product development process. The following represent some of the key performance solutions for routings.

Operations Throughput Enhanced by Default Routings Process speeds and feeds must be updated at the item or step level to eliminate the need to have a unique routing whenever the throughput varies by material viscosity or evaporation. Set up a default routing with an average material throughput, while indicating material-specific flows at the validity rule level. By locating routing management in this area, the larger corporate process engineering responsibilities are better defined and controlled.

Process Loss Factors Enable Better Material Planning Due to factors such as evaporation or changeovers, materials can be lost or unrecoverable in a production step. These lost materials need to be planned for to achieve the targeted process quantity for a step. The loss can vary depending on the material being processed, therefore a production loss factor must be defined at a product operation level, and it must be reflected in production and planning for ingredients associated to the step. Product Development allows entry of a process loss factor to enable better material planning.

Step Quantity Calculations Deliver Accurate Total Quantity Usage All step quantities are calculated based on the routing step definitions and ingredient usage per step. Quantities are cumulative in that ingredients in step one are added to ingredients in step two. When byproducts or coproducts are yielded at the step they decrease the total step quantity. Product Development accounts for this yield to deliver an accurate total step usage.

Seamless Integration of Product Development Responsibilities In addition to the default Recipe Data Organizer, the Process Engineer can manage all routings, operations, and recipes as part of a seamless integration of all pertinent job functions on the shop floor.

Select the Appropriate Ingredient Release Method Release method specification enables the automatic release of ingredients after each step is completed, on a step by step basis using manual release, or using an incremental release to keep inventory quantities current.

Defining and Maintaining Routings

Routings are defined in terms of operations. You enter and maintain the sequence of operations and step quantities used in a routing. Define multiple versions for a routing that makes the same product to accommodate for several production lines with differing characteristics. Since routings and operations are modeled into the structure of a new recipe, several attributes are defined at the recipe level, including planned process loss, step quantity, capacity, and activity factor.

Since a single product can be associated with several routings on the manufacturing floor, it can have different costs depending on the specified routing. Product Development tracks the route that the ingredients follow, thereby tracking appropriate costs.

Creating a New Routing

Create and define new routings on the Routing Details window. A routing represents the sequence of operations or steps used during the manufacturing process. Specify each of the operations in sequential order, with their respective step quantities, and total routing quantities. You can display the following windows from the Routing Details window:

- Operation Details Activities
- Routing Step Dependencies
- Routing Step Line

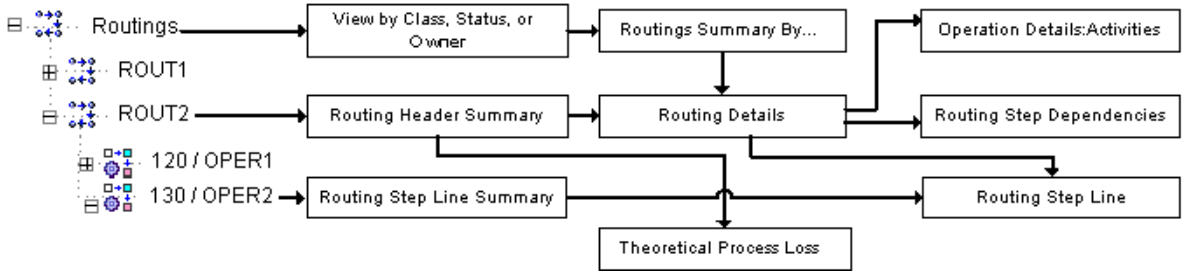
Maintaining Routings

Use the following windows to maintain routings:

- Routings Summary By... to display a list of defined routings with their individual version numbers and descriptions. These can be viewed by Class, Status, or Owner. You can display the Routing Details window from the Routings Summary By... window.
- Routing Header Summary to display important descriptive information on a specific routing. You can display the following windows from the Routing Header Summary window:
  - Routing Details
  - Theoretical Process Loss

- Routing Step Line Summary to determine the step number, operation, step quantity, and unit of measure for the step in a specific routing. You can display the Routing Step Line window from the Routing Step Line Summary window:
- Routing Step Dependencies to create and modify the interrelationships between routing steps. Step dependencies are those relationships between steps that establish whether a specific step can or cannot start until another step is completed.
- Theoretical Process Loss to enter the theoretical percent loss expected for a range of material processed during a specified routing.
- Routing Step Line to edit individual routing step lines.

The following graphic depicts the previously described routing navigation flow:



Finding a Routing

The Find Routings window enables you to find a specific routing.

Prerequisites

❑ Enter and save routings.

◗ To find a routing:

1. Navigate to the **Find Routings** window.
2. Enter as many parameters as needed to complete the search:
   - Enter search parameters in the **Standard** region for: **Name**, **Version**, **Description**, **Class**, or **Product**.
   - Enter search parameters in the **Advanced** region to enter a specific: **Item**, **Condition**, or **Value**.
3. Click **Find**.
4. Review the results of the search.
5. Close the window.

Displaying the Routings Summary

The Routing Summary window displays a list of all defined routings with their individual version numbers and descriptions. You can view these by Class, Status, or Owner. You can display the Routing Details window from this window to view specific steps and operations associated with each of the routings displayed.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❑ Optionally, enter and save routing classes.
- ❑ Enter and save routings.
- ❑ Use the View By list to select how you want to view the summary of routings. Select one of the following:
  - Class to display the list by routing class.
  - Status to display the list by routing status.
  - Owner to display the list by routing owner.

◗ To display a list of all defined routings:

1. Navigate to the **Routings Summary By...** window.
2. The following fields are display only:
   - **Routing** displays the name of the routing.
   - **Version** displays the version number of the Routing.
   - **Quantity** displays the product Quantity associated with this Routing. This is the total Quantity from which individual step requirements are scaled.
   - **UOM** displays the unit of measure for the Quantity. This unit of measure defaults from the process Quantity unit of measure entered on the **Operation Details Activities** window.
   - **Class** displays the optional class entered for the Routing.
   - **Valid From** displays the date on which the Routing is effective.
   - **Valid To** displays the date on which the Routing is no longer effective.
   - **Status** displays the current status of the Routing.

3. Click **Details** to display the **Routing Details** window.
4. Close the window.

Displaying the Routing Header Summary

The Routing Header Summary window displays important descriptive information on a specific routing.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❑ Optionally, enter and save routing classes.
- ❑ Enter and save routings.

◗ To display a summary of routing headers:

1. Navigate to the **Routing Header Summary** window.
2. Select the desired **Routing**.
3. The following fields are display only:
   - **Status** displays the approval status of the Routing.
   - **Routing** displays the code assigned to the Routing.
   - **Version** displays the version number of the Routing.
   - **Description** displays a brief explanation of the Routing.
   - **Valid From** displays the date on which the Routing is effective.
   - **Valid To** displays the date on which the Routing is no longer effective.
   - **Class** determine the optional class assigned to the Routing.
   - **Class Description** determine the optional class description assigned to the Routing.
   - **Theoretical Loss** displays the theoretical quantity of material lost in the Routing.
   - **Planned Loss** displays actual quantity of material lost in the Routing.
   - **Quantity** displays the amount of material assigned to the displayed Routing.
   - **UOM** displays the unit of measure for the Quantity of material.
   - **Owner** displays the initiator of the Routing.
4. Click **Details** to display the **Routing Details** window.

5. Click **Theoretical Process Loss** to display the **Theoretical Process Loss** window.
6. Close the window.

Using the View Menu to Find a Routing

The Find selection on the View menu enables you to find a routing.

◗ To find a routing from the View menu:

1. Choose **Find** from the **View** menu. The **Find Routings** window displays.
2. Enter one or more of these search parameters:
   - **Status** of the Routing.
   - **Routing Number** code assigned to the Routing.
   - **Routing Version** number assigned to the Routing.
   - **Description** of the Routing.
   - **Routing Class** assigned for classification of the Routing.
   - **Valid From** date that the Routing is effective.
   - **To** date that the Routing is no longer effective.
   - **Owner** or initiator of the Routing.
   - **Routing Quantity** as the amount of material assigned to the Routing in the displayed unit of measure.
   - **UOM** as the unit of measure for the Routing Quantity.
   - **Process Loss** as the planned loss of material for the Routing.
   - **Marked for Deletion** enables you to select **Yes** to find routings marked for purge or select **No** to find all routings not marked for purge.
3. Click **Find**.

Entering Routing Details

The Routing Details window enables you to enter the details for a specific routing.

Understanding the Enforce Step Dependency Indicator

When Enforce Step Dependency is selected, several business rules are applied:

- The Release Type field is set to Manual to indicate that the step must be released and completed manually.
- You cannot change the step dependency and step release type at the step level.
- All steps must be completed before you can complete a batch using this routing.
- All steps must be closed before you can close a batch using this routing.
- Business rules validate step start and completion dates and times for appropriate batch step rescheduling.

Refer to the "Understanding Batches" topic in *Oracle Process Manufacturing Process Execution User's Guide* for a complete discussion of how this indicator affects batch steps.

E-Record and E-Signature Approvals

There may be an e-signature event associated with this window. Refer to "Appendix D Oracle E-Records Events in Product Development" for additional information on e-record and e-signature approvals associated with this window.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Optionally, enter and save routing classes.

◗ To enter routing details:

1. Navigate to the **Routing Details** window.
2. Enter the code for the **Routing**. Required.
3. Enter a **Routing Version** of the Routing. Required.
4. After entering all relevant information and saving the Routing with the default Status of **New**, return to this window if you need to change Routing Status by selecting **Change Status** from the **Actions** menu. Depending on whether Workflow is enabled, a different set of statuses is available.

Select a **Status** for the Routing you are entering from one of the following:

- **Approved for Laboratory Use** to indicate that the Routing is approved for laboratory use.
- **Approved for General Use** to indicate that the Routing is approved for use in production.
- **Obsolete/Archived** to indicate that the Routing is no longer approved for use and is obsoleted, archived, or both.

If Workflow is enabled, when you select:

- **Approved for Laboratory Use**, Status changes to **Request Approval for Laboratory Use** until all approvers have accepted the Routing, at which time its Status changes to Approved for Laboratory Use.
- **Approval for General Use,** Status changes to **Request Approval for General Use** until all approvers have accepted the Routing, at which time its Status changes to Approved for General Use.

Refer to the Understanding the "Status Approval Workflow" topic for additional information.

5. Enter a **Routing Description** that briefly describes the Routing. Required.
6. Enter a **Class** for the Routing to identify how it is categorized. The **Class Description** assigned to the Class displays.
7. Enter the **Valid From** date for this Routing. The default date is the current system date. Required.
8. Enter a **To** date for the expiration of this Routing. If there is no expiration date for this Routing, leave the field blank.
9. Enter the process **Quantity** for this Routing. This is the total quantity of material for the Routing, and is used to scale individual step requirements. Required.
10. Enter the process Quantity **UOM** associated with this Routing. The process Quantity UOM must interconvert with the UOM defined for Theoretical Process Loss based on the primary product UOM conversion in the Routing. Required.
11. Enter the **Planned Loss** for this Routing. This value is expressed as a percent. For example, a loss of 1.304% would be entered as 1.304.

12. The **Theoretical Process Loss** for this Routing displays. This value is entered on the Theoretical Process Loss window, and is based on the value assigned to the Class associated with this Routing.
13. Enter the **Owner** to indicate the individual who is responsible for initiating this Routing. Required.
14. Enter the **Owner Organization** to indicate the plant, laboratory, or other facility that is responsible for initiating this Routing. Required.
15. **Enforce Step Dependency** is:
    - Selected when the routing enforces step dependency.
    - Cleared when the routing does not enforce step dependency.

Routing Steps

16. Enter the **Step** number to associate with an Operation in this Routing. It is recommended that the first number in this sequence be 10, the second 20, and so forth. This enables you to add intermediate steps between 10 and 20 at a later time. Required.
17. Enter the code for the **Operation** performed in this Routing. Required.
18. Enter a **Version** number for the Routing. Required.
19. The **Description** of the Operation entered displays.
20. Enter the Operation **Step Quantity** as the quantity of material associated with this Step. The **UOM** for the Step Quantity displays.
21. **Min Transfer Qty** is for future use by the Oracle Advanced Planning and Scheduling application. It is intended to reduce overall lead times by defining the minimum amount of material that must be produced in a step at a specific production operation and resource before the next operation can begin. This reduces bottlenecks by letting processes transfer an interim quantity of completed material to the next step without the requirement to complete the entire step.
22. Select the **Release Type** to indicate how the step is released as:
    - **Automatic** if the step is automatically released or completed when subsequent steps are released or completed.
    - **Manual** if the step must be released and completed manually.

    All steps are completed if the batch is completed, regardless of the step release type. Required.

23. Save the window.
24. Optionally, click **Step Dependencies** to display the **Routing Step Dependencies** window.
25. Optionally, click **Edit Operation** to display the **Operation Details Activities** window.
26. Optionally, click **Edit Step Line** to display **Routing Step Line** window.

To mark the routing for deletion:

1. Choose **Mark for Purge** from the **Actions** menu.
2. The record is marked for deletion.
3. Save the window.

To edit the routing text:

1. Choose **Edit Text** from the **Actions** menu.
2. Make the appropriate edits to routing text.
3. Save the window.

To display the Specifications window:

1. Choose **Specifications** from the **Actions** menu. The **Specifications** window displays.
2. Evaluate specifications.
3. Close the window.

To display the Samples window:

1. Choose **Samples** from the **Actions** menu. The **Samples** window displays.
2. Evaluate the samples.
3. Close the window.

To change the routing status:

1. Choose **Change Status** from the **Actions** menu.
2. Change the **Current Status** displayed by selecting a different Status from the **Change Status To** list.

3. Click **OK**.
4. The **Routing Details** window displays the revised **Status** for the routing.

To generate step dependencies:

1. Position the cursor in the routing header.
2. Choose **Generate Step Dependencies** from the **Actions** menu. A message displays to indicate that the dependencies have been generated.
3. Click **OK**.
4. Select the dependent **Step**.
5. Click **Routing Step Dependencies**. The **Routing Step Dependencies** window displays. Enter data as described in the "Entering Routing Step Dependencies" topic.

To duplicate a record:

1. Query the **Routing Details** record you want to duplicate.
2. Choose **New** from the **File** menu.
3. Choose **Duplicate Record Above** from the **Edit** menu.
4. Enter a new **Routing** name and **Version** number.
5. Save the window.

To display the E-Record Details window:

1. Choose **E-Record Details** from the **Actions** menu. The **E-Record Generic Query** displays if this option is implemented in your application.
2. Refer to "Appendix D Oracle E-Records Events in Product Development" for information on e-records.
3. Close the window.

Displaying the Routing Step Line Summary

The Routing Step Line Summary window enables you to determine the step number, operation, step quantity, and unit of measure for the step in a specific routing. You can go to the Routing Step Line window to edit individual lines.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

- ❏ Optionally, enter and save routing classes.
- ❏ Enter and save routings.

◗ To display the routing step summary:

1. Navigate to the **Routing Step Line Summary** window.
2. The following fields are display only:
   - **Step Number** displays the unique number for the step.
   - **Operation** displays the name of the operation associated with the Step Number.
   - **Operation Version** displays the version number of the Operation.
   - **Operation Description** displays a description of the Operation.
   - **Step Quantity** displays the quantity of material being processed by this step.
   - **UOM** displays the unit of measure associated with the Step Quantity.
   - **Minimum Transfer Qty** is for future use by the Oracle Advanced Planning and Scheduling application. It is intended to reduce overall lead times by defining the minimum amount of material that must be produced in a step at a specific production operation and resource before the next operation can begin. This reduces bottlenecks by letting processes transfer an interim quantity of completed material to the next step without the requirement to complete the entire step.
   - **Step Release Type** determines how the step is released, and displays:
   - **Automatic** if the step is automatically released or completed when subsequent steps are released or completed.
   - **Manual** if the step must be released and completed manually.

All steps are completed if the batch is completed, regardless of the step release type.

3. Click **Edit Line** to display the **Routing Step Line** window to edit individual steps.
4. Close the window.

Editing Routing Step Lines

The Routing Step Line window enables you to edit individual step lines.

Prerequisites

- ❏ Optionally, enter and save routing classes.
- ❏ Enter and save routings.

◗ To edit routing steps:

1. Navigate to the **Routing Step Line** window.
2. Enter the desired **Step Number**. This number must be unique.
3. Enter the desired **Operation** to be associated to the Step Number displayed. Required.
4. Enter the desired **Operation Version**. Required.
5. The **Operation Description** displays.
6. Enter the desired **Step Quantity**. Required. The **UOM** displays the unit of measure for Step Quantity.
7. **Minimum Transfer Qty** is for future use by the Oracle Advanced Planning and Scheduling application. It is intended to reduce overall lead times by defining the minimum amount of material that must be produced in a step at a specific production operation and resource before the next operation can begin. This reduces bottlenecks by letting processes transfer an interim quantity of completed material to the next step without the requirement to complete the entire step.
8. Select the **Step Release Type** to indicate how the routing step is released:
   - **Automatic** if the step is automatically released or completed when subsequent steps are released or completed.
   - **Manual** if the step must be released and completed manually.

   All steps are completed if the batch is completed, regardless of the step release type. Required.
9. Save the window.

Entering Routing Step Dependencies

The Routing Step Dependencies window enables you to create and modify the interrelationships between routing steps. Step dependencies are those relationships between routing steps that establish whether a specific step can or cannot start until another step is completed. Routing Step Dependencies reduce the routing development time by establishing a default sequence for operation steps during a production run. Step dependencies are implemented at the routing maintenance level to enable automatic step quantity calculation in recipes.

You are able to define new dependencies or delete the ones you do not want. For example, if step 10 is BAKING and step 20 is the COOLING step, then step 10 must be completed before step 20 can begin. By this definition, step 20 is dependent on the completion of step 10. Step dependencies are used to calculate planned start times however, they can be overwritten.

Any previous step must be validated against any routing currently being edited, and it must not be the same as the current step. Avoid defining circular references, for example Step 10 is less than Step 20 is less than Step 10.

Understanding Routing Step Dependency Selections

Step Dependencies are definable as:

- Finish-to-start with no offset, to indicate that a process step begins immediately after the completion of its preceding step. For example, a consecutive addition of ingredients is required without interruption.
- Finish-to-start with positive offset, to indicate that a process step begins a specified period of time after the completion of its preceding step. For example, time is required to rest material before the addition of another ingredient.
- Finish-to-start with negative offset, to indicate that a process step begins a specified period of time before the completion of its preceding step. For example, a production device needs to be activated before the addition of the next ingredient.
- Start-to-start with no offset, to indicate that a process step begins at the same time as the step it depends on. For example, there is a need for simultaneous addition of ingredients without interruption.
- Start-to-start with positive offset, to indicate that a process step begins a specified time after the beginning of its preceding step. This is similar to finish-to-start with negative offset, but by specifying that the dependency is

start-to-start, you can ensure the positive offset is maintained if the previous dependent step finishes early.

The offset is defined in the Standard Delay field as a positive or negative number. The application uses step dependencies when individual steps are rescheduled.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❏ Enter and save routings.
- ❏ Select a routing step to enter step dependencies.

◗ To enter routing step dependencies:

1. Navigate to the **Routing Step Dependencies** window.
2. The following fields are display only:
   - **Routing** displays the routing in which you want to set up step dependencies.
   - **Routing Version** number displays the version of the Routing.
   - The **Routing Description** displays a brief explanation of the Routing.
   - **Routing Step** displays the step number you selected for step dependency setup.
   - **Operation** displays the operation associated with the Routing.
   - **Operation Version** displays the version number of the Operation.
   - **Operation Description** describes the Operation associated with the Routing.

Dependencies

3. Enter the **Previous Step** that the currently selected step is dependent on. The dependent step must immediately follow the Routing Step entered in this field. Required.
4. The **Operation** associated with the Routing Step displays.
5. The **Version** of the Operation associated with the Routing Step displays.
6. Select **Dependency Type** as:

- **Start-to-start** if the dependent step starts at the same time as the step on which it is dependent.
- **Finish-to-start** if the dependent step starts after the previous step ends. For example, when Step 2 is dependent on Step 1 and there is no specified offset, Step 2 is scheduled to start when Step 1 finishes. If an offset of one hour is specified, Step 2 is scheduled to start one hour after Step 1 ends. You create overlapping steps by defining an Finish-to-start dependency with a negative offset so that Step 2 starts before step 1.

Required.

7. Enter the **Standard Delay** as the standard number of hours from the end of the preceding step to the start of the current step, or the start of the preceding step to the start of the current step, depending on the Dependency Type entered. This field is used to calculate step start times. If you enter a value equal to zero, the step following the current step begins immediately after the step ends or starts. You can enter a negative Standard Delay if the Dependency Type is Finish-to-start in order to create overlapping steps. Required.
8. Enter the **Transfer Percent** as the percentage of material that goes to the dependent step after all products and byproducts are yielded. This percentage is used to calculate the quantity of the dependent step if automatic step quantity calculations are on. For example:
   - If 40 percent of the material from the Previous Step comes into the current Batch Step as a result of 60 percent of the material going to another step, enter 40 for the Transfer Percent.
   - If 90 percent of the material from the Previous Step comes into the current Batch Step as the result of 10 percent being lost to evaporation or being retained by processing equipment, enter 90 for the Transfer Percent. Required.
9. Save the window.

