# Oracle® Process Manufacturing

Laboratory Management User's Guide

Release 11*i*

February 2000

Part No. A77219-01

ORACLE®

Oracle® Process Manufacturing Laboratory Management User's Guide, Release 11*i*

Part No. A77219-01



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**Oracle® Process Manufacturing Laboratory Management User's Guide, Release 11*i***

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# Preface

Welcome to the Oracle Process Manufacturing *Laboratory Management User's Guide*. This user's guide includes the information you need to work with the Oracle Process Manufacturing (OPM) application effectively.

This preface explains how this user's guide is organized and introduces other sources of information that can help you.

## Intended Audience

This guide assumes that you have working knowledge of your business area's processes and tools. It also assumes that you are familiar with OPM Laboratory Management. If you have never used Laboratory Management, we suggest you attend one or more of the Oracle Process Manufacturing training classes available through Oracle World Wide Education.

This guide also assumes that you are familiar with the Oracle Applications graphical user interface. To learn more about Oracle Applications graphical user interface, read the *Oracle Applications User's Guide*.

## About This Guide

This guide contains overviews as well as task and reference information. It includes the following:

| Name | Description |
|---|---|
| Laboratory Management Prerequisites | Explains all the necessary setup required prior to operating the Laboratory Management application |

| | |
|---|---|
| Laboratory Management Setup | Explains how to define and set up laboratory types, technical parameters, technical parameter sequences, and how to enter technical parameter data |
| Laboratory Formulas | Explains how to enter formula ingredients, add additional formula information, download a production formula, list experimental items, upload a laboratory formula to production, display ingredient technical parameters, select item technical data, scale ingredient and product quantities and calculate theoretical laboratory yield |
| Laboratory Spreadsheet | Explains how to use the laboratory spreadsheet, save and retrieve a spreadsheet, and display calculation errors |
| Ingredient Management | Explains how to search for and replace ingredients in a formula |
| Laboratory Management Scenario | Shows how to integrate all the functions of laboratory management application |
| Appendix A | Explains typical navigation paths and specific Profile Options that need to be set up |

## Information Sources

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

### Online Documentation

Oracle Applications documentation is available on CD-ROM, except for technical reference manuals. User's guides are available in HTML format and on paper. Technical reference manuals are available on paper only. Other documentation is available on paper and sometimes in PDF format.

The content of the documentation remains the same from format to format. Slight formatting differences could occur due to publication standards, but such differences do not affect content. For example, page numbers are included on paper, but are not included in HTML.

The HTML documentation is available from all Oracle Applications windows. Each window is programmed to start your web browser and open a specific, context-sensitive section. Once any section of the HTML documentation is open, you can navigate freely throughout all Oracle Applications documentation.

## Related Documents

Oracle Process Manufacturing shares business and setup information with other Oracle products. You may find the following Oracle Applications user's guides useful:

- *Oracle Applications User's Guide Release 11i*
- *Oracle Application's Flexfields Guide Release 11i*
- *Oracle Workflow User Guide*
- *Oracle Applications System Administrator's Guide Release 11i*
- *Oracle General Ledger User's Guide Release 11i*
- *Oracle Payables User's Guide Release 11i*
- *Oracle Receivables User's Guide Release 11i*
- *Oracle Human Resources North American User's Guide Release 11i*
- *Oracle Purchasing User's Guide Release 11i*

## Oracle Process Manufacturing Guides

The following is a list of documentation in each product group for OPM Release 11*i*:

**Financials**

- *Oracle Process Manufacturing Accounting Setup User's Guide*
- *Oracle Process Manufacturing Cost Management User's Guide*
- *Oracle Process Manufacturing Manufacturing Accounting Controller User's Guide*
- *Oracle Process Manufacturing and Oracle Financials Integration User's Guide*

**Inventory Control**

- *Oracle Process Manufacturing EC Intrastat Reporting User's Guide*
- *Oracle Process Manufacturing Inventory Management User's Guide*
- *Oracle Process Manufacturing Physical Inventory User's Guide*

**Logistics**

- *Oracle Process Manufacturing Order Fulfillment User's Guide*
- *Oracle Process Manufacturing Purchase Management User's Guide*

**Process Execution**

- *Oracle Process Manufacturing Process Operation Control User's Guide*
- *Oracle Process Manufacturing Production Management User's Guide*

**Process Planning**

- *Oracle Process Manufacturing Capacity Planning User's Guide*
- *Oracle Process Manufacturing Capacity Planning with RHYTHM Factory Planner User's Guide*
- *Oracle Process Manufacturing MPS/MRP and Forecasting User's Guide*

**Product Development**

- *Oracle Process Manufacturing Formula Management User's Guide*
- *Oracle Process Manufacturing Laboratory Management User's Guide*
- *Oracle Process Manufacturing Quality Management User's Guide*

**Regulatory**

- *Oracle Process Manufacturing Regulatory Management User's Guide*

**System Administration and Technical Reference**

- *Oracle Process Manufacturing Implementation Guide*
- *Oracle Process Manufacturing System Administration User's Guide*
- Oracle Process Manufacturing Technical Reference Manuals

## Training

Oracle offers a complete set of formal training courses to help you master Oracle Process Manufacturing and reach full productivity quickly. We organize these courses into functional learning paths, so you take only those courses appropriate to your area of responsibility.

You have a choice of educational environments. You can attend courses offered by Oracle Education Services at any one of our many Education Centers, or you can arrange for our trainers to teach at your facility. 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's structure, terminology, and data as examples in a customized training session delivered at your own facility.

# Conventions

The following conventions are used in this guide:

**Bolded Text**

Buttons, fields, keys, menus, and selections are bolded in procedures only. For example: To access the next window, click **OK**. Otherwise, references to these features appear in regular type.

**Additional Menu Options**

Only nonstandard menu options are discussed. Standard menu bar options (such as Save) are not discussed. These standard options are described in the *Oracle Applications User's Guide Release 11i*. Only menu options unique to the use of the specific window are discussed.

**Field References**

References to fields within procedures are in bold type. References within the body of this guide appear in regular type.

**Required Fields**

The word Required appears as the last word in the field description of all required fields. When the field is required contingent on the entry in another field, or only in specific situations, "Required if..." is the last sentence of the field description.

**Fields Reserved for Future Use**

Fields with no current processing implications are referenced by the statement "This field is not currently used" or "Reserved for future use." Do not use these fields for your own reference data, because there are plans to link future functionality to these fields. Fields intended for informational purposes only are referenced by the statement "This field is for informational purposes only."

**Pending/Completed Transactions**

Discussions about processing transactions that use the words pending and completed refer to the status of a transaction. Pending and completed do not refer to the database tables that are updated as a result of transactions (for example, some completed transactions are stored in the Pending Transactions table).

**Procedures**

Most topics contain a procedure with numbered steps. Any actions which are subordinate to a step are assigned letters. You can customize your Oracle Application, therefore, all procedures are suggestive only. Navigate to windows and

between responsibilities in a way that works best for your particular setup. Also note that fields may appear in a different order than they are discussed.

**Use of the Word Character**

The word character means an alphanumeric character. Characters that are numeric or alphabetic only are referenced specifically. Depending on your system security profile, you many not have access to all of the windows and functions described in this guide. If you do not see a menu option described in this guide, and you want access to it, contact your System Administrator.

## Do Not Use Database Tools to Modify Oracle Applications Data

Oracle Applications tables are interrelated. As a result, any change you make using Oracle Applications can update many tables at once. If you modify the Oracle Applications data using anything other than Oracle Applications, you could change a row in one table without making corresponding changes in related tables. If your tables are not synchronized with each other, you risk retrieving erroneous information and receiving 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 track who changes information. If you enter information into database tables using database tools, you could 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.

Consequently, we strongly recommend that you never use SQL*Plus or any other tool to modify Oracle Applications data unless otherwise instructed by Oracle Support Services.

## About Oracle

Oracle Corporation 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 45 software modules for financial management, supply chain management, manufacturing, project systems, human resources, sales, and service 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 140 countries around the world.