Displaying Theoretical Process Loss

Theoretical Process Loss can vary depending on the routing or the individual quantity being processed by a routing. This loss is defined at the routing level and is based on a minimum and maximum range of quantities.

The Theoretical Process Loss window enables you to enter the theoretical percent loss expected for a range of material processed during a specified routing. For example, if you mix a quantity of material up to 100 pounds, you could predict a loss of 1.50 percent theoretical process loss, or up to 1.5 pounds is lost. However, if you mixed a quantity between 100 and 500 pounds, you might predict a loss of 1.75 percent theoretical process loss, or up to 8.75 pounds lost. The loss could be attributable to equipment, evaporation, or any other aspect of the routing that would not deliver the full quantity of material added.

Prerequisites

- ❏ Enter and save routings.
- ❏ Enter and save routing classes.
- ❏ Optionally, enter and save routing step dependencies.

◗ To display theoretical process loss:

1. Navigate to the **Theoretical Process Loss** window.
2. The following fields are display only:
   - **Routing Class** displays the optional class assigned to the Routing.
   - **Description** displays a brief description of the Routing Class.

Theoretical Process Loss

3. The following fields are display only:
   - **Min Quantity** displays the lower limit for which the displayed Theoretical Process Loss percent applies. Required.
   - **Max Quantity** displays the upper limit for which the displayed Theoretical Process Loss percent applies. Required.
   - **UOM** displays the unit of measure for the minimum and maximum quantities.
   - **Process Loss** displays the loss of process material for a range between the Min Quantity lower limit and Max Quantity upper limit.

Editing Theoretical Process Loss

The Theoretical Process Loss Edit window lets you edit Theoretical Process Loss.

Prerequisites

- ❑ Enter and save routings.
- ❑ Enter and save routing classes.
- ❑ Optionally, enter and save routing step dependencies.

To edit theoretical process loss:

1. Navigate to the **Theoretical Process Loss** window.
2. Query the desired routing **Class**.
3. Enter the desired **Min Quantity** to specify the lower limit for which the displayed Theoretical Process Loss percent applies.
4. Enter the desired **Max Quantity** to specify the upper limit for which the displayed Theoretical Process Loss percent applies.
5. Enter the **Theoretical Process Loss** as a percent. For example, enter 1.32 for a Theoretical Process Loss of 1.32 percent.
6. Save the window.

Understanding the Routing Designer

The step dependency capability that is available on the Routing Details window lets you establish the sequences in which routing steps occur throughout a production run. By establishing step dependency sequences, routing step quantities in the recipe are calculated automatically after the material and step associations are defined.

The Routing Designer lets you define routing step dependencies using a visual network of operations, steps, and activities. All the functions that the Routing Designer performs are accessible using the Routing Details window. The Routing Designer provides an alternate, and more intuitive option that can reduce routing development time.

The Routing Designer is one component of the Recipe Designer. It displays routing steps in a hierarchical navigator structure. The Routing Designer can be used alone or in conjunction with the Recipe Designer.

The Routing Designer provides a view of routing steps in three navigator style display formats:

- Interleaved style, which positions operations, activities, and resources in a left-to-right orientation for each routing with spatial adjustment for each component.
- Organization chart style, which positions operations, activities, and resources in a top-to-bottom orientation for each routing with spatial adjustment for each component as in an organization chart.
- Vertical style, which positions operations, activities, and resources in a left-to-right orientation for each routing with no spatial adjustment for each component.

The drag-and-drop operation lets you organize the step network to get a better view of the sequence in which steps are run.

Understanding Step Dependency Type Connections

The Connect button lets you connect routing steps to develop a routing step network. The shape and color of the line that connects two steps determine the relationship between the two steps.

Two step dependency types are:

- Finish-to-start, represented by a black, single segment, line connection. The line originates at the end of an upstream step and points to the start of the downstream step. The finish-to-start connection indicates the serial property of

the connected steps, since one step must complete before the step following it can start.

- Start-to-start, represented by a blue, multisegment, connection line. The line originates at the start of the upstream step and points to the start of the downstream step. The start-to-start connection indicates the parallel property of the connected steps, since both steps start simultaneously.

Using the Routing Designer

The Routing Designer has two component panes:

- A navigator view of the routing. You can display or hide routing descriptions on the navigator. You can expand components on the navigator by clicking the + sign, or you can collapse components on the navigator by clicking the - sign. Routing components include operations arranged in steps, activities, and resources.
- A routing graph view of the routing step dependencies. Each routing displayed in the pane is composed of a routing icon, step number, and routing code.

The Routing Designer lets you view or update a routing depending on the privileges assigned to you.

Prerequisites

❑ Enter and save operations.

❑ Enter and save activities.

◗ To display a routing in the routing designer:

1. Navigate to the **Routing Designer**. The Find Routings dialog box displays.
2. Click the **Standard** or the **Advanced** tab.

Standard

3. Enter any of the following to narrow your search:
   - **Routing** is the name of the routing.
   - **Version** is the version of the routing.
   - **Description** is a brief description of the routing.
   - **Class** is the class assigned to the routing.
   - **Valid From** is the first date and time that the routing is valid.
   - **Valid To** is the last date and time that the routing is valid.
   - **Process Quantity** is the planned quantity of material to be processed by the resource. This value combined with the usage defines the usage rate.
   - **Status** is the status of the routing.

Advanced

4. In an advanced search of routings select any of the following conditions for one or more **Items** entered:
   - Equal To finds targets equal to the specified Value entered.
   - Greater Than finds targets greater than the specified Value entered.
   - Less Than finds targets less than the specified Value entered.
   - Greater Than or Equal To finds targets greater than or equal to the specified Value entered.
   - Less Than or Equal To finds targets less than or equal to the specified Value entered.
   - Like finds targets similar to the information specified using the wildcard %.

     For example, if you specify the Item as Routing, select the Condition Like, and enter FORM% you find each target Routing that contains entries with the letters FORM.
5. Click **Find**. The search results are displayed.
6. Click the desired routing to display it in the **Routing Designer** window.

To display the Routing Designer from other windows:

1. Navigate to one of the following windows:
   - **Routing Summary**
   - **Routing Header Summary**
   - **Routing Details**
2. Query the appropriate routing.
3. Click **Designer**. The **Routing Designer** window displays.

Identifying Buttons on the Routing Designer

The following discussion and graphic identify and explain each of tools displayed on the Routing Designer tool palette:

- 1 is the Vertical Style button. Click it to display the vertical navigator style. Operations, activities, and resources are positioned in a left-to-right orientation for each routing. There is no spatial adjustment for each component.

- 2 is the Interleaved Style button. Click it to display the interleaved navigator style. Operations, activities, and resources are positioned in a left-to-right orientation for each routing with spatial adjustment for each component.
- 3 is the Org-Chart Style button. Click it to display the organization chart navigator style. Operations, activities, and resources are positioned in a top-to-bottom orientation for each routing with spatial adjustment for each component.
- 4 is the Show/Hide Description button. Click it to display a description of the components shown in the the navigator. Click it again to hide the description.
- 5 is the Save button. Click it to save the changes made on the Routing Designer. This option is not available if the Routing Designer is in the view mode.
- 6 is the Refresh button. Click it to refresh the routing graph pane with data retrieved from the database.
- 7 is the Exit button. Click it to exit from the Routing Designer workbench.
- 8 is the Drag Mode button. Click it to move steps around the graph pane using the drag-and-drop operation. This option is not available if the Routing Designer is in view mode.
- 9 is the Connect Mode button. Click it to build dependencies between steps using the drag-and-drop operation. This option is not available if the Routing Designer is in view mode.
- 10 is the Help button. Click it to display online help for the current window.

The following is a graphic of the previously described tool palette buttons:

To show or hide a routing description using the View menu:

1. Choose **Show Description** from the **View** menu to display routing information.
2. The routing code, routing version, and description display for each routing.

3. Choose **Show Description** from the **View** menu again to hide routing information.

To create a new dependency connecting two routing steps:

1. Click **Connect** to begin building dependencies between two steps. This option is not available if the Routing Designer is in view mode.
2. Click the source or starting step in the routing graph pane.
3. Drag the dependency line to the target step, and drop it.
4. The **Routing Step Dependency Properties** window displays. To override the default step dependency attributes, reenter them.
5. Click **OK**.
6. The application checks the desired connection:
   - If a circular reference is detected, then the application displays:

     A Circular reference has been detected.

     The step dependency is not created.
   - If a step dependency already exists, then the application displays:

     Step dependency already exists.

     The step dependency is not created.
7. Save your work.

To remove a step dependency between two routing steps:

1. Right-click the line connecting two routing steps, then choose **Delete**.
2. The line connecting the two routing steps is removed.
3. Save your work.

Actions Menu Options

You can use options from the Actions menu for the following:

Edit Process Instructions

You can use this Actions menu option to create and maintain processing instructions for a specific step. This option is enabled if a node representing a step

in the navigator is selected. When this option is selected, the Edit Process Instructions window displays.

Edit Routing Header

You can use this option to view or edit routing header information. When you select this option, the Routing Properties window displays.

Edit Step Line

You can use this option to edit a specific step. This option is enabled if a node representing a step in the navigator is selected. When this option is selected, the Step Properties window displays.

Distribute Steps

When opening a routing created in the Routing Details window, the steps appear as one on top of another in the upper left hand corner of the graph. You can use this option to distribute steps and make them visible in the routing step dependency graph.

When selecting Distribute Steps, the following menu options are available:

- Left To Right: Images representing steps in the graph are drawn to create an equal distance between them. Steps are positioned from the left to the right and there is a maximum of three steps per line.
- Top To Bottom: Steps are positioned from the top to bottom. There is a maximum of seven steps per column.

Change Status

You can use this option to change the status of the current routing. If changes have been made to the routing, the system displays a warning message and prompts you to save the changes.

Mark For Purge

You can use this option to delete the current routing. This function is available if the routing is not marked for purge.

Undelete

You can use this option to undelete the current routing. This option is available if the routing is marked for purge.

QC Specification

You can use this option to access the Specifications window in the Oracle Process Manufacturing Quality Management application.

Generate Step Dependencies

You can use this option to generate sequential step dependencies. You can specify the type of dependency and distribute steps through the Generate Step Dependencies window. Enter data as described in the "Entering Routing Step Dependencies" topic.

Preferences

You can use this option to define user preferences using profile options. You can update them using the Profiles window, or the Preferences window within the Routing Designer.

Using the Routing Properties Window

The Routing Properties window displays information about the routing, including its status, version, description, and its valid dates of use. The planned loss and routing quantity are also displayed. Use this window to:

- Edit routing header properties.
- Create new routings.
- Load an existing routing.

To display the Routing Properties window:

1. There are two methods to display the **Routing Properties** window:
   - In the navigator, right-click the routing to display the pop-up menu, then choose **Properties**.
   - In the navigator, click the routing, then choose **Properties** from the **Actions** menu.
2. The following fields are display only:
   - **Status** displays the current status of the Routing.
   - **Routing** displays the name of the routing.
   - **Version** displays the version number of the routing.

- **Description** displays a brief description of the routing.
- **Class** displays the class assigned to the routing.
- **Valid From** displays the first date and time that the routing is valid.
- **Valid To** displays the last date and time the routing is valid.
- **Description** displays a description of the routing class.
- **Quantity** displays the quantity of material associated to the routing with its UOM.
- **Planned Loss** displays the planned loss. It defaults to the theoretical process loss unless otherwise specified.
- **Theoretical Process Loss** displays the theoretical process loss for the routing.
- **Owner** displays the initiator of the routing.
- **Owner Organization** displays the plant, laboratory, or other facility that is responsible for initiating the routing.
- **Enforce Step Dependency** indicates whether the routing enforces step dependencies.

3. Click **OK** to close the window.

Using the Routing Step Properties Window

The Routing Step Properties window displays a summary of the step and its dependencies, and lets you edit step information. The Step Summary tab lets you view the main attributes of a specific step. The Step Dependencies tab lets you display upstream and downstream steps and their individual attributes.

To display the Routing Step Properties window:

1. There are three methods to display the **Routing Step Properties** window:
   - In the navigator, right-click the routing step, then choose **Properties**.
   - In the navigator, click the routing step, then choose **Properties** from the **View** menu.
   - In the routing graph pane, double-click the routing step.

Step Summary

2. The Step Properties window displays the following fields:
   - **Step** displays the number of the selected routing step. Required.
   - **Operation** displays the operation code for the selected routing step. This field is display only and cannot be updated.
   - **Version** displays the version of the operation for the selected routing step.This field is display only and cannot be updated.
   - **Description** displays a description of the operation for the selected routing step. This field is display only and cannot be updated.
   - **Class** displays the class code of the operation if an operation class is associated to the routing step.
   - **Description** displays a description of the class if an operation class is associated to the routing step. This field is display only and cannot be updated.
   - **Quantity** displays the quantity of the selected routing step in the routing and its **UOM**. Required.
   - **Max Capacity** displays the maximum capacity of the routing step.
   - **Charges** displays the number of charges in the routing step.
   - **Release Type** of the step defaults to Manual. Possible values are Manual or Automatic. Required.

Step Dependencies

3. Select one of the following from the list:
   - **Incoming Steps** to display incoming dependencies of routing steps that are upstream to the currently selected routing step.
   - **Outgoing Steps** to display outgoing dependencies of routing steps that are downstream to the currently selected routing step.
4. The following fields are display only and depend on the selection you make in step 3:
   - **Step** displays the routing step number of the upstream or downstream routing step.
   - **Operation** displays the operation code of the upstream or downstream routing step.

- **Version** displays the operation version of the upstream or downstream routing step.
- **Quantity** displays the quantity of the upstream or downstream routing step and its **UOM**.
- **Transfer %** displays one of the following:

– If Incoming Steps is selected, then it is the percentage of the routing step quantity that transfers from the routing step shown in the list to the selected routing step.

– If Outgoing Steps is selected, then it is the percentage of the routing step quantity that transfers from the selected routing step to the routing step shown in the list.

- **Transfer Quantity** displays one of the following:

– If Outgoing Steps is selected, then it is the routing step quantity that transfers from the selected routing step to the routing step shown in the list.

– If Incoming Steps is selected, then it is the routing step quantity that transfers from the routing step shown in the list to the selected routing step.

5. Click **OK** to close the window.

Generating Step Dependencies

You can use this option from the Actions menu to generate sequential step dependencies. Enter data as described in the "Entering Routing Step Dependencies" topic.

Using the Activity Properties Window

The Activity Properties window displays the properties of the selected activity including a brief description, the activity factor, and the optional offset interval.

To display the Activity Properties window:

1. There are two methods to display the **Activity Properties** window:
   - In the navigator, right-click the activity, then choose **Properties**.
   - In the navigator, click the activity, then choose **Properties** from the **View** menu.

   The **Activity Properties** window displays.

2. The following fields are display only:
   - **Activity** displays the activity code.
   - **Description** displays a description of the activity.
   - **Factor** displays the activity factor.
   - **Offset Interval** displays the activity offset interval.
3. Click **OK** to close the window.

Using the Resource Properties Window

The Resource Properties window has two tabs:

- **Resource Summary** displays the main attributes of a specific resource.
- **Process Parameters** displays the process parameters defined for the selected resource.

◗ To display the Resource Properties window:

1. There are two methods to display the **Resource Properties** window:
   - In the navigator, right-click the resource then choose **Properties**.
   - In the navigator, click the resource, then choose **Properties** from the **View** menu.

   The **Resource Properties** window displays.

Resource Summary

2. The following fields are display only:
   - **Resource** displays the resource code.
   - **Description** displays a description of the resource.
   - **Quantity** displays the resource quantity and its **UOM**.
   - **Usage** displays the resource usage and its **UOM**.
   - **Class** displays the resource class.
   - **Description** displays the resource class description.
   - **Plan Type** displays:

- **Auxiliary** for a resource that works with the primary resource to perform an activity.
- **Primary** for a rate determining resource that limits or determines throughput. It is also referred to as the bottleneck or critical resource.
- **Secondary** for a resource that would replace the primary resource when it is not available. This resource performs the same task as the primary resource, but can have a different usage.

- **Count** displays the number of resource instances used.
- **Offset** displays the value entered for Standard Delay.
- **Scale Type** displays the scale type used.

Process Parameters

3. **Process Parameter** is the process parameter name. For example, Bath Temperature.
4. **Target** indicates the target value for the process parameter.
5. **Minimum** is the lowest acceptable value for a numeric range type of process parameter.
6. **Maximum** is the highest acceptable value for a numeric range type of process parameter.
7. Click **OK** to close the window.

Using the Routing Step Dependency Properties Window

The Routing Step Dependency Properties window displays the source and destination step dependency properties. It also displays the dependency type, standard delay, transfer percent, and transfer quantity. Step Dependency properties include a dependency type and an offset defined by the value entered for Standard Delay. The offset is defined in the Standard Delay field as a positive or negative number. The application uses step dependencies when individual steps are rescheduled. Dependency type and standard delay offsets are:

- Finish-to-start with no offset, to indicate that a process step begins immediately after the completion of its preceding step. For example, a consecutive addition of ingredients is required without interruption.

- Finish-to-start with positive offset, to indicate that a process step begins a specified period of time after the completion of its preceding step. For example, time is required to rest material before the addition of another ingredient.
- Finish-to-start with negative offset, to indicate that a process step begins a specified period of time before the completion of its preceding step. For example, you need to activate a production device before the addition of the next ingredient.
- Start-to-start with no offset, to indicate that a process step begins at the same time as the step it depends on. For example, there is a need for simultaneous addition of ingredients without interruption.
- Start-to-start with positive offset, to indicate that a process step begins a specified time after the beginning of its preceding step. This is similar to finish-to-start with negative offset, but by specifying that the dependency is start-to-start, you can ensure the positive offset is maintained if the previous dependent step finishes early.

Operation Charge Step Dependencies

The application calculates how much material is to be processed by each step, taking into account the step dependencies, and the input and output of material associated with the individual step. This information is used to calculate the number of charges required to satisfy the demand based on the maximum capacity of the selected process element. The process element can be a resource, an activity, or the step itself.

When you change the planned quantity of a material, the application recalculates all dependent quantities in the recipe. An option is available at the routing level to indicate whether step quantities are manually maintained or automatically calculated by the application. The prerequisites of the step quantity calculation are the creation of step dependencies and the association of material to each appropriate step. You can apply the defined dependency to each charge to enhance the scheduling of charges. The principle is to apply the dependency to the first charge. If the run rate of the downstream process is not equivalent, then the dependency is applied to the first and last charge. This functionality applies to users of the Oracle Advanced Supply Chain Planning application.

For example, step 10 yields a charge in 100 pound increments. Step 20 consumes that material by charge in the same increment. The yield at the end of the charge determines the timing for the material, so you define a finish-to-start relationship and select the Chargeable indicator. Step 20 starts its first charge at the end of the first charge for step 10.

To display the Routing Step Dependency Properties window:

1. There are three methods to display the **Routing Step Dependency Properties** window:
   - In the right pane, click the starting routing step and hold down the left mouse button as you draw a connection line to the target routing step. Release the left mouse button. This prompts you to validate or override the default values displayed for the routing step dependency attributes.
   - In the right pane, double-click the line connecting two routing steps.
   - In the right pane, right-click the line connecting two routing steps, then choose **Properties**.

Source

2. The following fields are display only:
   - **Step** displays the routing step number of the source routing.
   - **Apply Per Charge** indicator allows the dependency to be applied to the charges and not the operation as a whole.
   - **Operation** displays the operation code of the source operation.
   - **Version** displays the version of the source operation.
   - **Description** displays a description of the source operation.
   - **Quantity** displays the source routing step quantity.
   - **UOM** displays the unit of measure for the step quantity.

Destination

3. The following fields are display only:
   - **Step** displays the routing step number of the destination operation.
   - **Operation** displays the operation code of the destination operation.
   - **Version** displays the version of the destination operation.
   - **Description** displays a description of the destination operation.
   - **Quantity** displays the destination routing step quantity and its **UOM**.

Dependency Type

4. Select one of the following:

- **Finish-to-start** for operations that begin immediately after the completion of the previous routing step, or with a specified standard delay. This is the default that you can override.
- **Start-to-start** for operations that begin at the same time, or with a specified standard delay.

5. **Standard Delay** displays the positive or negative time offset between routing steps. It is the number of hours from the end of the source routing step to the start of the destination routing step. The default is zero. You can enter a value to override the default.
6. **Transfer %** displays the percentage of material that goes to the dependent routing step after all products and byproducts are yielded. This percentage is used to calculate the quantity of the dependent routing step if automatic routing step quantity calculations are on. You can enter a value to override the default.
7. **Transfer Quantity** displays the quantity transferred from the source routing step to the destination routing step and its **UOM**. It is calculated as:

   Transfer Quantity = Routing Step Quantity * Transfer %
8. Click **OK** to close the window.

To display a full description of a routing step:

Position the cursor over a routing step in the graph to display a full description of the routing step.

To display the transfer percentage of a routing step:

Position the cursor over a routing step dependency line to display the transfer percentage of material.