## Thank You

Thank you for choosing Oracle Process Manufacturing and this user's guide.

We value your comments and feedback. At the beginning of this guide is a Reader's Comment Form that you can use to explain what you like or dislike about this user's guide. Mail your comments to the following address or call us directly at 650-506-7000.

Oracle Applications Documentation Manager
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Redwood Shores, CA 94065
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Or, send an electronic mail message to appsdoc@us.oracle.com

# 1

# Laboratory Management Prerequisites

This topic explains all the necessary setup required prior to operating the Laboratory Management application.

The following topic is covered:

- Setting Up Other OPM Applications for Laboratory Management

# Setting Up Other OPM Applications for Laboratory Management

The OPM Laboratory Management application improves product consistency and reduces the costs associated with creating and modifying formulas. It is integrated with the OPM Quality Management application and interacts with the OPM Formula Management application. You can characterize and simulate the properties of formula ingredients and their effects on formulas. This capability has a major impact on improving the cost and yield performance of your production runs.

The OPM Laboratory Management application supports multiple laboratory types across the enterprise. The laboratory type provides a collection of technical parameters that are grouped together for your convenience.

Certain data must be set up in other OPM applications as a prerequisite to using the Laboratory Management (LM) application.

## Setting Up the System Administration Application

The following data must be set up in the System application before you can use the Laboratory Management application. This is usually done by your System Administrator.

### Setting Up Profile Options in System Administration

This involves checking and if necessary resetting any of the Default Values for Profile Options that affect Laboratory Management.

### Setting Up Unit of Measure Types in System Administration

This involves defining categories of units of measure, such as mass, volume, or count.

### Setting Up Units of Measure in System Administration

This involves defining units of measure. When you define a new unit of measure, you specify:

- the unit of measure (UOM) type to which it belongs (for example, mass, volume, or count)
- a conversion factor to convert the new unit of measure to the reference unit of measure (the first unit of measure defined for that UOM type).

For additional information see *Oracle Process Manufacturing Implementation Guide.*

## Setting Up the Inventory Management Application

Items must be set up in the Inventory Management application before you can use the Laboratory Management application.

### Setting Up Items in Inventory Management

This involves setting up the items which will be the ingredients, products, and byproducts in your laboratory formulas.

If you have experimental items that you want to use in Laboratory Management, but you wish to prevent them from being used in the Formula Management or Production Management applications, you should select the Experimental check box on the Items form.

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

## Setting Up the Quality Management Application

Units must be set up in the Quality Management application before you can use Laboratory Management.

### Setting Up Units of Measure in Quality Management

This involves setting up the units of measure which most of the technical parameters in the Laboratory Management application use.

### Setting Up Assays, Specifications and Results in Quality Management

You can have technical parameter values default to the most recent quality results for the item. In order to implement this behavior, you will need to define: an organization, a specific assay, an item/location specification and enter sample results for the organization.

# 2

# Laboratory Management Setup

This topic explains how to define laboratory types, and gives you a basic understanding of technical parameters. You are shown how to set up technical parameters and technical parameter sequences. Once you have specified your technical parameter sequences, you are shown how to enter the technical parameter data.

The following topics are covered:

- Defining Laboratory Types
- Understanding Technical Parameters
- Setting Up Technical Parameters
- Setting Up Technical Parameter Sequences
- Entering Item Technical Data

# Defining Laboratory Types

After meeting the prerequisites for setup in other applications, you need to define laboratory types. Laboratory types are used to group technical parameters (those properties of items that will be studied and calculated).

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.

For each item, you can enter and calculate data for the technical parameters associated with a laboratory type.

After you define laboratory types, you should navigate to the Personal Profile Options window in the System Administration application to set up a User Value for the OPM Default Lab Type Profile Name. This laboratory type will default into the laboratory type field on each window where you can enter a laboratory type. It will be the only laboratory type the user can use on the Laboratory Spreadsheet.

See: *Oracle Process Manufacturing Implementation Guide*

## Defining Laboratory Types Procedure

To define laboratory types:

1. Navigate to the **Laboratory Types** window.
2. Complete the fields as described.
3. Save the window.

## Laboratory Types Field Reference

The fields on this window are:

### Laboratory Type

Enter a code for the laboratory type you are defining. If you have already set up a default laboratory type, that code will default into the field. Ultimately, a laboratory type will group together a collection of technical parameters. Required.

### Active

Indicates whether the laboratory type is active or inactive:

- Select the Active box to indicate the laboratory type is active.
- Clear the Active box to indicate the laboratory type is inactive.

### Description

Enter a description of the laboratory type. Required.

### Shared Laboratory Type

For informational purposes only.

# Understanding Technical Parameters

After defining Laboratory Types, you need to define technical parameters using the Technical Parameters window.

Technical parameters are those characteristics of items which 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) would be Weight%.

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

## Using Expressions in Technical Parameters

The following lists functions that are supported for defining expressions, and the mathematical operators you must use:

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

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

```
PARM1*PARM2
```

To take the square root of PARM_1, 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) will *not* be calculated because there is an extra space before and after the * operator. Please keep this in mind when naming technical parameters.

## Using 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 table displays the 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 | $(\Sigma t_i \cdot l_i) - (\Sigma t_j \cdot l_j)$ |
| Equivalent Weight | $[(\Sigma T_i) - (\Sigma T_j)] / [(\Sigma T_i / t_i) - (\Sigma T_j / t_j)]$ |
| Quantity / Unit | $(\Sigma t_i \cdot l_i) - (\Sigma t_j \cdot l_j)$ |

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

# Setting Up Technical Parameters

Expressions are user-defined equations that use mathematical operators and previously defined technical parameters.

For example: a technical parameter could be defined as a percent (%) solvent, with each ingredient in a formula contributing a differing portion of its weight to a product as solvent. You can use the Technical Parameters window to set up various quantitative relationships between individual parameters. The OPM Laboratory Management application finds the weight of solvent contributed by each ingredient and calculates the sum of these contributions. After determining the total formula weight, OPM expresses the ratio of percent solvent for each product.

In addition to the technical parameters that you define on the Technical Parameters window, OPM automatically creates a technical parameter for density when you define a laboratory type. The Laboratory Management 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 in Laboratory Formulas. Therefore, be sure to enter data for the DENSITY technical parameter for all items in which mass to volume or volume to mass conversions need to be performed.

If this parameter is not set properly, spreadsheet calculations will not be accurate.

The name of the "Density" technical parameter is specified by the value of the GMD:Density Profile Option. This allows you to change the name.

## Setting Up Technical Parameters Procedure

To set up technical parameters:

1. Navigate to the **Technical Parameters** window.
2. Complete the fields as described.
3. Save the window.

## Technical Parameters Field Reference

The fields on this window are:

### Technical Parameters Fields

#### Laboratory Type

Enter the code of the laboratory type for which you are defining this technical parameter. Required.

#### Parameter Name

Enter the name of the technical parameter. Required.

#### Description

Enter a brief statement about what the technical parameter represents. Required.

### Quality Control Assay Link

#### Organization

If you are linking this technical parameter to a QC assay, enter the organization code for which the assay has been defined. Otherwise, leave this field blank.

The assay must be defined with your organization code. Global assays cannot be used.

#### Assay

If you are linking this technical parameter to a QC assay, enter the name of the QC assay to which you are linking this technical parameter. Otherwise, leave this field blank.

### Technical Parameters Fields

#### Data Type

Select one of the following codes to define the type of data associated with this technical parameter. Supply the required information listed. Only specific gravity and equivalent weight are not validated against the units entered in the QC application. QC units of measure are for notational purposes only. OPM does not use these units in calculations.