Accessing Quality Control Windows

You can display the Specifications window in the Oracle Process Manufacturing Quality Management application as follows:

1. Select **Routing** in the navigator pane.
2. Choose **QC Specifications** from the **Actions** menu.

Refer to the *Oracle Process Manufacturing Quality Management User's Guide* for more information on specifications.

Adding Operation Steps

The operation list is a component below the Routing navigator and displays operations from the operation master table. This list serves as the source for adding operations to the routing. This list is not available if the routing is in view mode.

◗ To add a new operation step:

1. If the operation list does not display, then click **Show/Hide Operation Master**. The operation list displays below the navigator.
2. Select an operation from the list and associate it to the routing in the navigator or in the Routing Dependency Graph pane.

   When adding a step to the routing, the application validates the operation and displays the Operation Step Properties window. You can review and override the default values in this window.
3. Save your work.

Removing Operation Steps

◗ To remove a step in the routing:

1. Use one of these methods to remove a step in the routing:
   - Select the step in the navigator and choose **Cut** from the **Edit** menu.
   - Select the step in the **Routing Dependency** graph pane, and choose **Delete** from the right-click menu.

   When removing an operation step, all incoming and outgoing dependencies are also removed. Changes are displayed in the Routing Graph pane and in the Process Instruction Sheet pane simultaneously.
2. Save your work.

Editing User Preferences

The Preferences window contains three tabs:

- The Routing tab lets you customize the behavior of the application when adding a new step to a routing and creating a dependency between two steps.
- The Step Dependency Graph tab lets you customize the routing step dependency graph.

- The Process Instructions tab lets you specify the language for displaying and maintaining process instructions.

To edit preferences:

1. Select **Preferences** from the **Actions** menu.
2. Click each tab to enter user preference details.
3. Click **OK** to save.

6

Recipes

This topic shows you how to define and maintain recipes. You are shown how to find a recipe. You are also shown how to display a summary of recipes and recipe headers. Procedures to enter recipe details, recipe organization details, and edit validity rules demonstrate the process flow for recipe development. You learn how to display and interpret recipe validity rules and how to display the recipe step and material association.

The following topics provide a basic understanding of recipes:

- Displaying Validity Rules By Recipe
- Generating a Recipe and Validity Rule Automatically
- Displaying the Recipe Step/Material Association
- Understanding the Recipe Designer
- Using the Recipe Designer
- Creating a Formula in the Recipe Designer
- Using the Process Instruction Sheet
- Expanding and Collapsing Nodes
- Editing User Preferences

Understanding Recipes

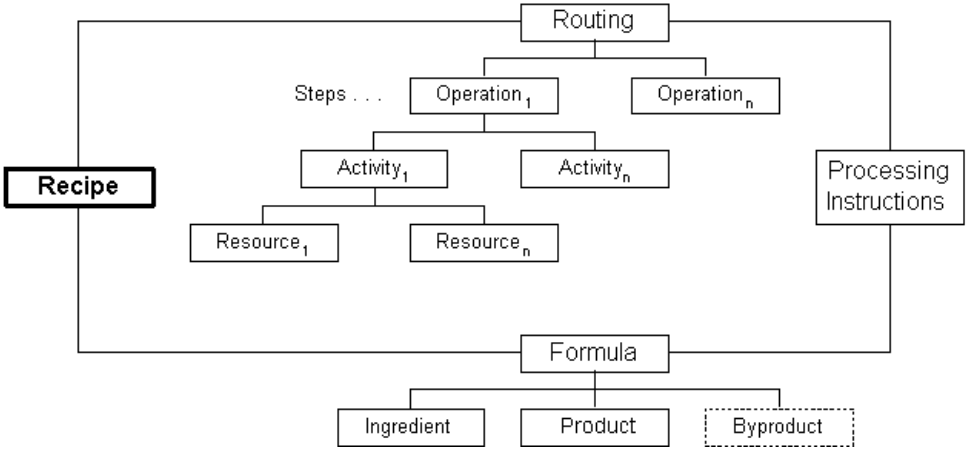
Recipes standardize the structure of all information that describes production of one or more products. Recipes have:

- Formulas that define the relationship of material resources (products, ingredients, and byproducts).
- Routings that define the relationships of nonmaterial resources (labor and equipment operations with activities and their associated resources). Routings are optional.
- Processing instructions that encompass the work instructions needed to produce the products.

To provide the greatest flexibility to process manufacturers, formulas and routings are built independently. They are linked using a Recipe that has validity rules. Different formulas can use the same routing, or one formula can be associated to several different routings.

Recipes are depicted hierarchically in the following diagram that shows the:

- Routing composed of a series of Operations organized in Steps.
- Operations composed of Activities containing Resources.
- Formula composed of Ingredient, Product, and possibly Byproduct.
- Recipe linking the Routing and Formula together with Processing Instructions.



Requirements

Following are some requirements that customers have for recipes in Product Development. The answers are explained in detail in the Solutions topic.

Does the application support effectivities already developed for in-house formulas?

Yes. Migrate Effectivities to Recipe Validity Rules with special scripts provided by Oracle.

Is there one place in the application that shows exactly how to make a product?

Yes. Use the Recipe Details window. After evaluating the information on the Recipe Details window, display Organization Details, Validity Rules, and the Recipe Step and Material Association needed to determine exactly how to make a product.

Does a Product Development recipe support Cost Management and Production Execution requirements?

Yes. By linking input and output of materials to individual operation steps and providing an automatic step quantity and charge calculation, the application supports the requirements for accurate cost rollup and flexible production execution.

Can an item be made differently depending on the manufacturing plant or the time of year?

Yes. Recipes enable rule based execution. By applying this logic to formula selecting, plant specific and seasonal formulations are possible.

Does the application support SP88 terms for batch manufacturing?

Yes. The application offers enhanced standards for Master Recipe definition.

Solutions

Product Development provides solutions to help resolve issues at every stage of the product development process. The following represent some of the key performance solutions for recipes.

Migrate Effectivities with Scripts Oracle provides a customized series of scripts that migrate existing formula information into the Product Development application.

Use the Recipe Details Window to Determine All Product Manufacturing Requirements The Recipe Details window displays all product manufacturing requirements. In each step of building a new product, components are created that appear on the Recipe Details or the Organization Details windows.

Use Recipes as the Foundation for Cost Management and Production Execution Where routings are used to specify process related requirements such as equipment, labor, and energy, the recipe defines the input and output of each operation step. This is achieved by linking formula materials and quantities to appropriate routing steps, and is a prerequisite to enabling automatic step calculation.

Enhance Product Consistency with Rule-Based Execution If not managed appropriately, manufacturing variability can lead to product inconsistency and complexity. Rule-Based Execution enhances product consistency and manufacturing simplicity by letting planners, quality control specialists, and cost accountants specify the conditions under that recipe components must be applied. When a recipe is needed for production, planning, or costing purposes, the application selects the appropriate version to support the activity. This capability improves consistency by applying rule-based logic to formula selection for use in specific environments and under specific conditions based on status.

Product Development uses Validity Rules that are based on several key factors including date, production site, plant, customer, and required quantities. Some recipes are seasonal and based on ingredient availability. Other recipes are determined by whether they are small, medium, or large production runs. Different plants can use different versions of a target recipe, so the choice of recipe depends on the plant that is producing the batch. By using Validity Rules an organization can set the standard quantity and effective dates of a recipe to specify what, where, when, and how formulas, recipes, routings, and operations must be applied.

With rule-based execution, production gains a tighter control over the business and is able to select an optimized recipe. When several recipes have overlapping validity dates, business logic selects the optimum valid recipe.

Offer Enhanced Industry Standards for Recipe Definition The concept of effective date is refined into a recipe structure that complies with industry standards for recipe definition. A Master Recipe combines a formula and a routing at a global level to streamline the overall approval process. The Master Recipe serves as the basis for subsequent planning, manufacturing, and costing, calculations.

Defining and Maintaining Recipes

Recipes contain the minimum set of information that uniquely defines the manufacturing requirements for a specific product. Recipes provide a way to describe products and how those products are produced.

Creating a New Recipe

Create and define new recipes on the Recipe Details window. You can access this window if the GMA: Default Organization profile is a manufacturing organization, and the organization is set up using the User Organizations window. To create a new recipe, you can specify product code and quantity, or formula number and version. If you enter product code and quantity, you get a list of all valid or effective formulas. Select the one you want to use to create the recipe. You also have the option to specify a routing in the recipe. You can override routing attributes such as Capacity, Activity Factor, Charges, and Resource Usage for each recipe you define. If a recipe is set up for Automatic Step Quantity Calculation, then you must ensure that formula material is properly associated to each appropriate routing step. You can display the following windows from the Recipe Details window:

- Recipe Organization Details
- Recipe Validity Rules
- Recipe Step/Material Association

Maintaining Recipes

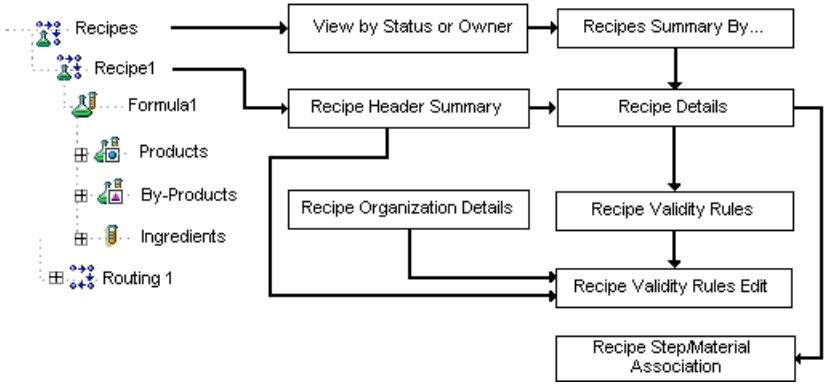
Use the following windows to maintain recipes:

- Recipes Summary By... to display a list of defined recipes with their individual version numbers and descriptions. These can be viewed by Status or Owner. You can display the Recipe Details window from the Recipes Summary By window.
- Recipe Header Summary to display important descriptive information regarding a particular recipe. You can display the following windows from the Recipe Header Summary window:
  - Recipe Validity Rules
  - Recipe Details
- Recipe Organization Details to display and, if necessary, override information defined for specific operations and routings at the Organization level. You can

display the Recipe Validity Rules window from the Recipe Organization Details window.

- Recipe Validity Rules is a multi-record window to enter or edit a complete list of Validity Rules for Organizations you can access.
- Recipe Validity Rules also enables you to edit validity rules for a specific recipe.
- Recipe Step/Material Association to display all items from the recipe's formula and associate them with specific routing steps.

The following graphic depicts the previously described recipe navigation flow:



Finding a Recipe

The Find Recipes window enables you to find a specific recipe. At least one search parameter needs to be entered.

Prerequisites

❑ Enter and save recipes.

◗ To find a recipe:

1. Navigate to the **Find Recipes** window.
2. Enter as many parameters as needed to complete the search:
   - Enter search parameters in the **Standard** region for: **Recipe**, **Description**, **Formula**, **Routing**, or **Product** with appropriate **Version** for Recipe, Formula, or Routing. You can also enter **Organization**, **Customer**, **From Date**, **To Date**, **Status**, and **Recipe Use**.
   - Enter search parameters in the **Advanced** region for a specific: **Item**, **Condition**, or **Value**.
3. Click **Find**.
4. Review the results of the search
5. Close the window.

Displaying the Recipes Summary

The Recipes Summary window displays a list of all defined recipes with their individual version numbers and descriptions. You can display these by Status or Owner. Multilingual support is provided for the Recipe Description.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❏ Enter and save recipes.
- ❏ Use the View By list to select how you want to view the summary of recipes. Select one of the following:
  - Status to display the list by recipe status.
  - Owner to display the list by recipe owner.

◗ To display a list of all defined recipes:

1. Navigate to the **Recipes Summary By...** window.
2. The following fields are display only:
   - **Recipe** is the recipe code.
   - **Version** is the version of the Recipe.
   - **Description** is a brief explanation of the Recipe.
   - **Status** displays the current status for the Recipe.
   - **Product** displays the code for the primary product produced by the Recipe.
   - **Owner Organization** displays the default organization for the Owner of the Recipe.
3. The following fields display for each selected recipe.
   - **Formula** is the formula for the currently selected Recipe.
   - **Formula Version** is the Version of the Formula for the currently selected Recipe.
   - **Routing** is the Routing for the currently selected Recipe.
   - **Routing Version** displays the Version of the Routing for the currently selected Recipe.
4. Click **Details** to display the **Recipe Details** window.

Displaying the Recipe Header Summary

The Recipe Header Summary window enables you to display important descriptive information regarding a particular recipe.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

❑ Enter and save recipes.

◗ To display recipe header information:

1. Navigate to the **Recipe Header Summary** window.

Summary

2. The following fields are display only:
   - **Status** is the current status of the Recipe.
   - **Recipe** is the name of the Recipe.
   - **Version** is the version of the Recipe.
   - **Description** is a brief explanation of the Recipe.
   - **Formula** is the Formula number used in the Recipe.
   - **Version** is the version of the Formula with its **Description**.
   - **Main Product** is the end item in the Formula.
   - **Total Output Qty** is the total output of material in the Formula **UOM**.
   - **Routing** is the routing number.
   - **Version** is the Routing version with its **Description**.
3. Click **Products** to display the **Formula Product Summary** window.
4. Click **Details** to display the **Recipe Details** window.

Validity Rules

5. The following fields are display only:
   - **Organization** displays the plant or laboratory organization code.
   - **Product** displays the coproduct of the Formula.

- **Recipe Use** displays if the Recipe is used in Production, Planning, Costing, or Technical class and subclass determination.
- **Status** displays the Status of the Validity Rules.

6. Click **Details** to display the **Recipe Validity Rules** window.

Customers

7. The following fields are display only:
   - **Customer** displays the customer number.
   - **Name** displays the customer name.

Understanding Step Quantity Calculations

The quantity of material required in a specific step is dependent on the weight of material that passes into and out of that step. Input material consists of ingredients that are injected directly into steps or material that is transferred from preceding steps.

The following example shows how material can be input, transferred, and output from a series of production steps.

Step 1: Add 10 pounds of Ingredient 1 to 25 pounds of Ingredient 2. The result is 5 pounds of Byproduct 1 and 30 pounds of Intermediate 1. Transfer of Intermediate 1 is as follows:

- 25% or 7.5 pounds to Product 1
- 35% or 10.5 pounds to Step 2
- 40% or 12 pounds to Step 3

Step 2: Transfer of 10.5 pounds of Intermediate 2 is as follows:

- 25% or 2.625 pounds to Step 3
- 75% or 7.785 pounds to Product 1

Step 3: Add 12 pounds of Ingredient 3 to the mixture of Intermediate 1 and Intermediate 2. This yields 3 pounds of Byproduct 2 and 23.625 pounds of Intermediate 3.

The final yield of Product 1 consists of:

- 7.500 pounds from Step 1
- 7.785 pounds from Step 2
- 23.625 pounds from Step 3

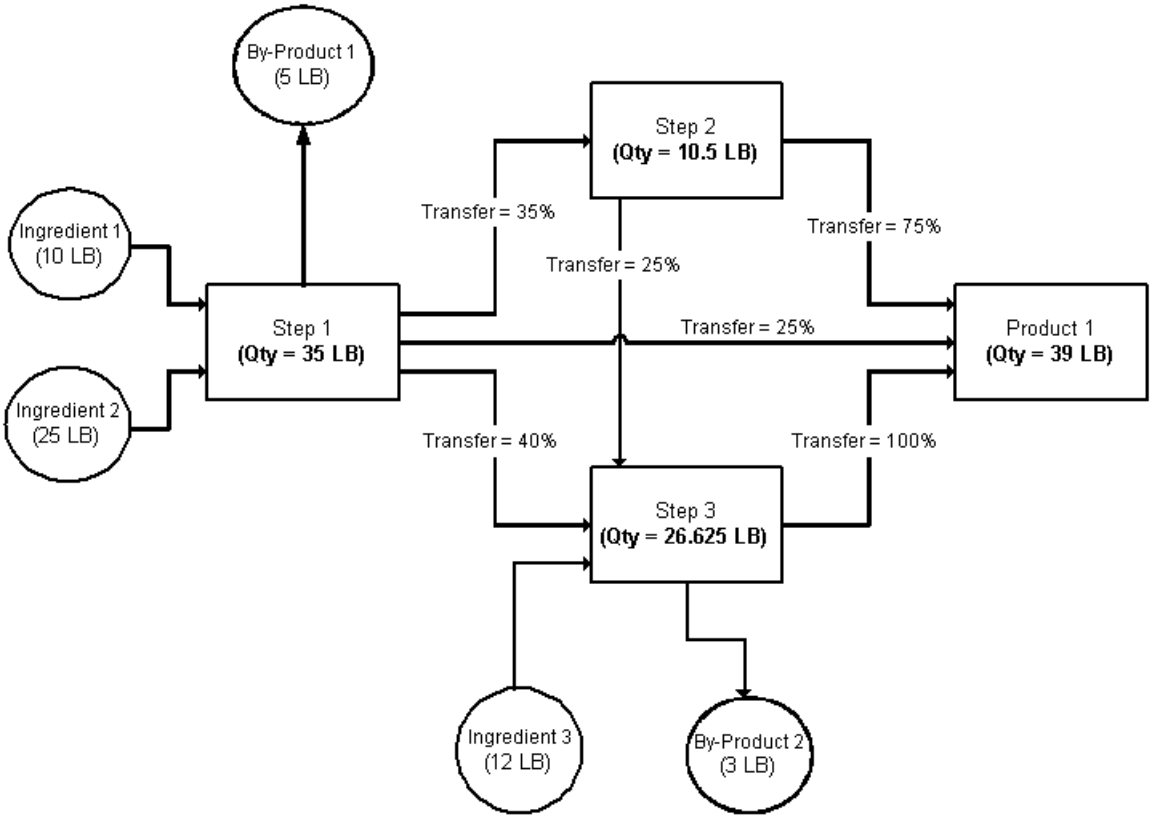
Total Product 1 produced is 39 pounds.

Total Byproduct produced is 8 pounds, and is comprised of:

- 5 pounds of Byproduct 1
- 3 pounds of Byproduct 2

In this example, there is yield is 100%. There is no process loss in the transfer of material.

The following depicts the previously described example. LB is equal to pounds.



Entering Recipe Details

The Recipe Details window enables you to enter the details for a specific recipe. A Plant or a Laboratory can be associated with all the materials and resources required to make a product at the recipe level. One or more customers can be associated to the recipe for informational purposes.

E-Record and E-Signature Approvals

There may be an e-signature event associated with this window. Refer to "Appendix D Oracle E-Records Events in Product Development" for additional information on e-record and e-signature approvals associated with this window.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

- ❑ Optionally, enter and save operations.
- ❑ Optionally, enter and save routings.
- ❑ Enter and save formulas.
- ❑ Set up the default Organization.
- ❑ Set up the GMA: Default Organization profile option.

Understanding Step Quantity Calculations

When you select the Calculate Step Qty indicator on the Recipe Details window, the application checks to determine if there are proper step quantity material associations. You must use a routing. Step and material associations must be made. If any of these associations are defective, then you receive an error message. When you use the Automatic Step Quantity Calculation, it checks quantities in each step to verify that material is available to pass into and out of each step. The quantity of material for a particular step is dependent on the quantity of material that passes into or out of it. The input material can be either the ingredient that is injected directly into the step, or it can be the output of preceding steps. Output is represented typically by coproducts or byproducts.

◗ To enter recipe details:

1. Navigate to the **Recipe Details** window.
2. Enter the code for the **Recipe** to be entered. Required.

3. Enter a **Version** of the Recipe. Required.
4. Enter a **Description** for the Recipe. Required.
5. After entering all relevant information and saving the Recipe with the default Status of **New**, return to this window if you need to change Recipe Status by selecting **Change Status** from the **Actions** menu. Depending on whether Workflow is enabled, a different set of statuses is available.

   Select a **Status** for the Recipe you are entering from one of the following:

   - **Approved for Laboratory Use** to indicate that the Recipe is approved for laboratory use.
   - **Approved for General Use** to indicate that the Recipe is approved for use in production.
   - **Obsolete/Archived** to indicate that the Recipe is no longer approved for use and is obsoleted, archived, or both.

   If Workflow is enabled, when you select:

   - **Approved for Laboratory Use**, then Status changes to **Request Approval for Laboratory Use** until all approvers have accepted the Recipe, then its Status changes to Approved for Laboratory Use.
   - **Approval for General Use,** then Status changes to **Request Approval for General Use** until all approvers have accepted the Recipe, then its Status changes to Approved for General Use.

   Recipe status cannot be changed to an approved status if the formula and routing are not yet approved. For example, the formula and routing must be Approved for General Use before the recipe status can be changed to Approved for General Use. If you change the status of a recipe to Obsolete, Archived, On-hold, or Frozen, validity rules associated to that recipe change to that status.