| Type | Required Information |
|---|---|
| Character | Enter the minimum and maximum valid character strings (based on ASCII sort sequence) and maximum length. |
| Numeric | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |
| Validation List | Enter the Unit of Measure in the Unit field.<br>Enter a list of valid values in the Validation List fields. |
| Boolean | No additional definition is required. The entry is unitless. |
| Expression | Enter the Unit of Measure in the Unit field.<br>Enter the mathematical expression for calculating the technical parameter in the Expression field.<br>See: Using Expressions in Technical Parameters and Using Fixed Expressions in Technical Parameters. |
| Weight% | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |
| Volume% | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |
| Specific Gravity | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |

| Type | Required Information |
|---|---|
| Cost | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |
| Equivalent Weight | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |
| Quantity Per Unit | Enter the Unit of Measure in the Unit field.<br>Enter the minimum and maximum valid values in Numeric Range fields.<br>Enter the number of significant digits required in the Significant Digits field. |

### Unit

Enter the unit of measure in which the technical parameter is quantified. Technical parameters for specific gravity and equivalent weight use the units of measure set up on the Unit of Measure window in the System application. 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.

The data type specified for the technical parameter determines which of the fields listed below will display.

### Numeric Range

Enter the lower limit of the range in the left field and the upper limit of the range in the right field.

### Significant Digits

Enter the number of significant digits to display for numeric expressions and calculations.

# Setting Up Technical Parameter Sequences

After you have entered the technical parameters for a laboratory type, you must specify the order in which they will be displayed on other windows. You specify the technical parameter sequence.

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 sequence.

By default, the DENSITY technical parameter (or its equivalent) is 1. You should not change this.

## Setting Up Technical Parameter Sequences Procedure

To set up Technical Parameter Sequences:

1. Navigate to the **Technical Parameter Sequences** window.
2. Complete the fields as described.
3. Save the window.

## Technical Parameter Sequences Field Reference

The fields in this window are:

### Laboratory Type

Enter the laboratory type for which you are defining the technical parameter sequence. Your default laboratory type from the operator master table defaults. Required.

#### Parameter Sequence

### Parameter

Enter the code for a technical parameter associated with the laboratory type you entered. For example, enter GMW for gram molecular weight.

### Sort

Enter a number between 1 and 9999 (inclusive) to determine where in the list of technical parameters this parameter will be displayed. When entering technical

parameter data, the technical parameters will be 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.

### Quality Control

If the Quality Control check box is selected, the technical parameter is linked to a Quality Control assay.

If the Quality Control check box is not selected, the technical parameter is not linked to a Quality Control assay.

For more information on linking assays to the Quality Control application, see *Oracle Process Manufacturing Quality Management User's Guide.*

### Description

This field displays a brief statement about what the technical parameter represents. The description is entered from the QC Assay Test Description.

# Entering Item Technical Data

Once you have specified the technical parameter sequence, you are ready to enter the technical parameter data. The data are the technical parameter values for your items.

Typically you will use Weight%, Volume%, Specific Gravity, Cost, Equivalent Weight, and Quantity per Unit for items which are raw materials or byproducts.

## Specifying the Set of Technical Parameters to Use

When you enter an item which is a product of one or more laboratory formulas in OPM, you will be asked to specify the formula for which you are editing (or viewing) the item technical data. Since the item is a product in formulas, its technical parameter values are calculated from those formulas. The calculated values may be different in each formula. Therefore, you must indicate which set of technical parameter values (from which formula) to use.

For example, suppose you make orange juice from concentrate, using two different formulas, each of which uses a different concentrate. You then use that orange juice in another formula to make a sweetened orange juice drink. The characteristics of the unsweetened orange juice (that is, the technical parameter values) may be different depending on which formula you used to make it. When you enter the unsweetened orange juice as an ingredient in the formula to make the sweetened orange juice drink, you must specify whether to use the technical parameter values from the first unsweetened orange juice formula or from the second unsweetened orange juice formula.

## Entering Density for Raw Materials

The Laboratory Management application uses the DENSITY technical parameter for unit of measure conversions. You should be sure to enter values for this technical parameter for all your raw materials.

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

The density values should be entered as a ratio between the base (or reference) unit of measure (UOM) for the mass UOM type and the base unit of measure for the volume UOM 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, enter the density in kilograms per liter rather than pounds per gallon.

You can determine which units of measure 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. The units displayed beneath the word Conversion are the base units that are used for mass and volume.

**Note:** You can access the Items window from Laboratory Management. You can find a complete discussion of this window in the *Oracle Process Manufacturing Inventory Management User's Guide*.

## Entering Item Technical Data Procedure

Calculated values for a product are not saved to the item technical data table until you bring up the formula on the Laboratory Spreadsheet and update technical parameters from the Actions menu. These values are not visible on this window and are not available for use in other formulas (if that product is an ingredient in other formulas).

If you need to enter item technical data for products, be aware that if you recalculate those technical parameter values on the spreadsheet and update technical parameters from the Actions menu, the data that you entered on the Item Technical Data window will be overwritten.

To define technical data for items:

1. Navigate to the **Item Technical Data** window.
2. Complete the fields as described.
3. Save the window.

## Item Technical Data Field Reference

The fields on this window are:

### Laboratory Type

Enter the laboratory type for which you are entering item technical parameter data. You can enter data only for the technical parameters associated with this laboratory type. This will default to the Personal Profile User Value entered for the Default Lab Type in the System Administration application. Required.

### Item

Enter the code of the item for which you are entering technical parameter data. Required.

### Lot

If you are entering technical parameter data for a specific lot, enter the lot code.

### Sublot

If you are entering technical parameter data for a specific sublot, enter the sublot code.

### Laboratory Formula

This field is only displayed if the item is a product in a formula, since the item technical data may be different depending on which formula is used to produce the item. Enter the name of the formula for which you are editing or viewing item technical data.

### Version

This field is only displayed if the item is a product in a formula, since the item technical data may be different depending on which formula version is used to produce the item. Enter the version number of the formula for which you are editing or viewing item technical data.

### Item Unit of Measure

The unit in which the technical parameter value is expressed is displayed. You cannot edit this field.

## Details

### Parameter

The name of each technical parameter defined for the laboratory type is displayed. You cannot edit this field.

### Value

Enter the value for each technical parameter.

You cannot edit this field if the technical parameter value is calculated by the system. For example, if the value is an expression (the check box is selected in the

Calculate field) or if it is derived from a QC assay (the check box is selected in the Quality Control field) you will not be able to edit this field.

The value you enter must satisfy the validation criteria displayed at the bottom of the window if entering a numeric value. Otherwise it must be in the List of Values if the Validation List method was selected as the data type.

### Unit

Displays the unit of measure in which the technical parameter is quantified. Technical parameters for 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 Quality Control application. With the exception of equivalent weight, this unit of measure is *not* used in any calculations.

### Quality Control

- The check box is selected if the technical parameter value comes from a QC assay.
- The check box is clear if the technical parameter value does not come from a QC assay.

### Data Type

The number identifying the type of technical parameter (for example, numeric, weight percent) is displayed. You cannot edit this field.

### Calculate

- The check box is selected if the technical parameter value is calculated by the program.
- The check box is clear if the technical parameter value is not calculated by the program.

### Range

This field displays the range entered for the parameter selected.

### Significant Digits

This field displays the number of significant figures that the technical parameter value can have.

# 3

# Laboratory Formulas

This topic explains laboratory formulas. You are shown how to enter laboratory formula information, including entering formula ingredients and formula byproducts. You are also shown how to enter additional formula information. The process of downloading a production formula is covered. You are instructed how to list experimental items. You are shown how to upload a laboratory formula to production. The steps needed to display ingredient technical parameters and the procedure to select item technical data are presented. You are also shown how to scale ingredient and product quantities and to calculate theoretical laboratory yield.

The following topics are covered:

- Understanding Laboratory Formulas
- Entering Laboratory Formula Information
- Entering Formula Ingredients
- Entering Formula Byproducts
- Entering Additional Formula Information
- Downloading a Production Formula
- Listing Experimental Items
- Uploading a Laboratory Formula to Production
- Displaying Ingredient Technical Parameters
- Selecting Item Technical Data
- Scaling Ingredient and Product Quantities
- Calculating Theoretical Laboratory Yield

# Understanding Laboratory Formulas

Laboratory formulas and the windows on which they are set up are identical in format to formulas in the Formula Management application. Laboratory formulas, however, cannot be used as the basis of a batch in the Production Management application. These formulas do not have effectivity records associated with them.