   You can change the status of recipes or validity rules to On-hold or Obsolete even if they are used in batches as long all these batches are closed or cancelled.
6. Enter the main **Product** for the Formula associated with this Recipe. If you enter a new Recipe, enter the Formula to fill this field automatically.
7. The Output **Quantity** displays the sum of all materials. **UOM** indicates the unit of measure for the Formula associated with this Recipe.
8. Enter the **Formula** number for the Recipe. Required. Once a recipe is saved, this field cannot be edited. You cannot use an inactive Formula in a recipe. The formula **Version** displays. Required.

9. **Creation Organization** displays the organization code for the initial Owner. This field is not updateable for an existing Recipe. Required.
10. Enter a **Routing** number for the Recipe. A routing can be added to an existing Recipe. The **Version** for the Routing entered displays.
11. **Theoretical Process Loss** displays the hypothetical loss of process material associated to a routing as a percentage. If no routing is associated to a recipe, or if no routing class is associated to a given routing, and no Process Loss is defined for that routing, this field is blank.
12. Enter the **Planned Process Loss** as the loss of process material observed during production of a batch using the recipe. If no value is entered in this field, it defaults to the Theoretical Process Loss. You can change this value on a New or existing recipe.
13. **Total Output Qty** displays with its **UOM**.
14. Enter the **Laboratory** that has current ownership of the recipe. This is a Folder field.
15. Enter the **Owner Organization**. This field is the default organization for the Owner of the Recipe. In order for you to enter or edit information for the Recipe, you must have an association with this organization and permission to access and change this field. Required.
16. Enter the **Owner** of the Recipe. The Owner name must be a valid User name. This field defaults to the current User. Required.

Note: You must enter all information on this window before you select the Calculate Step Qty check box.

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17. The **Calculate Step Qty** check box indicates whether you want to enter step quantities manually or have the application calculate them for you.
    - Select the **Calculate Step Qty** check box to enable the application to calculate step quantities automatically. Quantities are based on the amount of materials that go into and out of each supported step. Step Quantity fields cannot be entered after you select the check box. You must associate all items marked as contributing to step quantity to specific Steps on the **Recipe Step/Material Association** window.
    - Clear the **Calculate Step Qty** indicator to enter step quantities manually. Step quantities are calculated using routing step quantity, total output quantity of formula, and routing header quantity.

Plant/Laboratory

18. The following fields are display only:
    - **Organization** displays the Organization code that the Process Loss is being defined for. This must be a plant or a laboratory. Required.
    - **Organization Name** displays a description of the plant or laboratory.
    - **Type** indicates whether this is a plant or a laboratory.
    - **Process Loss** displays the material that is lost through the process. This field is blank if you did not enter a Routing. This field allows you to override the default Process Loss.

Customer

19. Enter the **Customer** number. Required.
20. **Name** indicates the name of the Customer associated with the Customer number entered.

Step Quantity

If a routing has not been entered, this region is not available. If you calculate step quantities in the Automatic Step Quantity Calculation, the Step Material Associations need to be entered.

21. **Step** indicates the step number associated with the listed Operation in the displayed Routing. Steps cannot be added or deleted here. However, if a step is deleted in the base routing used for this Recipe, and the Step field is overwritten, you must choose **Delete** from the **Edit** menu to delete the orphaned Step. Charges are calculated for each Step displayed. You can associate text with each Step.
22. **Operation** displays the operation associated with the Step. The operation **Version** and **Description** are displayed.
23. **Step Quantity** indicates the default quantity of material associated with the Step. The **UOM** for the Step Quantity displays. You can enter a new value in the Step Quantity field if you do not use the Automatic Step Quantity Calculation. If Automatic Step Quantity Calculation is used, this field is not enterable. Required if the Step is associated to material, and you are not using Automatic Step Quantity Calculation. Required.
24. **Charges** displays the total calculated charges for the step. Charges are the number of times the Operation must be performed to complete the Step for the specified Step Quantity. For example, a mixer that holds 50 kg would require

two charges to process 100 kg of material. Charges are calculated from the smallest minimum capacity for all resources in the Step. Calculation of charges is based on the resources defined at the more granular level. If a resource is defined at plant resource level, then the maximum capacity defined at the plant is used rather than the maximum capacity defined at the generic resource level.

25. Optionally, click **Organization Details** to display the **Recipe Organization Details** window.
26. Optionally, click **Validity Rules** to display the **Recipe Validity Rules** window.
27. Optionally, click **Step/Material Association** to display the **Recipe Step/Material Association** window.
28. Save the window.

To mark a recipe for deletion:

1. Choose **Mark for Purge** from the **Actions** menu.
2. The record is marked for deletion.
3. Save the window.

To copy a recipe:

1. Select the **Recipe** to copy.
2. Choose **Copy** from the **Edit** menu. Copying a recipe creates a new recipe. All header fields in the the new recipe are editable. You must change the recipe number or recipe version in the copied recipe before saving it. Duplicate recipe names are not allowed. The current Owner and Organization are assigned to the new recipe. Recipes that have been marked for deletion cannot be copied.
3. Click **OK**.

To edit text:

1. Choose **Edit Text** from the **Actions** menu.
2. Enter appropriate text.
3. Save the window.

Duplicating a Recipe

You can duplicate a recipe, routing, and validity rules from an existing record. If you change the routing end date prior to saving the record, then the application

checks the routing end date against the validity rule end date. If the validity rule end date is greater than the routing end date, or blank, then the application assigns the value of the routing end date to the validity rule end date.

To duplicate a recipe:

1. Query the **Recipe Details** record to duplicate.
2. Choose **New** from the **File** menu.
3. Choose **Duplicate Record Above** from the **Edit** menu.
4. Enter a new **Recipe** name and **Version** number.
5. Save the window.

To display the Formula Details window:

1. Choose **Formula** from the **Actions** menu. The **Formula Details** window displays.
2. Close the window.

To display the Routing Details window:

1. Choose **Routing** from the **Actions** menu. The **Routing Details** window displays.
2. Close the window.

To display the E-Record Details window:

1. Choose **E-Record Details** from the **Actions** menu. The **E-Record Generic Query** displays if this option is implemented in your application.
2. Refer to "Appendix D Oracle E-Records Events in Product Development" for information on e-records.
3. Close the window.

To display the Specifications window:

1. Choose **Specifications** from the **Actions** menu. The **Specifications** window displays.
2. Evaluate specifications.
3. Close the window.

To display the Samples window:

1. Choose **Samples** from the **Actions** menu. The **Samples** window displays.
2. Evaluate the samples.
3. Close the window.

Using the View Menu to Find a Recipe

The Find selection on the View menu enables you to find a recipe. At least one search parameter needs to be entered.

To find a recipe from the View menu:

1. Navigate to the **Recipe Details** window.
2. Choose **Find** from the **View** menu.
3. Enter search parameters for: **Recipe**, **Version**, **Description**, **Status**, **Product**, **Description**, **Formula**, **Version**, **Routing**, **Version**, **Owner**, **Owner Organization**, **Laboratory**, or **Marked for Deletion**.
4. Click **Find**.

Entering Recipe Organization Details

The Recipe Organization Details window enables you to display and, if necessary, override information defined for specific operations and routings at the plant or laboratory level.

E-Record and E-Signature Approvals

There may be an e-signature event associated to this window. Refer to "Appendix D Oracle E-Records Events in Product Development" for additional information on e-record and e-signature approvals and workflow processes associated with this window.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Enter and save recipes.

◗ To enter recipe organization details:

1. Navigate to the **Recipe Organization Details** window. The **Find Recipe Organization Details** window displays.
2. Enter the **Organization** that owns the recipe. Required.
3. Click **Find**.
4. The following fields are display only:
   - **Organization** indicates the code for the Plant or Laboratory that owns the recipe.
   - **Type** displays **Plant** if the Organization is a plant, or a **Laboratory** if the Organization is a laboratory.
   - **Organization Name** displays the description assigned to the Organization. This field defaults to the entry from the Recipe Details window. Required.
   - **Planned Process Loss** displays the loss of process material observed during production of a batch using the recipe as a percentage. You can enter and save a different Planned Process Loss value for the recipe used in the Organization displayed. This value defaults to the Theoretical Process Loss when no entry is made on the Recipe Details window.

- **Theoretical Process Loss** displays the hypothetical loss of process material associated to a routing. If no routing is associated to the recipe, this field is blank.

Validity Rules

5. Enter a **Product** for the formula used in the recipe. Required.
6. **Recipe Use** displays if the recipe is used in Production, Planning, Costing, or Technical when it is used to define technical classes and subclasses. Required.
7. Enter the **From Date** as the date the Validity Rule becomes effective. The date must be within the effective date for any routing associated to the recipe. Required.
8. Enter **To Date** as the date to stop using the Validity Rule. This is an optional field and must be left blank if no expiration date is defined for the Validity Rule.
9. **Status** displays the status of the Validity Rule entered on the Recipe Validity Rules window.
10. Enter the **Std Qty** as the usual quantity of product produced by the Validity Rule.

    If the Automatic Step Quantity Calculation is not used, then the step quantities are based on the routing, and are scaled to this quantity. If the Automatic Step Quantity Calculation is used, then step quantities are based on the formula that is scaled to the this quantity. Required.
11. Enter the **UOM** as unit of measure for the standard quantity. Required.
12. Enter the **Min Qty** as the minimum quantity of material that is allowable by the Validity Rule. Required.
13. Enter the **Max Qty** as the maximum quantity of material that is allowable by the Validity Rule. Required.
14. Enter the **Preference** number for the Validity Rule. When more than one formula can be used to produce the same product, the Preference field is used to show the Validity Rule that must be used first, second, third, and so forth. Preference defaults to 1. Required.
15. Enter the **Theoretical Process Loss** based on the standard quantity produced by this validity rule.
16. Enter the **Planned Process Loss** for the product. This entry overrides the process loss defined at the routing or recipe level. Once you save the current

window, you can override the Planned Process Loss field on the **Validity Rules** window by reentering it and saving your work.

Batches created for a different quantity using this validity rule calculate the actual process loss by dividing the planned process loss by the theoretical process loss for the standard quantity to compute a factor. The theoretical process loss for the batch quantity is then multiplied by this factor to compute the actual process loss for the batch.

Activities

17. The following fields are display only:
    - **Step** indicates the step number associated with the listed Operation. Steps cannot be added or deleted here.
    - **Operation** displays the operation associated with the Step. The operation **Version** and **Description** are displayed.
    - **Activity** displays the Activity associated with the Operation. The Activity **Description** is displayed.
18. Enter **Factor** as the number of times the Activity is performed in the displayed Operation. This value can change when resources that are specific to the Organization are associated with ingredients. Required.

Capacity

19. The following fields are display only:
    - **Step** indicates the step number associated with the listed Operation. Steps cannot be added or deleted here.
    - **Operation** displays the operation associated with the Step. The operation **Version** is displayed.
    - **Activity** displays the activity associated with the Operation. Activities cannot be added or deleted here.
    - **Resources** displays the Resource associated to each displayed Activity.
20. The following fields display and can be edited:
    - **Min Capacity** displays the minimum throughput amount per capacity unit as defined on the Resources window.
    - **Max Capacity** displays the maximum throughput amount per capacity unit as defined on the Resources window.

21. **UOM** displays the unit of measure for both Min Capacity and Max Capacity.
22. Click **Parameters** to display the **Recipe Organization Details-Process Parameters** window.

Throughput

23. The following fields are display only:
    - **Step** indicates the step number associated with the listed Operation. Steps cannot be added or deleted here.
    - **Operation** displays the operation associated with the Step. The operation **Version** is displayed.
    - **Activity** displays the activity associated with the Operation. Activities cannot be added or deleted here.
    - **Resources** displays the Resource associated to each displayed Activity.
24. **Process Qty** displays the total quantity of material for the Step with its **UOM**. You can enter and save a different Process Qty.
25. **Usage** displays the unit of the Resource used to perform the activity on the displayed Step. The usage **UOM** displays. You can enter and save a new usage quantity.
26. Click **Parameters** to display the **Recipe Organization Details-Process Parameters** window.
27. Save the window.

Using the Find Recipe Organization Details Window

The Find Recipe Organization Details window displays when you navigate to the Recipe Organization Details window.

To find the recipe organization:

1. Enter the **Organization** that owns the recipe. Required.
2. The **Name** of the Organization displays.
3. Click **Find**.

To display the E-Record Details window:

1. Choose **E-Record Details** from the **Actions** menu. The **E-Record Generic Query** displays if this option is implemented in your application.
2. Refer to "Appendix D Oracle E-Records Events in Product Development" for information on e-records.
3. Close the window.

Displaying Recipe Organization Details-Process Parameters

The Recipe Organization Details-Process Parameters window displays organization-specific process parameters for recipes. Process parameters are a component of the process instructions necessary to run resources during the batch process. They are usually machines or instruments and are the standard for processing a task. They can be generic or specific. Each industry and company uses different machines and instruments, and there are different requirements for recording process parameters.

A process parameter details information such as temperature, pressure, or time that is pertinent to the product, but does not fall into the classification of input or output. You can use process parameters as set points, comparison values, or in conditional logic.

You can use folders with this window.

See: *Oracle Applications User's Guide* and *Oracle Flexfields User's Guide*.

Prerequisites

❑ Set up process parameters.

See: *Oracle Process Manufacturing Capacity Planning User's Guide*

◗ To display the Recipe Organization Details-Process Parameters window:

1. Navigate to the **Recipe Organization Details-Process Parameters** window.
2. The following fields are display only:
   - **Recipe** displays the recipe with its **Version** and **Description**.
   - **Organization** displays the recipe organization and its **Description**.
   - **Resources** displays the resource attached to the activity and its **Description**.

Parameter Values

3. The following fields default from the process parameter set up in the planning application:
   - **Seq** is the sequence of the resource process parameter.
   - **Parameter** is the process parameter name. For example, Bath Temperature.

- **Target** is the target value for the process parameter.
- **Minimum** is the lowest acceptable value for a numeric range type of process parameter.
- **Maximum** is the highest acceptable value for a numeric range type of process parameter.
- **Units** is the unit of measure for the process parameter.

4. Click **OK** to close the window.

Entering Multi-Record Recipe Validity Rules

The Recipe Validity Rules Multi-Record window lets you enter or edit a complete list of Validity Rules for organizations you can access. Validity Rules provide a combination of a quantity of material and an effective date that is used by production, planning, costing, or technical in one or more specified organizations. Validity Rules that have been marked for deletion are not updateable. Validity Dates are ordered by Organization, Product, Recipe Use, and Start Date.

Refer to the "Editing Recipe Validity Rules" topic for a complete discussion of the how to override process loss entered at the routing level.

You can use folders and flexfields with this window. See: *Oracle Applications User's Guide* and *Oracle Applications Flexfields Guide*, respectively.

Prerequisites

❑ Enter and save recipes.

◗ To view multi-record recipe validity rules:

1. Navigate to the **Recipe Validity Rules** window.
2. The following fields are display only:
   - **Formula** displays the formula used in the recipe with its **Version** and **Description**.
   - **Routing** displays the routing used in the recipe with the routing **Version** and **Description**.
3. **Organization** displays the organization that owns this Validity Rule to produce products. This can be your plant or laboratory. When left blank, this field enables the Validity Rule to be global. You can enter and save a new Organization.
4. Enter a **Product** for the Validity Rule. The **Product Description** field displays. Required.
5. Select **Recipe Use** as:
   - **Production** for use in production of products.
   - **Planning** for use in planning material consumption.

- **Costing** for use in establishing costs.
- **Technical** for use in establishing technical classes and subclasses.

Required.

6. Enter the **Preference** number for the Validity Rule. When more than one formula can be used to produce the same product, Preference is used to show the Validity Rule that must be used first, second, third, and so forth. Required.
7. Enter the **From Date** as the date the Validity Rule becomes effective. The date must be within the effective date for any routing associated to the recipe. Required.
8. Enter **To Date** as the date to stop using the Validity Rule. This is an optional field and must be left blank if no expiration date is defined for the Validity Rule.
9. Enter the **Standard** Quantity of Product made with this Formula. This quantity is only used for costing. It does not restrict quantities that can be produced by the Formula displayed. The standard quantity must be in the specified range defined by the minimum and maximum quantities. Required.
10. Enter the **UOM** for the Standard Quantity. Required.
11. Enter the **Min Quantity** as the minimum quantity of Product that can be made using the Formula. Required.
12. Enter the **Max Quantity** as the maximum quantity of Product that can be made using the Formula. Required.
13. **Theoretical** displays the theoretical process loss based on the Validity Rule Standard Quantity.
14. Enter the **Planned** process loss. This overrides planned process loss entered at the routing level.
15. Save the window.

Editing Recipe Validity Rules

The Recipe Validity Rules window lets you edit validity rules for a specific recipe. Use this window to apply global or specific organization rules to batches, cost management, planning, or technical data when producing the same product. Validity Rules can be added, updated, or marked for deletion.

Overriding Process Loss Entered at the Routing Level

Process loss is based on the standard quantity entered at the validity rule level. Process loss that is entered at that level overrides the process loss entered at the routing level. Theoretical Process Loss, Planned Process Loss, Step Quantity, and Charges fields display at the validity rule level.

Theoretical Process Loss calculations are also based on the Validity Rule Standard Quantity. If Planned Process Loss is entered on a validity rule, then its value overrides process loss defined at any other level in the routing or the recipe. If a batch is created for a different quantity, then the same rule is applied to calculate the actual Process Loss. Planned Process Loss is compared to the Theoretical Process Loss for the Standard Quantity field on a validity rule. This loss is taken from the Process Loss field for the routing class in order to compute a factor. The Theoretical Process Loss for the batch quantity is multiplied by this factor to compute the actual Process Loss for the batch.

Following are the modifications for the Automatic Step Quantity Calculation, or ASQC:

- If ASQC is not used, then the step quantities displayed initially are based on the routing, as scaled to the Validity Rule Standard Quantity. If step quantities are overridden at the recipe level, then the recipe step quantities are scaled to the Validity Rule Standard Quantity.
- If ASQC is used, then the Step Quantities displayed are based on the formula scaled to the Validity Rule Standard Quantity.

Charges displayed at the validity rule level are based on the step quantities indicated there. Process Execution, Cost Management, Financials, and Planning applications use process loss overrides at the validity rule level.

E-Record and E-Signature Approvals

There may be an e-signature event associated to this window. Refer to "Appendix D Oracle E-Records Events in Product Development" for additional information on e-record and e-signature approvals and workflow processes associated with this window.

Prerequisites

❑ Enter and save recipes.

To edit recipe validity rules:

1. Navigate to the **Recipe Validity Rules** window.
2. The following fields are display only:
   - **Formula** displays the formula used in the recipe with its **Version** and **Description**.
   - **Routing** displays the routing used in the recipe with the routing **Version** and **Description**.
   - **Status** displays the Status of the Validity Rule. This field cannot be higher than its associated recipe. For example, a Validity Rule cannot be Approved for General Use until the recipe associated to it is Approved for General Use.

     You can change the status of recipes or validity rules to On-hold or Obsolete even if they are used in batches as long all these batches are closed or cancelled.
3. **Organization** displays the organization that owns this Validity Rule, and the **Organization Description**. This must be your Plant or Laboratory. You can enter and save a new Organization.

Validity Rule

4. Select **Recipe Use** as:
   - **Production** for use in production of products.
   - **Planning** for use in planning material consumption.
   - **Costing** for use in establishing costs.
   - **Technical** for use in establishing technical classes and subclasses.

   Required.
5. Enter a **Product** in the Formula for the Validity Rule. The product **Description** field displays. Required.
6. Enter the **Preference** number for the Validity Rule. When more than one formula can be used to produce the same product, the Preference field is used to show the Validity Rule that must be used first, second, third, and so forth. Preference defaults to 1. Required.

For example, one formula can be used to produce between 10 and 150 gallons of a product. Another formula can be used to produce between 100 and 1000 gallons of the same product. Since either formula can be used to produce 100 to 150 gallons of material, the Preference field shows the suggested order of use. Lower numbers indicate a higher Preference. The number 1 indicates the highest Preference.

7. Enter the **Standard Quantity** of product made with this Formula. This quantity is only used for product costing. It does not restrict quantities that can be produced with the Formula. Standard defaults to the quantity provided in the Formula displayed. Required.
8. **UOM** is the unit of measure for the standard quantity. You can enter and save a different unit of measure. Required.
9. Enter the **Minimum** quantity of product that can be made using the Formula. Minimum defaults to 1. Required.
10. Enter the **Maximum** quantity of product that can be made using the Formula. Required.
11. **Theoretical** displays the theoretical process loss based on the Validity Rule Standard Quantity.
12. Enter the **Planned** process loss. This overrides planned process loss entered at the routing level.
13. Enter the **From** date as the date the Validity Rule becomes effective. The date must be within the effective date for any routing associated to the recipe. Required.
14. Enter **To** date as the date to stop using the Validity Rule. This is an optional field and must be left blank if no expiration date is defined for the Validity Rule.

Step Quantity

15. The following fields are display only:
    - **Step** displays the step number associated with the operation displayed.
    - **Operation** indicates the operation associated to the step. The operation **Version** displays.
    - **Description** indicates a description of the operation.
    - **Step Quantity** and its **UOM** indicates the quantity processed by the routing step and the unit of measure of the step quantity.