You can create a laboratory formula by entering the information on the laboratory formula windows manually or you can download a formula from Formula Management. You can also upload a laboratory formula to OPM Formula Management to be used in production applications.

Laboratory formulas may contain experimental items. You can only upload a laboratory formula that does not contain any experimental items. Experimental items are available to all applications except Formula Management and Production Management. This safeguard prevents you from using an experimental item in a bona fide production batch. You can also check whether a laboratory formula contains any experimental items.

You should use the OPM Formula Management application to define the formulas that drive your manufacturing process.

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

## Copying Laboratory Formulas to Formula Management

When you upload a laboratory formula to Formula Management, the formula may or may not be created with an effectivity record, depending on the setting of the GMD:Effectivity on Upload Profile Option.

Query the GMD:Effectivity on Upload Profile Option.

- If it is set to 0, the formula will be uploaded without an effectivity record.
- If it is set to 1, the Maintain Effectivities window will be displayed each time you upload a laboratory formula.

The organization code on this window defaults to your default organization. You can change the organization code to any of the organizations for which you have permissions or you can leave it blank to enable this effectivity for all organizations.

## Displaying Technical Parameter Values

While working with a formula, you can display the technical parameter values for the ingredients and products. You access this capability from the Laboratory Formula Ingredients window.

The product technical data displayed on the Product Technical Parameters window is retrieved from the database. It is not calculated when you enter the window as it is on the Laboratory Spreadsheet. Therefore, you can only display product technical data once it has been saved to the database from the Laboratory Spreadsheet window.

# Entering Laboratory Formula Information

Use the Laboratory Formulas window to enter header and product information about the laboratory formula.

## Entering Laboratory Formula Information Procedure

To enter header and product information for a laboratory formula.

1. Navigate to the **Laboratory Formulas** window.
2. Complete the fields as described.
3. You can select the:
    1. **Byproducts** button to access the **Formula Byproducts** window.
    2. **Ingredients** button to access the **Formula Ingredients** window.
4. Save the window.

**Note:** You can use Attachments with this window. See *Oracle Applications* for detailed information on attachments and folders.

### [ ]

The double brackets ([ ]) identify a descriptive flexfield that you can use to add data fields to this window without programming.

## Laboratory Formulas Field Reference

The fields on this window are:

### Formula

Enter the code for the laboratory formula you are adding or editing. Required.

### Version

Enter the laboratory formula's version number. A laboratory formula is uniquely identified by the combination of formula code and version number. Required.

### Description

Enter a description of the laboratory formula/version. This description is displayed on lookups. Required.

### Comments

Enter any comments associated with the laboratory formula and version. These comments appear on this window only.

### Formula Class

If you have set up formula classes and you want to associate this laboratory formula with a formula class, enter the code for the formula class.

### Scaling Allowed

Specify whether scaling is allowed. Scaling allows the proportional increase or decrease of ingredient and product quantities.

- Select the Scaling Allowed box if scaling is allowed.
- Clear the Scaling Allowed box if no scaling is not allowed.

Required.

### Inactive

Specify whether this formula is active or inactive:

- Select the Inactive box if the formula is inactive.
- Clear the Inactive box if the formula is active.

Required.

## Products

### Seq

This field displays the line number for each product line. This field cannot be edited.

### Item

Enter the code for each item produced by this laboratory formula. If the laboratory formula code you entered is the same as an item code, that item code will display as the default in this field. Required.

### Description

The item description of the product defaults from the item master table.

### Quantity

Enter the quantity of the product that this laboratory formula yields. Required.

### UOM

Enter the unit of measure in which this quantity is expressed. Required.

### Products

Displays the number of products associated with this formula.

### Byproducts

Displays the number of byproducts associated with this formula.

### Ingredients

Displays the number of ingredients associated with this formula.

## Laboratory Formulas - Additional Setup in Laboratory Management

The following options are available on the Laboratory Management Actions Menu:

### Additional Information

With the cursor placed on a product line, this menu choice accesses the Additional Information box. This allows you to enter additional information, such as scale type and release type, for each product line.