- **Charges** indicates the total calculated charges for the step. Charges are calculated from the smallest minimum capacity for all resources in the Step. Calculation of charges is based on the resources defined at the more granular level. If a resource is defined at plant resource level, then the maximum capacity defined at the plant is used rather than the maximum capacity defined at the generic resource level

16. Save the window.

Displaying Validity Rules By Product

The Validity Rules Summary by Product window allows you to specify under which circumstances a recipe can be used. This window displays only if there is more than one validity rule available. Validity rules provide a combination of material quantities and a range of effective dates used by production and planning in one or more specified organizations. This window only displays validity rules that have not expired.

Prerequisites

- ❑ Enter and save recipes.
- ❑ Enter and save validity rules.

◗ To select a validity rule by product:

1. Navigate to the **Validity Rules Summary By Product** window.
2. The **Find Validity Rules By Product** window displays.
3. Enter the desired product item in the **Find** field.
4. Click **Find**. The window displays all recipes found for the item.
5. The following fields are display only:
   - **Recipe** displays the recipe that is the basis of the validity rule.
   - **Version** displays the Recipe version.
   - **Recipe Description** displays a brief description of the Recipe.
   - **Organization** displays the organization for which the validity rule can be used. This field is blank if any organization can use the validity rule.
   - **Formula** displays the formula associated with the Recipe.
   - **Formula Version** displays the version of the Formula.
   - **Formula Description** displays a brief description of the Formula.
   - **Routing** displays the routing associated with the Recipe.
   - **Routing Version** displays the version of the Routing.
   - **Routing Description** displays a brief description of the Routing.
   - **Product** displays the product code for the primary product used in the Recipe.

- **Product Description** displays a description of the primary product.
- **Recipe Use** displays the intended use for the recipe. Firm Planned Orders can use Production or Planning validity rules.
- **Preference** displays the preference number for the Validity Rule. When more than one formula can be used to produce the same product, the Preference field is used to show the the order of preference for a validity rule. Lower numbers are preferred. For example, a preference of 2 is higher than a preference of 5.
- **Start Date** displays the first date the validity rule can be used.
- **End Date** displays the last date the validity rule can be used. When this field is blank, there is no specified end date.
- **Standard Quantity** displays the standard quantity of material used for costing the formula. It does not restrict quantities that can be produced by the formula.
- **UOM** displays the unit of measure for the Quantity fields.
- **Min Quantity** is the minimum quantity of product that can be made using the recipe.
- **Max Quantity** is the maximum quantity of product that can be made using the recipe.

6. Select the validity rule you want to use.
7. Click **OK**.

To edit a validity rule:

Click Edit to edit a validity rule.

Displaying Validity Rules By Recipe

The Validity Rules Summary by Recipe window allows you to specify under which circumstances a recipe can be used. This window displays only if there is more than one validity rule available. Validity rules provide a combination of material quantities and a range of effective dates used by production and planning in one or more specified organizations.

This window only displays validity rules that have not expired.

Prerequisites

- ❏ Enter and save recipes.
- ❏ Enter and save validity rules.

◗ To select a validity rule by recipe:

1. Navigate to the **Validity Rules Summary By Recipe** window.
2. The **Find Validity Rules By Recipe** window displays.
3. Enter the desired recipe in the **Find** field.
4. Click **Find**. The window displays all recipes found for the item.
5. The following fields are display only:
   - **Recipe** displays the recipe that is the basis of the validity rule.
   - **Version** displays the Recipe version.
   - **Recipe Description** displays a brief description of the Recipe.
   - **Organization** displays the organization for which the validity rule can be used. This field is blank if any organization can use the validity rule.
   - **Formula** displays the formula associated with the Recipe.
   - **Formula Version** displays the version of the Formula.
   - **Formula Description** displays a brief description of the Formula.
   - **Routing** displays the routing associated with the Recipe.
   - **Routing Version** displays the version of the Routing.
   - **Routing Description** displays a brief description of the Routing.
   - **Product** displays the product code for the primary product used in the Recipe.

- **Product Description** displays a description of the primary product.
- **Recipe Use** displays the intended use for the recipe. Firm Planned Orders can use Production or Planning validity rules.
- **Preference** displays the preference number for the Validity Rule. When more than one formula can be used to produce the same product, the Preference field is used to show the the order of preference for a validity rule. Lower numbers are preferred. For example, a preference of 2 is higher than a preference of 5.
- **Start Date** displays the first date the validity rule can be used.
- **End Date** displays the last date the validity rule can be used. When this field is blank, there is no specified end date.
- **Standard Quantity** displays the standard quantity of material used for costing the formula. It does not restrict quantities that can be produced by the formula.
- **UOM** displays the unit of measure for the Quantity fields.
- **Min Quantity** is the minimum quantity of product that can be made using the recipe.
- **Max Quantity** is the maximum quantity of product that can be made using the recipe.

6. Select the validity rule you want to use.
7. Click **OK**.

To edit a validity rule:

Click Edit to edit a validity rule.

Generating a Recipe and Validity Rule Automatically

The Recipe Generation window configures rules for the creation of a recipe and validity rule automatically when a formula is created. You can select how the recipe is used, its start date, end date, creation type, naming convention, and how to manage validity rules created for the recipe.

When you save a formula, the application determines if a recipe generation configuration is set up for the formula owning organization. If an owning organization is not specified, then a recipe with a global validity rule is generated.

The application checks for default status rules to determine if the recipe must be set to a default status.

If an approval workflow is configured, then it starts when the formula or recipe is set to a default status other than New. If a recipe generation e-signature event was configured, then its approval process begins. When an approval workflow or e-signature workflow is not started, then the recipe and its associated validity rule are created for the formula.

You can use folders with this window.

Refer to the *Oracle Applications User's Guide* for additional information.

E-record and E-signature Approvals

E-signature events can be associated to this window. The GMD ERES Recipe Generation event works in conjunction with automatic recipe generation. The event displays the formula, recipe, and validity rule on a single e-record. When the event is approved, then all records are approved. Approval of this e-record bypasses the requirement to start the individual status change e-signature events associated to formulas, recipes, and validity rules.

Creation Type is Automatic or Optional You can use the GMD ERES Recipe Generation event if the Creation Type field selection on this window is set to Automatic or Optional. The e-record event is triggered online when the formula is saved, unless you choose to defer it. If the event is deferred, then the formula status changes to Pending and its approval can be managed manually. The recipe and validity rule are not created until the event is approved.

Creation Type is User-Initiated The GMD ERES Recipe Generation event cannot be used if the Creation Type is User-Initiated. If the Creation Type is User-Initiated, then the individual e-record status change events must be used for approvals. After the formula is saved, the Formula Status Change event is triggered online. The

recipe event is triggered in a deferred mode after you approve the formula event. The validity rules event is triggered in a deferred mode after you approve the recipe event.

If the Creation Type is User-Initiated, then choose Recipe Generation from the Actions menu on the Formula Details window to trigger the recipe workflow if it is enabled. Otherwise, the recipe and validity rules are created automatically after the formula workflow is approved.

Impact of the GMD ERES Recipe Generation Event on Status Approval Events If you do not use the GMD ERES Recipe Generation event with automatic recipe generation feature and you do use the current status approval events for formulas, recipes and validity rules, then the formula changes to an approved status. The Formula Status Change event is not triggered. The Recipe Status Change event is triggered in a deferred mode after the formula is approved. Similarly, the Validity Rules event is triggered in a deferred mode after you approve the Recipe Approval event.

Workflows are always deferred. The notifications are not triggered online. The approval of the formula workflow notification triggers the recipe workflow if it is enabled. If the recipe workflow is not enabled, then the recipe is automatically created after the formula workflow is approved. Likewise, the validity rules workflow is triggered after the recipe workflow notification is approved. If the validity rules workflow is not enabled, then the validity rules are created automatically after the recipe workflow is approved.

Prerequisites

- ❏ Set up items, units of measure, and unit of measure conversions.
- ❏ Verify formula version control settings.

◗ To generate a recipe and validity rule automatically:

1. Navigate to the **Recipe Generation** window.
2. Enter the **Organization** to use for validity rule creation. If you leave this field blank, then the application creates a global configuration rule. The global configuration rule produces a global validity rule that can be used by any organization that does not have a configuration. The formula owner organization is used to determine the recipe generation rule to be used.
3. **Organization Description** displays the organization entered. This field is blank if no organization is entered.

Recipe Use

4. This selection determines how validity rules are configured for use. Select one or more of the following recipe use types to define how to create the recipe validity rules:

   - **Production** to create a validity rule for manufacturing.
   - **Costing** to create a validity rule to use in establishing costs.
   - **Planning** to create a validity rule to use for planning material consumption.
   - **Regulatory** to create a validity rule for regulatory purposes.
   - **Technical** to create a validity rule for use in establishing technical classes and subclasses.

   The application creates a validity rule for each type of recipe use you select.

Start Date

5. Specify the start date using one of these methods:

   - Select **Formula Date** to use the formula creation date as the start date for the validity rule.
   - Select **Specific Date** and enter the start date for the validity rule.

End Date

6. Specify the end date using one of these methods:

   - Enter **End Date** as the last date to use the validity rule. When this field is blank, there is no specified end date.
   - Enter **Number of Days** to indicate the number of days from the start date that you want the validity rule to end. If you enter an end date, then you cannot use this field.
   - Enter **Cost Calendar** for a costing type validity rule to end on the period end date.

7. The **Creation Type** field lets you choose how recipes and validity rules are created when a formula is saved. Select one of the following:

   - **Automatic** to indicate that the recipe and validity rule are saved automatically when you save the formula. This is the default.

- **User Initiated** to choose whether to create a recipe and validity rule when you save a formula. Choose Recipe Generation from the Actions menu on the Formula Details window.
- **Optional** to respond to the message: Do you wish to create the recipe?
  - If you click **Yes**, then the recipe and validity rules are created automatically when you save the formula.
  - If you click **No**, then only the formula is created.

8. Select one of the following for **Recipe Naming Convention**:
   - **Formula** to name the recipe with the name of the formula.
   - **Product** to name the recipe with the name of the product.
9. **Managing Validity Rules** determines how existing validity rules and formula versions are handled. It also prevents you from saving duplicate validity rules by selecting how the existing ones are managed. Select one of the following:
   - **Preference** when more than one formula can be used to produce the same product. This indicates the order of choice for a validity rule. Lower numbers are preferred. For example, a preference of 2 is higher than a preference of 5. If you select this to manage validity rules, then preexisting, overlapping validity rules increase their preference by one and the validity rules you create are set to the default preference of 1. The preference is used in background processes such as material requirements planning and standard cost calculation rollups.
   - **End Date** to set preexisting, overlapping validity rules to end on the date and time you create the new one. This option sets the Preference field for the new validity rule to 1.
   - **Next Preference** to create a preference for the newly created validity rule as one higher than the highest value of any preexisting overlapping validity rules. For example, if the highest preexisting validity rule preference is 4, then an overlapping validity rule is assigned a preference of 5; one higher than the highest preexisting value.
10. Save your work.

To delete configurations created by this window:

You cannot use Mark for Purge functionality with this window. If you want to undo a configuration, then delete it physically.

Displaying the Recipe Step/Material Association

The Recipe Step/Material Association window displays all items from the recipe formula and lets you associate these items with specific routing steps.

Minimum Transfer Quantity (MTQ) has a restriction on the gap between the time that the MTQ is yielded for the item, and the start of the next routing that involves that item. The gap is defined with a minimum and maximum value based in the TIME unit of measure for hour. When calculating the gap, the minimum value creates the gap, and the maximum value limits the duration of the gap between the routing and the MTQ yield point. This MTQ calculation can be added for all products of a recipe.

Minimum and maximum values are optional, and blank values represent an infinite gap between the manufacturing processes:

- If you enter the minimum value only, then a specific gap must exist between the MTQ timepoint and the next routing for the item. However, the end of the gap is infinite.
- If you enter both minimum and maximum values, then the gap is fixed and requires the next routing to start in the defined period after the MTQ timepoint.

Minimum delay and maximum delay represent this gap. The values for these can never be negative, and the minimum must always be less than or equal to the maximum value. The entry of an MTQ for any of the products is not required. Blank value for MTQ implies the full quantity must be yielded before the next routing can start.

Note: Data that displays on this window is entered and saved on the Recipe Details window.

You can use folders with this window. See: *Oracle Applications User's Guide*.

Prerequisites

- ❑ Enter and save recipes.
- ❑ If the Automatic Step Quantity Calculation is used:
  - A routing must be associated with the recipe.
  - Each item marked as contributing to step quantity must be associated with a step, and have a conversion specified between the standard mass unit of measure and standard volume unit of measure.

– All operations must use a mass or volume unit of measure.

To display recipe step/material associations:

1. Navigate to the **Recipe Step/Material Association** window.
2. The following fields are display only:
   - **Formula** displays the formula used in a recipe with the **Version** and **Formula Description**.
   - **Routing** displays the routing used in a recipe with the **Version** and **Routing Description**.

Associations

- **Step** displays the step number associated with the listed Operation in the displayed Routing. You cannot add a Step to a routing on this window. You must do this on the **Routing Details** window. Required.
- **Maximum Delay** displays the delay offset in hours. This is a restriction on the gap between the point in time that the minimum transfer quantity is yielded for the item and the start of the next routing involving the item. If the maximum delay is set, then the material must be used before this delay. For future use by the Oracle Advanced Supply Chain Planning application.
- **Minimum Delay** displays the Minimum Delay offset in hours. This must be less than or equal to the Maximum Delay. For future use by APS.
- **Item Description** displays the descriptions each product, byproduct, or ingredient listed.
- **Line Unit of Measure** displays the unit of measure for each product, byproduct, or ingredient listed.
- **Minimum Transfer Quantity** displays the minimum quantity of product needed to yield a partial quantity before the next routing can start. For future use by APS.
- **Operation** displays the operation associated with the Step. The operation **Version** displays.
- **Step Qty** displays the default quantity of material associated with the Step. The **UOM** for the Step Quantity displays.
- **Line** displays the line number for each product, byproduct, or ingredient listed. Required.

- **Item** displays the code associated with each product, byproduct, or ingredient listed.
- **Type** displays the type of Line associated in the Step as a product, byproduct, or ingredient.
- **Item Qty** displays the Quantity of product, byproduct, or ingredient yielded by the listed Formula.
- **Line UOM** displays the unit of measure for the Item Quantity.

3. Close the window.

Editing the association of materials and steps:

1. Enter the **Step** from the LOV. Required.
2. The following fields are display only:
   - **Operation** displays the operation associated with the Step. The operation **Version** is displayed.
   - **Step Qty** displays the default quantity of material associated with the Step. The **UOM** for the Step Quantity displays.
3. Enter the **Line** from the LOV. Required.
4. The following fields are display only:
   - **Item** displays the code associated with each product, byproduct, or ingredient listed.
   - **Type** displays the type of Line associated in the Step as a product, byproduct, or ingredient.
   - **Item Qty** displays the Quantity of product, byproduct, or ingredient yielded by the listed Formula.
   - **Line UOM** displays the unit of measure for the Item Quantity.
5. Save the window.

Understanding the Recipe Designer

The Recipe Designer provides all functions that are accessible using the Routing, Formula, and Recipe Details windows. The Recipe Designer is used to create, copy, and edit a complete recipe that includes formulas, routings, validity rules, and process instructions.

Recipe Designer Components

The Recipe Designer window has three major components:

1. A navigator located in the top left pane displays:
   - A Recipe tab which displays a broad view of the product including material and process requirements.
   - A Formula tab which displays a material oriented view of the product.
   - A Routing tab which displays a process oriented view of the product.

   The following navigator style formats are available:
   - Interleaved style that positions recipe components in a left-to-right orientation for each recipe with spatial adjustment for each component.
   - Organization chart style that positions recipe components in a top-to-bottom orientation for each recipe with spatial adjustment for each component as in an organization chart.
   - Vertical style that positions recipe components in a left-to-right orientation for each recipe with no spatial adjustment for each component.
2. A display of formula items in the bottom left pane has tabs that let you select all items, or filter out only products, byproducts, or ingredients. For each type of item, you can display those that are associated to steps, or those that are not associated to steps. You can also display a combination of those that are associated to steps and those that are not associated to steps.
3. A right pane displays the following views selected from tabs located at the bottom of the pane:
   - Process Instruction Sheet view that combines routing information. This view includes process requirements and formula details, including input output requirements.
   - Step Dependency Graph view that depicts the step dependencies within the routing associated to the recipe. All of the steps in the routing display are represented as a graphic image. Below each image is a step number,

operation code, and operation version. When you position the cursor over a step, text displays the complete description of that step. When you position the cursor over a line dependency that links two routing steps, text displays the transfer percentage between the routing steps.

The graphics that appear as nodes on the navigator are also used to identify the Recipe Designer components. Button graphics are described in the "Using the Recipe Designer" topic.

Understanding the Tab Pane

The Tab pane contains a Recipe tab, Formula tab, and Routing tab.

- The Recipe tab displays a Formula Items view or Item Master view. The Formula Items view displays a list of items in the present formula, and you can associate formula items to steps. The Formula Items view has several tabs that let you display a list of items by product, byproduct, or ingredient. Within each tab, you can view all items, items that are associated to routing steps, or items that are not associated to routing steps. The Item Master view displays items from the item master table, and you can add new items to the formula while assigning them to steps. The Process Instruction Sheet tab displays steps and associated items. It also displays formula, routing, and recipe level process instructions.
- The Formula tab lists all items in a formula. You can create and maintain material requirements of a recipe. You can also maintain standard item level processing instructions. The Process Instruction Sheet tab displays formula details and standard item process instructions.
- The Routing tab lets you create and edit routings. You can also maintain standard routing step level processing instructions. The Process Instruction Sheet tab displays routing step details and standard routing step process instructions.

Associating an Item to a Routing Step

The specification of material input and output for each step in a recipe is required if production and consumption of materials are controlled at the step level. The Formula Item view under the Recipe tab lets you select one or more items and assign them to a routing step in the navigator or on the routing step dependency graph using the drag-and-drop operation. This function is available when the View Unassigned Items option is selected on the Formula Item list. You can also use the Item Master option. The Item Master view displays items from the item master table, and you can add new items to the formula.

Redistributing a Formula

When you select the Formula tab, all items associated to a step display by expanding the related node in the navigator. Then, by using the drag-and-drop operation or a cut and paste operation, you can move items from one routing step to another. The Process Instruction Sheet tab on the right pane reflects all changes you make.

Using Automatic Step and Number of Charges Calculation

The routing step quantities and the number of charges are calculated and updated on the Process Instruction Sheet pane when you change an item and step association. The calculation is performed when you select the Calculate Step Quantities indicator on the toolbar.

Understanding the Process Instruction Sheet Pane

The Process Instruction Sheet pane provides process engineers and formulators with the ability to display, develop, and maintain material and routing step associations as well as the process instructions for a specific recipe. Standard process instructions can be maintained at the formula item level and the routing step level. It provides navigator views of routing steps in interleaved, organization chart, or vertical display styles. It also presents multiple views of items in the formula.

The Process Instruction Sheet lets you:

- Assign formula items to routing steps using the drag-and-drop operation.
- Perform automatic step quantity and number of charge calculations.
- Redistribute formula items from one step to another step using the drag-and-drop operation.
- Display process instructions defined at the formula item level and at the routing step level.
- Create, maintain, and view process instructions at the routing step, and at the item and step association level.
- Combine process requirement inputs and production execution outputs within a single set of process instructions.
- View the properties of recipes, routings, routing steps, operations, activities, resources, and items at the product, ingredient, and byproduct levels.

Editing Process Instruction Text

Access the Process Instruction Text Editor from the right-mouse menu or the Tools menu. Process instructions are created and maintained for a specific operation item or step association row, or for a particular step in the recipe. Standard process instructions that are defined in the formula at the item level, or in the routing at the step level cannot be edited at the recipe level. Process instructions are stored in the standard text table against the paragraph code defined in the GMD: Process Instruction Paragraph profile option.

Differentiating Standard from Specific Process Instructions

Standard process instructions that are common to all recipes are defined in the formula or routing. Text displays in the Recipe Process Instruction Sheet pane; however, you cannot edit this text in the pane.

Standard process instructions maintained at the step level in the routing display under the routing step line. Display or hide process instructions by expanding or collapsing the corresponding routing step line. Process instructions defined at the step level for this particular recipe are displayed. The process instructions defined at the recipe level display with a yellow background to distinguish between the standard instructions that are defined at the routing level and the specific instructions that are defined at the recipe level.

Using the Recipe Designer

The Recipe Designer contains the following components:

- A navigator view of the recipe in the top left pane. Display or hide descriptions on the navigator. You can expand components on the navigator by clicking the + sign, or you can collapse components on the navigator by clicking the - sign. The navigator has a Material View and a Resource View that selectively displays materials such as products, byproducts, and ingredients, or routings composed of operations arranged in steps, activities, and resources.
- A Formula Item view of the recipe in the bottom left pane.
- A Process Instruction Sheet or a Step Dependency Graph in the right pane, depending on the tab selected.

Depending on the status of the recipe, the Recipe Designer is in update or view mode. You have the same update or view privileges for the Recipe Designer as you have for the Recipe Details window.

Prerequisites

❑ Define a paragraph code for process instructions using the GMD: Process Instruction Paragraph profile option. By default, the Recipe Designer uses PI as the default paragraph code.

◗ To display the Recipe Designer from Product Development windows:

You can find an existing recipe or create a new recipe within the Recipe Designer. You can display the Recipe Designer as follows:

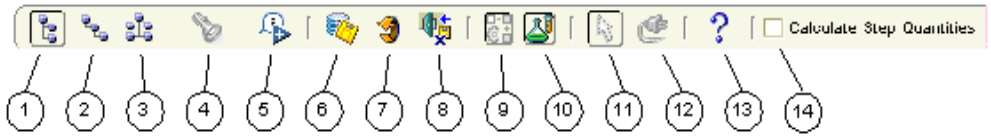
1. Navigate to one of the following windows:
   - **Recipe Details**
   - **Recipe Summary By...**
   - **Recipe Header Summary**
2. Query the appropriate recipe.
3. Click **Designer**. The **Recipe Designer** window displays.

Identifying Buttons on the Recipe Designer

The following discussion and graphic identify and explain each of the tools displayed on the Recipe Designer tool palette:

- 1 is the Vertical Style button. Click it to display the vertical navigator style. Recipe components are positioned in a left-to-right orientation. There is no spatial adjustment for each component.
- 2 is the Interleaved Style button. Click it to display the interleaved navigator style. Recipe components are positioned in a left-to-right orientation with spatial adjustment for each component.
- 3 is the Org-Chart Style button. Click it to display the organization chart navigator style. Recipe components are positioned in a top-to-bottom orientation with spatial adjustment for each component.
- 4 is the Find button. Click it when the Edit Process Instructions window is displayed to display the Find Text Token window. Text tokens are codes or short descriptions that represent longer descriptions or messages. These tokens are set up on the Text Token window. Refer to the *Oracle Applications System Administration User's Guide* for a complete discussion on the creation and use of Text Tokens.
- 5 is the Show/Hide Description button. Click it to display a description of the components shown in the navigator. Select it again to hide the description.
- 6 is the Save button. Click it to save the changes made on the Recipe Designer. This option is not available if the Recipe Designer is in View mode.
- 7 is the Refresh button. Click it to refresh the panes with data retrieved from the database.
- 8 is the Exit button. Click it to exit from the Recipe Designer workbench.
- 9 is the Show/Hide Operation Master button. Click it to display the Routing Operation Pane. Select it again to hide the Routing Operation Pane.
- 10 is the Show/Hide Formula Items button. Click it to display the Formula Item Pane. Select it again to hide the Formula Item Pane.
- 11 is the Drag Mode button. Click it to move steps around the graph pane using the drag-and-drop operation. This option is not available if the Recipe Designer is in View mode, or if the Process Instruction Sheet tab is selected.
- 12 is the Connect Mode button. Click it to build dependencies between steps using the drag-and-drop operation. This option is not available if the Recipe Designer is in view mode.
- 13 is the Help button. Click it to display online help for the current window.
- 14 is the Calculate Step Quantities indicator. Click it to calculate step quantities. Clear the box to indicate that steps are not calculated.

The following is a graphic of the previously described toolbar buttons:



Setting Up the GMD: Process Instruction Paragraph Profile Option

Many windows in Oracle Process Manufacturing applications let you associate text with a record of the edited document. For example you can attach text to a specific ingredient line in a formula. In this application, paragraphs are structures that are used to store and categorize text. The standard application has the General Text paragraph as the one default paragraph stored for each database table.

In order to provide the Recipe Designer with a means to distinguish between Process Instructions and other text types, your system administrator needs to define a paragraph code for process instructions. Text displayed in the Process Instruction Sheet in the Recipe Designer is the text defined for the paragraph code specified by the GMD: Process Instruction Paragraph profile option.

See Also

Oracle Process Manufacturing Implementation Guide

Oracle Process Manufacturing System Administrator User's Guide

Using the Recipe Tab

The Recipe tab includes the following options:

Formula Items

If Formula Items is selected, then the list below the navigator displays the list of items in the formula and lets you associate formula items to steps.

Item Master

When Item Master is selected, then the list below the navigator displays items from the item master table and you can add new items to the formula while assigning them to steps.

The following options are available when the Recipe tab is selected, letting you:

Mark For Purge

Select this option to delete a recipe. If the recipe is not marked for purge, then this function is available.

Edit Process Instructions

Select this option to create and maintain processing instructions for a recipe step, or step-item association. This option is enabled if a node representing a step or an item is selected.

Edit Properties

Select this option to view or edit properties of the selected node. You can edit recipe header, recipe step, and recipe step material properties.

Change Status

Select this option to change the recipe, formula, or routing status. If changes are made to the components, then the application displays a warning message prompting you to save the changes. If the save option is selected, then the standard Change Status window displays.

Organization Details

Select this option to view or edit organization specific attributes of the current recipe. If changes are made to the recipe, then the application displays a warning message prompting you to save the changes. If the save option is selected, then the standard Validity Rules window displays.

Validity Rules

Select this option to view or edit validity rules for the current recipe. If changes are made to the recipe, then the application displays a warning message prompting you to save the changes. If save is selected, then the standard Validity Rules window displays.

Undelete

Select this option to undelete a recipe. If the recipe is marked for purge, then this option is available.

Using the Recipe Properties Window

The Recipe Properties window displays information about the selected recipe. You can edit some fields on this window to edit the recipe.

Prerequisites

- ❏ Enter and save operations.
- ❏ Enter and save routings.
- ❏ Enter and save formulas.
- ❏ Enter and save recipes.

◗ To display the Recipe Properties window:

1. Navigate to the **Recipe Properties** window:
   - In the navigator, right-click the Recipe node, then choose **Properties**.
   - In the navigator, click the recipe, then choose **Properties** from the **Actions** menu.

Recipe

2. The following fields are display only:
   - **Status** displays the recipe status.
   - **Recipe** displays the recipe and its **Version**.
3. **Description** displays the recipe description. You can edit this field.
4. **Owner** displays the recipe owner. You can edit this field.
5. **Owner Organization** displays the owner organization for the recipe. You can edit this field.
6. **Creation Organization** displays the organization that created the recipe.

Formula

7. The following fields are display only:
   - **Status** displays the formula status.
   - **Formula** displays the formula used in the recipe and its **Version**.
   - **Description** displays a description of the formula.
   - **Total Output Quantity** displays the total material yielded by the formula.

- **Main Product** displays the primary product for the formula associated with the recipe.
- **Main Product Qty** displays the quantity and UOM of the first product the formula produces.

Routing

8. **Status** displays the status of the routing used in the recipe.
9. **Routing** displays the routing used in the formula and its **Version**. You can edit these fields.
10. **Description** displays the routing description.
11. **Planned Loss** displays the planned material loss for the routing.
12. **Theoretical Process Loss** displays the theoretical process loss associated with the routing.
13. Click **OK** to close the window. If you edited recipe properties, then your changes are validated and saved.

◗ To display or edit the list of customers:

1. Click the **Recipe** tab on the **Recipe Properties** window.
2. Click **Customers**. The Customers property sheet displays.
3. Click **Add** to add a customer. Enter the customer and customer **Name**.
4. Click **Delete** to delete a customer.
5. Click **OK** to save your work.

◗ To enter or edit process loss:

1. Click the **Recipe** tab on the **Recipe Properties** window.
2. Click **Plant/Laboratory**. The **Process Loss** property sheet displays.
   - Enter the **Organization**. The Name displays the name of the organization.
   - **Type** indicates whether this organization is a plant or a laboratory.
   - Enter the **Process Loss** for the Organization entered.
   - Click **OK** to save your work.
3. Click **Add** to add process loss for a specific organization.

4. Click **Organization Details** to display the **Recipe Organization Details** window.
5. Click **Validity Rules** to display validity rules to display the **Recipe Validity Rules** window.
6. Click **Delete** to delete process loss for a selected organization.

Finding a Recipe in the Recipe Designer

The Find Recipes window displays when you select the Recipe Designer option from the navigator. It also displays when you select the Open option from the File menu.

Prerequisites

- ❏ Optionally, enter and save operations.
- ❏ Optionally, enter and save routings.
- ❏ Enter and save formulas.

◗ To find a recipe in the Recipe Designer:

1. Choose the **Recipe Designer** menu from the navigator. The **Find Recipes** window displays.
2. Enter the appropriate search criteria to find the desired recipe.
3. Click **Find**. The lower region of the window displays recipes matching the entered criteria.
4. Select the appropriate recipe. The **Recipe Designer** displays with the selected recipe.

Creating a Recipe in the Recipe Designer

You can click New on the Find Recipes window, or select the New file option to create a new recipe. The Recipe Designer displays in the create mode. You can then navigate to the Recipe Properties window to enter additional recipe details.

Using the Recipe Properties window, you can specify a formula and a routing marked for purge or with a status of On-hold or Obsolete. However, they cannot be modified and the recipe cannot be created with these components. Use the Save As option to create a new formula and routing for the recipe. Refer to the "Copying a Recipe And Its Components" topic for additional information.

If the formula and routing specified in the Recipe Properties window do not exist, then the application assumes that you intend to create these components in the Recipe Designer.

Formula is a required component of a recipe. However, you can create a recipe without a routing.

Prerequisites

- ❏ Enter and save operations.
- ❏ Enter and save routings.
- ❏ Enter and save formulas.

◗ To create a recipe:

1. Select **Recipe Designer** from the navigator. The **Find Recipes** window displays.
2. Click **New**. The Recipe Designer displays with New as the root node.

Changing Recipe Status

The Change Status window displays when you select one of the following options from the Actions menu:

- Change Recipe Status
- Change Routing Status
- Change Formula Status

◗ To change recipe status:

1. Click the desired **Recipe**.
2. Choose **Change Status** from the **Actions** menu.
3. Enter the desired status for the recipe.
4. Click **OK**.

◗ To view and edit recipe header information:

1. Click the desired **Recipe**.
2. Choose **Properties** from the **Actions** menu. You can also right-click the Recipe node and select **Properties** from the right-click menu. The **Recipe Properties** window displays.

3. Enter or edit the recipe header **Description**. When creating a new recipe, this defaults to the formula description. Required.
4. **Owner** defaults to the current user. This is validated against the user master table, and if not found, displays an invalid user message. Required.
5. Enter the **Owner Organization**. This defaults to the current user organization and is validated against the user organization table. Required.

Copying a Recipe and Its Components

When developing a new product, consider identifying an existing recipe with similar characteristics. Use this recipe as a template, and modify it to meet the specific new product requirements. Save the modified recipe.

To improve new product development efficiency and speed time to market, the ability to locate and load existing recipes as templates is necessary for promoting reuse of existing product definitions. The recipe and its material and process components that include formulas and routings, can be modified to meet new product requirements and saved as new entities.

Choose Save As from the File menu and the Save As window displays. You can specify the name, version, and description of the new recipe, routing, and formula. Once saved, the new recipe, routing, and formula are current. Note that the primary purpose of this function is to copy the current recipe. This window can also be used to replace the formula or routing in the current recipe.

◗ To copy a recipe and its components:

1. Choose **Save As** from the **File** menu. The **Save As** window displays.
2. Select the copy indicators for the recipe, formula, and routing that you are copying.
3. Click **OK.**

When copying a recipe, formula, or routing, the status of the new record is set to New. If the recipe is not copied, but one of its component is, then the current recipe status is also set to New, because one of its components is copied and has a status of New.

Using the Formula Tab

The Formula Tab in the Recipe Designer displays information about the formula items. The following fields display:

- Item number
- Item description
- Item unit of measure

The Formula tab has three item properties windows:

- Ingredient Properties
- Product Properties
- Byproduct Properties

Using Formula Menu Options

The following options are available when you select the Formula tab.

Edit Process Instructions

Choose this option to create and maintain processing instructions for a formula item. This option is enabled when an item node is selected in the navigator.

Edit Properties

Choose this option to view or edit properties of the selected node in the navigator. You can edit formula header and formula item properties.

QC Specifications

Choose this option to view or edit production specifications for the formula. If changes are made to the formula, then the application displays a warning message prompting you to save the changes. If the save option is selected, then the standard Production Specifications window displays.

Change Formula Status

Choose this option to change the status of the current formula. If changes are made to the recipe, then the application displays a warning message prompting you to save changes. If the save option is selected, then the standard Change Status window displays.

Ingredient Technical Parameters

Choose this option to display the Technical Parameters window for the selected ingredient. If changes have been made to the formula, then the application displays

a warning message prompting you to save the changes. If the save option is selected, then the standard Ingredient Technical Parameters window displays.

Product Technical Parameters

Choose this option to display the Technical Parameters window for the selected product. If changes are made to the formula, then the application displays a warning message prompting you to save the changes. If the save option is selected, then the standard Product Technical Parameters window displays.

List Experimental Items

Choose this option to display the List Experimental Items window for the formula. If changes have been made to the formula, then the application displays a warning message prompting you to save changes. If the save option is selected, then the standard List Experimental Items window displays.

Technical Data Selection

Choose this option to specify the formula number and version from where to get the intermediate's technical parameter values, or to specify the formula number and version to use for the explosion of this intermediate during the formula ingredient contribution analysis calculation.

Scale Formula

Choose this option to scale formulas up or down by input or output.

Calculate Theoretical Yield

Choose this option to calculate theoretical yield.

Assign Access

Choose this option to assign formula security access.

E-Record Details

Choose this option to view electronic signature details.

Creating a Formula in the Recipe Designer

When creating a new recipe, you can build a new formula within the Recipe Designer. If the formula entered in the Recipe Properties window exists, then you can edit the formula in the Recipe Designer and use Save As in the File menu to generate a new formula. You can also use an existing formula to serve as a template for the new formula.

If the formula entered in the Recipe Properties window does not exist, then there are several ways to create a formula in the designer.

- Select the Formula tab to access the Formula navigator. The Item Master list displays. You can build the formula by associating items using the drag and drop operation.
- Select the Recipe tab and choose the Item Master option to display the list of items. Choose the Step Dependency Graph tab. You can build the formula by associating items to the steps in the routing step dependency graph using the drag and drop operation.
- Select the Recipe tab to access the Recipe navigator. Select the Item Master view. You can build the formula by associating items to the steps in the Recipe navigator using the drag and drop operation.

New Item Window

The Item Properties window displays when adding an item to the formula using one of the methods described above, provided the Display New Item Window user preference option is selected. Refer to the "Editing User Preferences" topic for additional information. You can enter basic item attributes in this window.

Click Edit Line to access the Ingredient, Product, or By Product Properties windows, depending on the type of item selected.

This section includes the following topics:

- Changing Formula Status
- Editing the Formula Header
- Editing Formulas in the Recipe Designer
- Using the Routing Tab

Changing Formula Status

The Change Status window displays when you select one of the following options from the Actions menu:

- Change Recipe Status
- Change Routing Status
- Change Formula Status

To change formula status:

1. Navigate to the **Recipe Designer**.
2. Click the **Formula** tab in the navigator.
3. Choose **Change Status** from the **Actions** menu.
4. Enter a new status.
5. Click **OK**.

Editing the Formula Header

You can edit formula details in the Formula Properties window.

To edit the formula header:

1. Navigate to the **Recipe Designer**.
1. Select the formula node in the navigator.
2. Click **Properties** from the **Actions** menu, or right-click and choose **Properties** from the menu.
3. Enter formula header data and click **OK** to save, or **Cancel** to close the window without saving.

Editing Formulas in the Recipe Designer

Click the Formula tab to edit formula specific data. The Formula navigator displays and the following functions are available:

- Create and edit processing instructions at the formula item level
- Add and remove items
- Edit item properties

- Edit formula header properties

Creating and Editing Formula Item Process Instructions

Process instructions defined at the formula item level establish the standard procedure to follow when processing a particular material. Instructions are usually process independent, but are not required to be. Process related instructions can be defined at the routing step level, the recipe step level, or the routing item level. Formula item process instructions display in the Formula Process Instruction Sheet tab, and also in the Recipe Process Instruction Sheet tab.

Access the current Process Instruction editor by selecting an item in the Formula navigator and selecting Edit Process Instructions from the Tools menu.

To view formula process instructions:

1. Navigate to the **Recipe Designer**.
2. Click the **Formula** tab in the navigator.
3. Choose the **Process Instruction Sheet** tab in the right pane of the Recipe Designer.

The Process Instruction Sheet tab displays item details in a hierarchical grid. If processing instructions are defined for an item, then you can expand the corresponding item to view the text.

All changes made to the formula in the designer are immediately displayed in the Formula Process Instruction Sheet.

Adding items to a formula

The item master list is a component below the recipe and Formula navigator. It displays items from the item master table and serves as the source for adding items to the formula. The item master list is not available if the formula is in view mode. You can sort the list by item, description, UOM, and category by clicking the appropriate column heading in the item list.

To add an item to the formula:

1. Navigate to the **Recipe Designer**.
2. Display the Item Master list by clicking **Show/Hide Formula Items** on the toolbar, or check the **Show Item List** indicator from the **View** menu.
3. Choose **Item Master** in the lower region.

4. If the **Item Code** indicator is selected, then enter an **item code,** or part of an item code in the **Find** field. If the **Category** indicator is selected, then enter a **Category Code**, or part of a category code in the **Find** field.
5. Choose the desired item in the list and associate it to the formula in the recipe, formula, or to a step in the routing dependency graph pane using the drag-and-drop operation.
6. Depending on user preferences, the **New Item** window displays, prompting you to enter item attributes.

Removing an Item from a Formula

If the item being removed is a product, then the application checks for validity rules associated to the product. If at least one valid validity rule exists, then an error message displays and the product cannot be deleted.

To remove an item from a formula:

1. Navigate to the **Recipe Designer**.
2. Click the **Formula** tab in the navigator.
3. Expand the recipe to display the item to cut. Following are two methods for removing items:
   - In the navigator, right-click the item node, then choose **Cut**.
   - In the navigator, click the item node, then choose **Cut** from the **Edit** menu.
4. Save your work.

To display assigned and unassigned item components:

1. Navigate to the **Recipe Designer**.
2. Click the **Recipe** tab in the navigator.
3. Click **Formula Items**. A pane showing all items in the formula displays below the navigator.
4. Select one of the following to display assigned, unassigned, or both assigned and unassigned items:
   - **View Assigned** to display only those items that are assigned to a routing step.
   - **View Unassigned** to display only those items that are not yet assigned to a routing step.

- **View Assigned/Unassigned** to display all items that are assigned or not yet unassigned to a routing step.

To activate or disable automatic step calculation:

1. Navigate to the **Recipe Designer**.
2. Select the **Calculate Step Quantities** indicator on the toolbar. The following message displays:

   Do you want to delete the current calculated step quantities? Y/N

   - Click **Yes** to delete recipe step quantities from the database and Process Instruction Sheet. The sheet is updated with the default step quantities in the routing.
   - Click **No** to retain the current calculated step quantities.
3. Clear the **Calculate Step Quantities** indicator to disable automatic step calculation.

To define material input and output for a step:

1. Navigate to the **Recipe Designer**.
2. Click the **Recipe** tab in the navigator.
3. If the Formula Item pane is not displayed, then click **Show/Hide Formula Items**. A pane showing all items in the formula displays.
4. Select **View Unassigned Item**s. The list of all items that are not assigned to a particular step displays.
5. Associate one or more items to a particular step by dragging the items in the Formula Item pane and dropping them onto a particular step either in the Step Dependency Graph or the navigator.
6. If the **Calculate Step Quantities** indicator is selected, then the step quantities and the number of charges are calculated, and the **Process Instruction Sheet** pane displays the revisions.

To redistribute formula items:

1. Navigate to the **Recipe Designer**.
2. Click the **Recipe** tab in the navigator.
3. Use one of the following techniques to redistribute an item:

- Drag the item in the navigator, and drop it onto a target routing step in the navigator, or in the Step Dependency graph.
- Click the item to redistribute. From the **Edit** menu, choose **Cut**. Then, select the target routing step in the navigator, or in the Step Dependency Graph. From the **Edit** menu, choose **Paste**.

4. Optionally, select the **Calculate Step Quantities** indicator to calculate and display the step quantities and the number of charges on the Process Instruction Sheet pane.
5. Save your work.

Editing Ingredient Header

The Ingredient Properties window is accessible from the Formula tab. You can also display ingredient properties from the New Item window that displays when adding a new ingredient to the formula.

To edit ingredient properties

1. Navigate to the **Recipe Designer**.
2. Select the Ingredient node in the navigator.
3. Choose **Properties** from the **Actions** menu to display the **Ingredient Properties** window, or right-click an ingredient node in the recipe Formula navigator, and choose **Properties** from the right-click menu.
4. Edit the Ingredient Properties fields and click **OK** to save, or **Cancel** to close the window without saving.

Editing Product Properties

The Product Properties window is accessible from the Recipe navigator or from the Formula navigator. You can also display product properties from the New Item window that displays when adding a new product to the formula.

To edit product properties:

1. Navigate to the **Recipe Designer**.
2. Select the Product node in the navigator.
3. Choose **Properties** from the **Actions** menu to display the Product Properties window, or right-click an ingredient node in the Recipe navigator or in the Formula navigator, and choose **Properties** from the right-click menu.

4. Edit the Product Properties fields and click **OK** to save, or **Cancel** to close the window without saving.

Editing By Product Properties

The By Product Properties window is accessible from the Recipe navigator or from the Formula navigator. You can also display byproduct properties from the New Item window that displays when adding a new byproduct to the formula.

To edit byproduct properties

1. Navigate to the **Recipe Designer**.
2. Select the **By Product** node in the navigator.
3. Choose **Properties** from the **Actions** menu to display the By Product Properties window, or right-click an ingredient node in the Recipe navigator or in the Formula navigator, and choose Properties from the right-click menu.
4. Edit the By Product Properties fields and click **OK** to save, or **Cancel** to close the window without saving.

Entering Formulas for Item Technical Data

You can specify the formula to use in the item technical data calculation, and in formula analysis.

To enter item technical data

1. Navigate to the **Recipe Designer**.
2. Click the **Formula** tab and select the appropriate intermediate ingredient in the Formula navigator.
3. Select the **Technical Data Selection** option from the **Actions** menu. Prior to displaying this window, the application verifies that the selected ingredient is an intermediate.
4. Click the **Ingredient Contribution** tab.
5. Enter the **Technical Formula.** This is the formula used by the laboratory spreadsheet to derive technical values.
6. Enter the formula **Version**.
7. Click the **Technical** tab.

8. Enter the **Contribution Formula.** This is the formula used by formula analysis to derive indirect ingredient contribution.
9. Enter the formula **Version.**
10. Click **OK** to save your work.

Using the Routing Tab

In the Recipe Designer, select the Routing tab to view routing components.

Creating a Routing in the Recipe Designer

While creating a new recipe within the Recipe Designer, you can build a new routing. An existing routing can also be used as a template for a new routing.

You must select the Routing tab to edit and create routings. The Routing navigator displays and the following functions are available:

- Create and edit processing instructions at the routing step level.
- Add and remove steps.
- Edit step properties.
- Edit routing header properties.

◗ To create or edit routing properties:

1. Navigate to the **Recipe Designer**.
2. Select the **Routing** node in the navigator.
3. Choose **Properties** from the **Tools** menu to display the Routing Properties window.
4. Enter routing header information and click **OK** to save.

Adding Operation Steps

The Operation List displays all operations. It serves as the source for adding new operations to a routing. This list is not available when the routing is in view mode.

◗ To add a new operation step:

1. If the operation list is not displayed, then click **Show/Hide Operation Master**. The operation list displays.

2. Select an operation from the list and associate it to the routing in the navigator or in the Routing Dependency Graph pane. When adding a step to the routing, the application validates the operation and displays the **Operation Step Properties** window. You can review or override the default values in this window.
3. Save your work.

Using the Process Instruction Sheet

The Process Instruction Sheet pane is a view only user interface that displays on the right side of the Recipe Designer. It is a hierarchical grid that combines the details of the three main components of the recipe: routing steps, the formula items associated to the steps, and the process instructions. The Process Instruction Sheet updates automatically, and instantaneously reflects any changes that you make.

Standard process instructions are defined at the routing step level and at the formula item level. These instructions are generic and apply to any recipes that use the routing and the formula. These standard instructions are shown in the Process Instruction Sheet, but cannot be amended in the recipe.

The standard process instructions maintained at item level in the formula display under the item line. You can show or hide process instructions by expanding or collapsing the corresponding item line. The process instructions defined at the step and item association level for the selected recipe are displayed. The process instructions defined at the recipe level appear with a yellow background to distinguish between standard instructions defined at the formula level, and the specific instructions defined at the recipe level.

In order to define process instructions that are specific to a particular recipe, use the Edit Process Instruction window.

Process instructions are defined at two separate levels within a recipe:

- At the routing step level with instructions that need to be considered at a specific stage in the process.
- At the routing step and item level with instructions that are specific to the processing of a specific item at a particular stage in the process.

◗ To create or edit process instructions:

1. There are two methods to display the **Edit Process Instructions** window:
   - In the navigator, right-click the appropriate item line for a product, ingredient, byproduct, or routing step, then choose **Edit Process Instructions**.
   - In the navigator, click the appropriate item line for a product, ingredient, byproduct, or routing step, then choose **Edit Process Instructions** from the **Tools** menu.
2. Enter or edit text.
3. Click **OK**.

4. Save your work.

To add text tokens to process instructions:

1. There are two methods to display the **Edit Process Instructions** window:
   - In the navigator, right-click the appropriate item line for a product, ingredient, byproduct, or routing step, then choose **Edit Process Instructions**.
   - In the navigator, click the appropriate item line for a product, ingredient, byproduct, or routing step, then choose **Edit Process Instructions** from the **Tools** menu.
2. Click **Find**. Select the appropriate text tokens.
3. Click **OK**. The full text for the text token displays in the **Process Instructions** window.
4. Save your work.

Expanding and Collapsing Nodes

You can expand all nodes to view the entire recipe structure in the navigator. This feature is also available in the Routing and Formula navigators. The following options can be selected from the Tools menu to expand or collapse a selected node or the entire navigator with just one click. You can also right-click a node in the navigator and select one of the following options from the right-click menu:

- Expand the selected node. Choose this option to expand the selected node and subnodes.
- Collapse the selected node. Choose this option to collapse the selected node and subnodes.
- Expand All. Choose this option to expand the entire navigator.
- Collapse All. Choose this option to collapse the entire navigator.

Editing User Preferences

The Preferences window provides the ability to maintain preferences related to the formula. Formula preferences are used to customize the behavior of the application when the following actions are performed:

1. Add a new item to the formula
2. Search an item in the Item Master list

User preferences are defined using profile options. They can be updated through the standard Profiles window, or through the Preferences window in the Recipe Designer.

To edit preferences:

1. Navigate to the **Recipe Designer**.
2. Select **Preferences** from the **Actions** menu. The **Preferences** window displays.

Formula

3. Select the **Display New Item Window** to display the **New Item** window when adding a new item. This prompts you to review and override the default item attributes. Clear this box to review and edit default values later using the **Item Properties** window.
4. Enter a **Category Set** to display on the Item Master List, otherwise leave this field blank.

Routing

5. Select one of the following:
   - **Display Step Properties Window** to display the Step Properties window when you add a new step.
   - **Generate Step Number Automatically** to generate a step number automatically when you add a new step.
6. Select one of the following:
   - **Display Step Properties Window** to display the Step Properties window when you create a new step dependency.
   - **Generate Default Attributes** to generate the default step attributes when creating a step dependency. Select the **Dependency Type** as Finish-to-start or Start-to-start.

Step Dependency Graph

7. Select **Display Step Quantity** to display the quantity of each step. Clear this box to hide step quantities.
8. Select **Display Transfer Percentage** to display the transfer percentages between steps. Clear this box to hide transfer percentages between steps.

Process Instructions

9. **Language** displays the default language. You can edit this field. Description displays a description of the Language code.
10. Click **OK**.

7

Tools

This topic presents multipurpose tools that help you manage recipes, formulas, routings, operations, and validity rules. It includes a basic understanding of each tool. Several customer requirements are stated for Product Development tools and some typical solutions are provided. A discussion of tools shows you how Product Development enhances your ability to manage routine and advanced search and replace operations.

The following topics provide a basic understanding of tools:

- Understanding Mass Search and Replace
- Requirements
- Solutions
- Performing a Mass Search and Replace

Understanding Mass Search and Replace

The Mass Search and Replace window lets you search for and replace records in:

- Operations
- Routings
- Formulas
- Recipes
- Validity Rules

The Find list enables you to select the target for the search, such as an operation or a routing. You can only search for one target at a time. The Basic and Advanced search regions let you specify conditions to narrow the search. Once you have selected a target, and initiated a search, clear the window before searching for a new target.

Using the Basic Search Region

The Basic search region enables you to specify any combination of Name, Version, Description, Organization, Owner, or Status. Enter specific search data, or use the wildcard % for search string matching.

For example, if you search for:

Owner JDOE

Name A%

The results contain all entries where the Owner is JDOE and that start with the letter A.

Using the Advanced Search Region

The Advanced search region enables you to specify conditions to narrow the search for one or more Item field entries. You can specify different conditions for each search target.

Specifying the Item Field in an Advanced Search

- For Operations you can specify search conditions for:
  - Activity
  - End Date
  - Operation Class

- Operation
- Operation Version
- Resource
- Start Date
- Status

- For Routings you can specify search conditions for:
  - End Date
  - Operation
  - Owner
  - Routing Class
  - Routing
  - Routing Version
  - Start Date
  - Status
- For Formulas you can specify search conditions for:
  - Byproduct
  - Formula Class
  - Formula
  - Formula Version
  - Ingredient
  - Owner
  - Product
  - Status
- For Recipes you can specify search conditions for:
  - Formula
  - Owner
  - Owner Organization
  - Recipe

  - Recipe Version
  - Routing
  - Status
- For Validity Rules you can specify search conditions for:
  - End Date
  - Maximum Qty
  - Minimum Qty
  - Organization
  - Planned Process Loss
  - Preference
  - Product
  - Recipe Use
  - Start Date
  - Status
  - Standard Qty

Specifying the Condition Field in an Advanced Search

In an advanced search of operations, routings, formulas, recipes, or validity rules, select any of the following conditions for one or more items entered:

- Equal To finds targets equal to the specified Value entered.
- Greater Than finds targets greater than the specified Value entered.
- Less Than finds targets less than the specified Value entered.
- Greater Than or Equal To finds targets greater than or equal to the specified Value entered.
- Less Than or Equal To finds targets less than or equal to the specified Value entered.
- In finds targets that contain the information specified in single quotation marks.

  For example, if you specify the Item as Owner, select the Condition In, and enter 'JDOE' as the Value, you find all targets whose owners are JDOE. You can

enter one or several Values for the search. You must separate each entry with a comma.

For example, if you specify the Item as Product, select the Condition In, and enter 'FORMULA 101','ROUTING 100' you find each target product that contains the entries specified within single quotation marks.

- Not In finds targets that do not contain the information specified in single quotation marks.

  For example, if you specify the Item as Owner, select the Condition Not In, and enter 'JDOE' as the Value, you find all targets whose owners are not JDOE. You can enter one or several Values for the search. You must separate each entry with a comma.

  For example, if you specify the Item as Product, select the Condition Not In, and enter 'FORMULA 101','ROUTING 100' you find each target product that does not contain entries specified within single quotation marks.

- Like finds targets similar to the the information specified using the wildcard %.

  For example, if you specify the Item as Product, select the Condition Like, and enter FORM% you find each target Product that contains entries with the letters FORM.

Mass Search and Replace Security

Your System Administrator sets up the security level for Mass Search and Replace. This is done in the System Administrator responsibility using the Applications Functions window. When functions are registered for the appropriate responsibility that can use Mass Search and Replace two parameters are passed with the following settings:

- Enable_status=No disables the ability to make a change of status using Mass Search and Replace. If you cannot change status, then contact your System Administrator. The default is Yes.
- Enable_replace=No disables the replace capability. If you cannot use the replace capability, then contact your System Administrator. The default is Yes.

Default Status Rules Applied to New Versions

When new versions of operations, routings, formulas, recipes, and validity rules are created during the Mass Search and Replace process, the default status is assigned according to the status set up for configuration rules on the Default Configuration

Parameters window. If a new formula is created, then a new recipe is also created if the recipe configuration rules are set up for the formula owner organization.

Requirements

Following are some requirements that customers have for tools in Product Development.

Can the application perform a mass search and replace for ingredients in formulas?

Yes. By using the Product Development Search and Replace tool, the application searches for and replaces specified records in recipes, formulas, routings, operations, and validity rules.

Does mass search and replace support change management control by allowing status and version updates?

Yes. As part of change management control, mass search and replace enables rapid component substitution while supporting status and version control updates for each formula, recipe, routing, operation, or validity rule affected by the substitution.

Solutions

Product Development provides solutions to help resolve issues at every stage of the product development process. The following represent some of the key management solutions for tools.

Product Development Mass Search and Replace Provides Efficient Substitutions in Formulas, Routings, Operations, Recipes, and Validity Rules The Mass Search and Replace window enables the identification and replacement of key components in formulas, routings, operations, recipes, and validity rules for single or multiple organizations. The basic features of the mass search and replace tool permit the query for fundamental components such as the name, version, description, owner, and status. Advanced search and replace features facilitate the search and replacement of components using conditions and specific values in formulas, routings, operations, recipes, and validity rules.

Mass Search and Replace Supports Change Management Control Formula ingredient substitution is a critical business need for process industries to meet stringent product specifications during batch production. The tool enables rapid identification and replacement of approved ingredient substitutions.

Ingredients are replaced for various business reasons such as obsolescence, customizations, pricing, or regulatory compliance. Mass Search and Replace takes into account the affected formula and status in order to recalculate step quantities, technical parameters, and formula contribution by class and subclass. As part of change management control, this tool assists in the management of status and version for each changed component.

Performing a Mass Search and Replace

The Mass Search and Replace window lets you search for and replace components in recipes, formulas, operations, routings, and validity rules.

You cannot replace components in recipes, formulas, operations, routings, or validity rules that have a status of obsolete/archived, or on hold. If you attempt to replace any components in these entities, then an error message displays indicating that you can only change the status. You can search for recipes, formulas, operations, routings, or validity rules that are obsolete/archived or on hold. The Update indicator is cleared for these entities. If you attempt to select the Update indicator, then an error message displays that indicates you can only update the status. Select the Replace tab, choose Status, and select the Update indicator.

You cannot replace components in recipes, formulas, operations, routings, or validity rules with a status of pending. If workflow, e-records, and e-signatures are enabled, and a status is changed through mass search and replace, then the entity changes to a pending status. You cannot update an entity with a pending status until it is approved. Go to the advanced worklist to approve a pending status through Oracle Workflow or Oracle E-Records, and respond to the notification. If you attempt to replace any components for such entities, then you will receive an error message.

Prerequisites

- ❑ Determine if your responsibility has the authority to use the mass search and replace function.
- ❑ Read the "Understanding Mass Search and Replace" topic.

◗ To search for and replace components:

1. Navigate to the **Mass Search and Replace** window.
2. Select **Operations**, **Routings**, **Formulas**, **Recipes, or Validity Rules** from the **Find** list to specify the type of records to search for and replace.
3. The **Basic** and **Advanced** regions let you specify the search criteria.

   Enter one or more of the search parameters. It is not necessary to enter them all. You can use string search matching by entering % as wildcard.

Basic

4. Enter the **Name** of the record type you need to search and replace.
5. Enter the **Version** number of the record type you need to search and replace.

6. Enter the **Description** of the record type you need to search and replace.
7. Enter the **Organization** of the record type you need to search and replace.
8. Enter the **Owner** of the record type you need to search and replace.
9. Select a **Status** of the record type you need to search and replace.
10. You have the option to:
    - Click **Find** to search for all records that match the Basic search criteria. If you do this, then proceed to step 13.
    - Click the **Advanced** region to enter additional search criteria. If you do this, then proceed to step 11.

Advanced

11. Enter an **Item**, **Condition**, and **Value** to specify a condition for the search. For example, to search for all formulas with a version of 1, select **Formula Version** as the **Item**, **Equal To** as the **Condition**, and enter a Value of 1.
12. Click **Find** to search for all records that match **Basic** and **Advanced** search criteria.
13. The **Results** of the search display. If no results are found, you not able to use **GoTo** or **Replace**. To review the details for each record found perform one of the following:
    - Double-click the drill down indicator next to the appropriate **Name**.
    - Select the appropriate **Name** and click **Go To**.

    Return to the **Product Development Search and Replace** window to continue.

> **Note:** You cannot use the Replace capability unless you have proper authorization. Contact your System Administrator if you have questions regarding this authorization.

Replace

14. Click the **Replace** region.
15. Select the component to be replaced from the **Replace** list. Enter the **Old** component **Name** and, if required, the **Version**.
16. Enter the **New** component **Name** to replace in selected Results. If required, enter a new **Version**. If the component being replaced is a formula, enter an

appropriate **Scale Factor**. You can replace ingredients using a scale factor greater than zero. However, you cannot replace ingredients using a negative scale factor.

17. Select the **Update** indicator next to each Name that you want to replace with the entry made in the New **Name** field. To update the entire list, select **Select All** from the **Actions** menu. To clear all selections, select **Deselect All** from the **Actions** menu.

18. Press **Replace** to perform the specified changes. The message "Are you sure you want to replace this?" is displayed:

    - Click **Yes** to proceed and replace the selected records with the **New Name** field.
    - Click **No** to cancel and do not proceed to replace the selected records with the **New Name** field.

    If automatic version control is active, then the message "Create new version?" displays.

    - Enter **Y** to indicate that you want to create a new version.
    - Enter **N** to indicate that you do not want to create a new version.

    Verify that the profile option GMD: Formula Version Control is set to Y or O to get this message. If no records are found that meet the replace criteria, the message "No records were found that meet the replace criteria." is displayed.

19. Note the **Request ID** number displayed.

20. Choose **View** from the menu, and choose **Requests** to view the status of your request in the concurrent program manager.

21. When your **Request ID** has completed normally, select **View Log** to determine if there were any problems. The log displays all successful and failed updates. The log specifies if there were no records found for the replacement operation.

A

Product Development Navigator Paths

Although your System Administrator may have customized your Navigator, typical navigation paths are described in the following tables. In some cases, there is more than one way to navigate to a window. These tables provide the most typical default path.

Window	Path
Activities	Process Engineer:Setup:Activities
Activity Properties	Process Engineer:Routing Designer Navigator:right-click the activity:choose Properties Process Engineer:Routing Designer Navigator:click the activity:choose Properties from the View menu
Add Lot/Sublot	Formulator:Simulator:load simulation: Add Lot/Sublot
Allocations	Formulator:Simulator:Load Simulator:Optimizer:Allocations
Alternate Resources	Process Engineer:Setup:Alternate Resources

Window	Path
By-Product Properties	Formulator:Recipe Designer:Find Recipes:Recipe or Formula tab:right-click the byproduct node:choose Properties Recipe Designer Material View navigator:right-click the byproduct node:choose Properties Recipe Designer Material View navigator:click the byproduct node:choose Properties from the View menu
Calculate Theoretical Yield	Recipe Designer:Find Recipes:select the Formula tab:choose Calculate Theoretical Yield from the Actions menu
Change Status	Formulator:Recipe Designer:Find Recipes:select recipe:Actions:Change Status
Customers	Formulator:Recipe Designer:Find Recipes:choose Customers from the Actions menu
Display Calculation Errors	Formulator:Simulator: Actions:Calculation Errors
Find Analysis	Formulator:Formula Analysis:Analysis:Formula Ingredient Contribution Analysis:View:Find...
Find Formulas (from the Product Development Workbench)	Formulator:Formulator Workbench:click the Formula tab:View:Find...
Find Formulas (from the View Menu)	Formulator:Formulas:Formula Details:View:Find...
Find Item Technical Data	Formulator:Technical Data:Item Technical Data:View:Find...
Find Operations (from the Product Development Workbench)	Process Engineer:Engineering Workbench:click the Operation tab:View:Find...
Find Operations (from the View Menu)	Process Engineer:Operations:Operation Details Activities:View:Find...
Find Recipe Organization Details	Formulator:Recipes:Recipe Details:click Organization Details
Find Recipes (from the Product Development Workbench)	Formulator:Formulator Workbench:click the Recipe tab:View:Find...

Window	Path
Find Recipes (from the Recipe Designer)	Formulator:Recipe Designer Formulator:Recipe Designer:Find Recipes:File:Open
Find Recipes (from the View Menu)	Process Engineer:Recipes:Recipe Details:View:Find...
Find Routings (from the Product Development Workbench)	Process Engineer:Engineering Workbench:click the Routing tab:View:Find...
Find Routings (from the Routing Designer)	Process Engineer:Routing Designer Navigator Process Engineer:Routing Designer Navigator:File:Open
Find Routings (from the View Menu)	Process Engineer:Routings:Routing Details:View:Find...
Find Technical Parameters	Formulator:Technical Data:Technical Parameters:View:Find...
Find Technical Parameter Sequences	Formulator:Technical Data:Technical Parameter Sequences:View:Find...
Find Status Codes	Formulator:Setup:Status Codes:View:Find...
Formula Analysis Parameters	Formulator:Formula Analysis:Parameters
Formula By-Product Line Edit	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula:select By-Products:Formula By-Product Summary:select a Line:click Edit Line (also available from Formula By-Product Line Summary, Formula By-Product Lines, and Formula Details)
Formula By-Product Line Summary	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula node:expand By-Products:select a byproduct node

Window	Path
Formula By-Product Lines	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:select a formula:Formula Header Summary:click By-Products (also available from Formula By-Product Summary and Formula Details)
Formula By-Product Summary	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula:select By-Products
Formula Classes	Formulator:Setup:Formula Class
Formula Details	Formulator:Formulas (also available from Formulas Summary By... and Formula Header Summary)
Formula Header Summary	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:select a formula node label
Formula Ingredient Contribution Analysis	Formulator:Formula Analysis:Analysis
Formula Ingredient Line Edit	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula node:select Ingredients:Formula Ingredient Summary:select a Line:click Edit Line (also available from Formula Ingredient Line Summary, Formula Ingredient Lines, and Formula Details)
Formula Ingredient Line Summary	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula node:expand Ingredients:select an ingredient node
Formula Ingredient Lines	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:select a formula:Formula Header Summary:click Ingredients (also available from Formula Ingredient Summary and Formula Details)
Formula Ingredient Summary	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula node:select Ingredients

Window	Path
Formula Inquiry Selection	Formulator:Formula Inquiry
Formula Inquiry Summary View	Formulator:Formula Inquiry:Formula Inquiry Selection
Formula Product Line Edit	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula node:select Products:Formula Product Summary:select a Line:click Edit Line (also available from Formula Product Line Summary, Formula Product Lines, and Formula Details)
Formula Product Line Summary	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:expand a formula node:expand Products:select a product node
Formula Product Lines	Formulator:Formulator Workbench:click the Formula tab:expand Formulas:select a formula node:Formula Header Summary:click Products (also available from Formula Product Summary)
Formula Product Summary	Formulator:Formulator Workbench:expand Formulas:expand a formula node:select Products
Formula Properties	Formulator:Recipe Designer:Find Recipes:choose the Formula tab:select a formula node:Actions:Properties
Formula Summary By...	Formulator:Formulator Workbench:click the Formula tab:choose View By:select Class, Status, Owner, Laboratory, Product, or Plant:expand Formulas By...:select an unexpanded node
Indented Bill of Materials Report	Formulator:Indented Formulas

Window	Path
Ingredient Properties	Formulator:Recipe Designer:Find Recipes:Recipe or Formula tab:right-click the ingredient node:choose Properties Recipe Designer Material View navigator:right-click the ingredient node:choose Properties Recipe Designer Material View navigator:click the ingredient:choose Properties from the View menu
Item Technical Data	Formulator:Technical Data:Item Technical Data
Item Technical Data Selection	Formulator:Recipe Designer:Find Recipes:choose Formula tab:select intermediate ingredient:choose Technical Data Selection from the Actions menu Formulator:Formulas:Formula Details:choose Technical Data Selection from the Actions menu
Items	Formulator:Inventory Items
Load Simulator	Formulator:Simulator:View:Find...
Mass Search and Replace	Formulator:Mass Search And Replace
New Item	Formulator:Recipe Designer:Find Recipes:click the Recipe tab:associate items to the formula in the navigator (window displays only when the Display New Item Window user preference is selected)
Operation Activity	Process Engineer:Operations:Operation Details Activities:select an activity:click Resources
Operation Activity Line	Process Engineer:Engineering Workbench:click the Operation tab:chose View By Operations:expand Operations:select an operation node:Operation Header Summary:click Details:Operation Details Activities:select an activity (also available from Operation Activity Line Summary)

Window	Path
Operation Activity Line Summary	Process Engineer:Engineering Workbench:click the Operation tab:choose View By Operation:expand Operations, expand an operation node:select an activity
Operation Classes	Process Engineer:Setup:Operation Classes
Operation Details Activities	Process Engineer:Operations (also available from Operation Summary By..., Operation Header Summary, and Routing Details)
Operation Details Activity-Resource	Process Engineer:Operations:Operation Details Activities:query an operation:select an Activity:click Resources
Operation Header Summary	Process Engineer:Engineering Workbench:click the Operation tab:choose View By Operation:expand Operations:select an operation node label
Operation Resource Line	Process Engineer:Engineering Workbench:click the Operation tab:choose View By Operation:expand Operations:select an operation:Operation Header Summary:click Details (also available from Operation Details Activity-Resource)
Operation Resource Line Summary	Process Engineer:Engineering Workbench:click the Operation tab:choose View By Operation:expand Operations:expand an operation node:expand an activity node:select a resource
Operation-Resource Process Parameters	Process Engineer:Operations:select the desired Activity:click Resources:click Parameters
Operations Summary By...	Process Engineer:Engineering Workbench:click the Operation tab:choose View By Class or Status:expand Operations By...:select unexpanded operation node
Optimizer	Formulator:Simulator:click Optimizer

Window	Path
Preferences	Formulator:Recipe Designer:Find Recipes:choose Preferences from the Actions menu
Product Development Workbench	Process Engineer:Engineering Workbench
Product Properties	Formulator:Recipe Designer:Find Recipes:Recipe or Formula tab:right-click the product node:choose Properties
Recipe Designer	Formulator:Recipe Designer Process Engineer:Recipe Designer Formulator:Recipes:query the desired recipe:click Designer (also available from Recipe Summary and Recipe Header Summary)
Recipe Details	Process Engineer:Recipes Formulator:Recipes (also available from Recipe Header Summary and Recipes Summary By...)
Recipe Generation	Formulator:Setup:Recipe Generation
Recipe Header Summary	Formulator:Formulator Workbench:click the Recipe tab:choose View By Recipe:expand Recipes:select a recipe node label
Recipe Organization Details	Formulator:Recipe Orgn Details:Find Recipe Organization Details:enter search parameters:click Find (also available from Recipe Details)
Recipe Properties	Recipe Designer:right-click the recipe node:choose Properties Recipe Designer:click the recipe:choose Properties from the View menu
Recipe Step/Material Association	Formulator:Formulator Workbench:click the Recipe tab:choose View By Recipe:select a recipe:Recipe Header Summary:click Details:Recipe Details:click Step/Material Association

Window	Path
Recipe Validity Rules	Formulator:Recipes:query a recipe on the Recipe Details window:click Validity Rules Formulator:Formulator Workbench:click the Recipe tab:choose View By Recipe:expand Recipes:select a recipe node:Recipe Header Summary:click Validity Rules tab:select desired validity rule:click Details (also available from Recipe Header Summary)
Recipes Summary By...	Formulator:Formulator Workbench:click the Recipe tab:choose View By Status or Owner:expand Recipes By...:select unexpanded node
Resource Properties	Process Engineer:Routing Designer Navigator:right-click resource:choose Properties Process Engineer:Routing Designer Navigator:click the resource:choose Properties from the View menu
Resource Information	Process Engineer:Setup:Plant Resources
Resources	Process Engineer:Setup:Generic Resources
Routing Classes	Process Engineer:Setup:Routing Classes
Routing Designer	Process Engineer:Routing Designer Process Engineer:Routings:query the desired routing:click Designer (also available from Routing Summary and Routing Header Summary)
Routing Details	Process Engineer:Routings (also available from Routings Summary By... and Routing Header Summary)
Routing Header Summary	Process Engineer:Engineering Workbench:click the Routing tab:choose View By Routing:expand Routings:select a routing node label

Window	Path
Routing Properties	Process Engineer:Routing Designer Navigator:right-click the routing:choose Properties Process Engineer:Routing Designer Navigator:click the routing:choose Properties from the View menu.
Routing Step Dependencies	Process Engineer:Routings:Routing Details:query a routing:select a Step:click Step Dependencies
Routing Step Dependency Properties	Routing Designer:displays automatically after drawing connection between two steps Routing Designer:double-click the line connecting two steps Routing Designer right pane:right-click the line connecting two steps:choose Properties
Routing Step Line	Process Engineer:Routings:Routing Details:query a routing:select a Step (also available from Routing Step Line Summary)
Routing Step Line Summary	Process Engineer:Engineering Workbench:click the Routing tab:select View By Routing:expand Routings:expand a routing node:select an operation node
Routing Step Properties	Process Engineer:Routing Designer Navigator:right-click the routing step:choose Properties Process Engineer:Routing Designer Navigator:click the routing step:choose Properties from the View menu Routing Designer routing graph pane:double-click the routing step
Routings Summary By...	Formulator:Formulator Workbench:click the Routing tab:choose View By Class, Status, or Owner:expand Routings By...:select an unexpanded node

Window	Path
Save As (Recipe)	Formulator:Recipe Designer:Find Recipes:File:Save As Process Engineer:Recipe Designer:Find Recipes:File:Save As
Save As (Routing)	Process Engineer:Routing Designer:File:Save As
Save Simulation	Formulator:Simulator:choose Save Simulation from the Actions menu
Scale Formula	Formulator:Recipe Designer:Find Recipes:select the Formula tab:choose Scale from the Actions menu
Simulator	Formulator:Simulator
Status Codes	Formulator:Setup:Status Codes
Status Details	Formulator:Setup:Status Codes:click Details
Technical Parameter Sequences	Formulator:Technical Data:Technical Parameter Sequences
Technical Parameters	Formulator:Technical Data:Technical Parameters Formulator:Formulas:Formula Details:query the formula:select Ingredients region:select Line containing technical parameters:select Ingredient Technical Parameters from Actions menu
Theoretical Process Loss	Process Engineer:Product Development Workbench:click the Routing tab:expand Routings:click a Routing:Routing Header Summary:click Theoretical Process Loss
Validity Rule Summary By Product	Formulator:Validity Rules - Product
Validity Rule Summary By Recipe	Formulator:Validity Rules - Recipe
Workpad	Formulator:Simulator:click Optimizer:click Workpad

B

Product Development Profile Options

During your implementation, you set a value for selected profile options to specify how your Product Development application controls access to and processes data. Product Development uses the listed profile options.

- GMD: Allow Zero Ingredient Qty
- GMD: Automatic Generation Of Step Dependency Attributes
- GMD: Automatic Step Number Generation
- GMD: Byproduct Active
- GMD: Default Consumption/Yield Type
- GMD: Default Dependency Type
- GMD: Default Step Release Type
- GMD: Default Lab Organization
- GMD: Density
- GMD: Designer Category Set
- GMD: Designer Display New Item Window
- GMD: Display Step Qty In Routing Graph
- GMD: Display Transfer Pct In Routing Graph
- GMD: Display Transfer Qty In Routing Graph
- GMD: Enforce Step Dependency
- GMD: Formula Security
- GMD: Formula Version Control

- GMD: Operation Version Control
- GMD: Process Instruction Paragraph
- GMD: Recipe Version Control
- GMD: Routing Version Control
- GMD: Scrap Factor Type
- GMD: Technical Parameter Category Set
- GMD: UOM Mass Type
- GMD: UOM Volume Type
- GMD: User Name for ALL
- GMD: Workflow Timeout (in Days)
- GMD: Yield Type

You can set up these profile options when you set up other applications prior to your Product Development implementation. Refer to the other product user's guides for more details on how these products use these profile options.

Your System Administrator sets user profile options at one or more of the following levels: Site, Application, Responsibility, and User. Use the Personal Profile Options window to view or set your profile options at the user level. You can consult the *Oracle Process Manufacturing Implementation Guide* for a complete description of the profile options listed. Consult your *Oracle Applications System Administrator's Guide* for a list of profile options common to all Oracle Applications.

C

Product Development Status Codes

This appendix outlines how status codes change when workflow is and is not running.

Workflow Running and Approval Required for the Current Data

A status of New changes to a status of:

- Pending Approval for Laboratory Use when the Requester selects Approve for Laboratory Use.
- Pending Approval for General Use when the Requester selects Approve for General Use.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Pending Approval for Laboratory Use changes to a status of:

- Approved for Laboratory Use when the Approver approves the request.
- Revise for Laboratory Use when the Approver rejects the request.

A status of Revise for Laboratory Use changes to a status of:

- Pending Approval for Laboratory Use when the Requester selects Approve for Laboratory Use.

A status of Approved for Laboratory Use changes to a status of:

- Pending Approval for General Use when the Requester selects Approve for General Use.
- On Hold when the Requester selects On Hold.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Pending Approval for General Use changes to a status of:

- Approved for General Use when the Approver approves the request.
- Revise for General Use when the Approver rejects the request.

A status of Revise for General Use changes to a status of:

- Pending Approval for General Use when the Requester selects Approve for General Use.

A status of Approved for General Use changes to a status of:

- On Hold when the Requester selects On Hold.
- Frozen when the Requester selects Frozen.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of On Hold changes to a status of:

- Pending Approval for Laboratory Use when the Requester selects Approve for Laboratory Use.
- Revise for Laboratory Use when the Requester selects Revise for Laboratory Use.
- Revise for General Use when the Requester selects Revise for General Use.
- Pending Approval for General Use when the Requester selects Approve for General Use.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Frozen changes to a status of:

- On Hold when the Requester selects On Hold.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Obsolete or Archived changes to a status of:

- Revise for Laboratory Use when the Requester selects Revise for Laboratory Use.
- Revise for General Use when the Requester selects Revise for General Use.

Workflow Not Running

A status of New changes to a status of:

- Approve for Laboratory Use when the Requester selects Approve for Laboratory Use.

- Approve for General Use when the Requester selects Approve for General Use.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Approved for Laboratory Use changes to a status of:

- Approve for General Use when the Requester selects Approve for General Use.
- On Hold when the Requester selects On Hold.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Approved for General Use changes to a status of:

- On Hold when the Requester selects On Hold.
- Frozen when the Requester selects Frozen.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of On Hold changes to a status of:

- Approve for Laboratory Use when the Requester selects Approve for Laboratory Use.
- Approve for General Use when the Requester selects Approve for General Use.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Frozen changes to a status of:

- On Hold when the Requester selects On Hold.
- Obsolete or Archived when the Requester selects Obsolete or Archived.

A status of Obsolete or Archived changes to a status of:

- Approve for Laboratory Use when the Requester selects Approve for Laboratory Use.
- Approve for General Use when the Requester selects Approve for General Use.

D

Oracle E-Records Events in Product Development

OPM Product Development supports the acquisition of electronic signatures on electronic records. Electronic documentation replaces paper with a seamless interface of business activities that improves manufacturing throughput and enhances the overall quality of operations in the enterprise. The following provides information for online and deferred events that are e-record and e-signature enabled in the OPM Product Development application. A brief discussion of each event is provided. Refer to the *Oracle E-Records Implementation Guide* for details on setting up the events and approvals.

Events

The following table lists the events that are e-record and e-signature enabled for OPM Product Development:

Event	Online or Deferred
Operation Approval	Deferred
Routing Approval	Deferred
Formula Approval	Deferred
Recipe Approval	Deferred
Validity Rule Approval	Deferred

Operation Approval

When the status of an operation is changed, the e-signatures can be captured at multiple points in the process. When the status change is requested, required signatures can be captured online, while the event is happening in the window. Any users responsible for additional required signatures receive workflow notifications informing them that their e-signature must be entered before the status of the operation is changed to the requested status.

The Change Status window in Product Development starts the signature capturing process whenever an operation status change is requested. This replaces the existing operation approval workflow.

Routing Approval

When the status of a routing is changed the e-signatures can be captured at multiple points in the process. When the status change is requested, required signatures can be captured online, while the event is happening in the window. Any users responsible for additional required signatures receive workflow notifications informing them that their e-signature must be entered before the status of the routing is changed to the requested status.

Formula Approval

When the status of a formula is changed the e-signatures can be captured at multiple points in the process. When the status change is requested, required signatures can be captured online, while the event is happening in the window. Any users responsible for additional required signatures receive workflow notifications

informing them that their e-signature must be entered before the status of the formula is changed to the requested status.

Recipe Approval

When the status of a recipe is changed the e-signatures can be captured at multiple points in the process. When the status change is requested, required signatures can be captured online, while the event is happening in the window. Any users responsible for additional required signatures receive workflow notifications informing them that their e-signature must be entered before the status of the recipe is changed to the requested status.

Validity Rule Approval

When the status of a validity rule is changed the e-signatures can be captured at multiple points in the process. When the status change is requested, required signatures can be captured online, while the event is happening in the window. Any users responsible for additional required signatures receive workflow notifications informing them that their e-signature must be entered before the status of the validity rule is changed to the requested status.

Finding Additional E-record Information

You can find the following information in the *Oracle E-Records Implementation Guide:*

- Events
- Event Key
- Subscriptions

From the XML Gateway, using the existing Event and Event Key, you can derive the XML Map, Subscription Data, and Metadata.

Statuses Available for E-records

You can set up the capturing of e-signatures and e-records for the following seeded statuses and any other customized statuses:

- Approved for Laboratory Use
- Approved for General Use
- On Hold
- Frozen
- Obsolete/Archived

Glossary

Activity

Action performed during the manufacturing process, such as mixing or heating.

Activity Factor

The number of times an activity is performed. For example, a quality test must be performed at the beginning, middle, and end of a mixing time period. Rather than defining the activity and associated resources three times, use a factor or multiplier to indicate several iterations of the same activity. In example of performing a test at the beginning, middle, and end of a mixing time period, you would define a factor of 3. Factors are applied to resource usage when planning and calculating resource costs. Factors can be set to zero to exclude a particular activity. This is also a means to select the equipment (resources) that are used for this production run within this specific plant.

Boolean

A logical combinatorial system that represents the symbolic relationships between entities. Typical logical operators are: AND, OR, and NOT. In Boolean searching, the AND operator between two words indicates a search for both words. For example "pear AND apple" searches for information containing both words.

Byproduct

An item produced by a formula in addition to the product. Byproducts differ from products in that you do not plan your production to make byproducts. Byproducts can have monetary value, but generally have less monetary value than products. In some instances there can be a cost associated with disposing of a byproduct.

Category

Code used to group items with similar characteristics, such as plastics, paints, inks, or foods.

Category Set

Grouping scheme consisting of categories. Typical category sets include purchasing, materials, costing, and planning.

Charges

Often in a process manufacturing plant the capacity of a step is determined by the equipment used. For example, a mixing tank that has a maximum capacity of 1000 gallons overflows if more is added. A charge is defined as one full load that can be accommodated in a single pass through equipment. The maximum capacity determines the total number of charges that are required to process the ingredients required for a batch. In the previous example, a batch size of 5000 gallons requires five charges at 1000 gallons each.

Component Class

A way of classifying item costs. Examples of component classes are labor or overhead.

Coproduct

One of several products produced by a formula. The term coproduct is sometimes used when a formula produces more than one product. OPM does not distinguish between products and coproducts. Compare with byproduct.

Cost Analysis Code

A code that generally specifies whether an activity is value-added.

Density

The quantity of a material per unit volume. In general, density is mass divided by volume.

Electronic Record

Also e-record. Any combination of text, graphics, data, audio, pictorial, or other information representation in digital form that is created, modified, maintained, archived, retrieved, or distributed by a computer system.

Electronic Signature

Also e-signature. A computer data compilation of any symbol or series of symbols executed, adopted, or authorized by an individual to be the legally binding equivalent of the individual's handwritten signature.

Event

An occurrence in an Internet or intranet application or program that is significant to other objects in a system or to external agents.

Exponentiation

The act or process of raising a quantity to a power.

Formula

A statement of ingredient requirements. A formula can also include processing instructions and ingredient sequencing directions. The formula can also specify the quantities of each item.

Gravimetric

Of or relating to measurement by weight.

Ingredient

An item that is used in a formula to produce a product.

Operation

A combination of one or more activities and the resources used to perform those activities. For example, the combination of mixing (activity) and the mixer (resource) defines the mixing operation.

Process Parameter

A processing instruction. Processing parameters are used to provide operators with information needed for managing equipment that is used during the preparation of a product or to drive a production decision, such as the type of filter to use, or the quantity of product required to fill a container. There is no direct linkage between a process parameter and the equipment it describes.

Product

An item that is produced by a formula. See also coproduct.

Project

In the context of product development, this represents an endeavor undertaken to develop a new product or to perform changes to an existing product. A project gathers information about the project manager, participants and objectives to be met such as start dates, end dates, unit cost, and quality specifications.

Recipe

An entity that contains the minimum set of information that uniquely defines the manufacturing requirements for a specific product. Recipes provide a way to describe products and how those products are produced.

Resource

Any noninventory item used in production, like a mixer or oven.

Routing

A sequenced set of operations that need to be performed in order to complete a production batch.

Routing Process Loss

The capability to account for material lost during the production process at the routing level. This loss can vary depending on the routing and quantity being processed by the routing. A loss factor is defined at the routing level based on a range of quantities.

Scaling

The proportional increase or decrease of product, byproduct, and ingredient quantities in a formula or batch.

Specific Gravity

The ratio of the density of a substance to the density of some other substance, usually pure water, taken as a standard when both densities are obtained by weighing in air at standard temperature and pressure.

Specification

Identify the target or ideal result of a quality control assay test performed on an item or lot. Assay codes and item attributes are combined to devise test specifications for specific items and lots.

Technical Class

An item category that is used to identify and group ingredients. It is used to analyze ingredients within a formula by contribution of the class. This can assist in both development and maintenance of a formula, wherein the overall contribution of specific technical characteristics of ingredients is significant.

Technical Subclass

An item category that is used to identify and group ingredients within a technical class. The technical subclass refines the analysis of ingredients within a formula a level beyond the technical class. For example, if a technical class is RESIN, a technical subclass could be EPOXY.

Theoretical Process Loss

The capability to account for the material lost during the production process at the routing level. This loss can vary depending on the routing or the individual quantity being processed by the routing. This loss is defined at the routing level and is based on a minimum and maximum range of quantities.

Theoretical Yield Calculation

A calculation that calculates product quantities yielded by a formula given a specified yield percentage.

Validity Rule

Formerly effectivity. The combination of a quantity of material and an effective date that is used by production, planning, costing, or MSDS in one or more specified organizations.

Version

A number identifying a variant of a formula, operation, routing, or recipe.

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