### Scale

Accesses the Scale Formula box, which allows you to scale the quantities of the ingredients, products, and byproducts in the formula.

### Theoretical Yield

Accesses the Calculate Theoretical Yield box, which allows calculation of the product quantities based on the ingredient quantities and a yield factor.

### Download Formula

Accesses the Download Production Formula to Laboratory box, which allows you to copy a formula from the Formula Management application to the Laboratory Management application.

### List Experimental Items

Accesses the List Experimental Items box, which displays any experimental items in the laboratory formula.

### Upload Laboratory Formula

Accesses the Upload Laboratory Formula to Production box, which allows you to copy a formula from the Laboratory Management application to the Formula Management application.

# Entering Formula Ingredients

Use the Laboratory Formula Ingredients window to enter ingredients and ingredient quantities for a laboratory formula.

## Entering Formula Ingredients Procedure

The first two product lines, and the number of products, byproducts, and ingredients in the formula are displayed at the bottom of the window. These fields cannot be edited.

To enter formula ingredients and ingredient quantities for a laboratory formula:

1. Navigate to the **Formula Ingredients** box.
2. Complete the fields as described.
3. You can select the:
    1. **Byproducts** button to access the **Formula Byproducts** window
    2. **Formulas** button to return to the **Laboratory Formulas** window.
4. Save the box.

## Formula Ingredients Field Reference

The fields on this box are:

### Formula

The laboratory formula code is displayed. This field cannot be edited.

### Version

The version number of the laboratory formula is displayed. This field cannot be edited.

#### Ingredients

### Seq

This field displays the line number for each ingredient line. This field cannot be edited.

### Item

Enter the item codes of the ingredients in this laboratory formula. If you enter an item that is a product of more than one other laboratory formula, the Item Technical Data Selection box will be displayed.

### Description

This field displays the item description of the ingredient. It defaults from the item master table. This field cannot be edited.

### Quantity

Enter the quantity of each ingredient used in the laboratory formula. Required if you entered an ingredient.

### UOM

Enter the unit of measure in which this quantity is expressed in the next field. The item's inventory unit of measure is the default. Required.

## Products

### Seq

This field displays the line number for each product line. The field cannot be edited.

### Item

This field displays the code for each item produced by this laboratory formula.

### Description

This field displays a description of the product and defaults form the item master table.

### Quantity

This field displays the quantity of product that this laboratory formula yields

### UOM

This field displays the unit of measure in which the Quantity is expressed.

## Formula Ingredients - Additional Setup in Laboratory Management

The following options are available on the Formula Ingredients Actions Menu:

### Ingredient Technical Parameters

Accesses the Ingredient Technical Parameters window, which displays the technical parameter values for the highlighted ingredient.

### Technical Data Selection

Accesses the Item Technical Data Selection box. If an ingredient in your formula is a product of other formulas (that is, if the item is an intermediate), you use this box to specify the formula from which to get the item's technical parameter values.

# Entering Formula Byproducts

Byproducts are items produced by a formula. They differ from products in that you do not plan your production to make byproducts, and you cannot cost byproducts.

## Entering Formula Byproducts Procedure

The first two product lines, and the number of products, byproducts, and ingredients in the formula are displayed at the bottom of the window. These fields cannot be edited.

To enter formula ingredients and ingredient quantities for a laboratory formula:

1. Navigate to the **Formula Byproducts** box.
2. Complete the fields as described.
3. You can select the:
    1. **Ingredients** button to access the **Formula Ingredients** window
    2. **Products** button to return to the **Laboratory Formulas** window.
4. Save the box.

## Formula Byproducts Field Reference

The fields on this box are:

### Formula

The laboratory formula code is displayed. This field cannot be edited.

### Version

The version number of the laboratory formula is displayed. This field cannot be edited.

#### Byproducts

### Seq

The line number for each byproduct line is displayed. This field cannot be edited.

### Item

Enter the item codes of the byproducts produced by this laboratory formula.

### Description

The item description of the byproducts defaults from the item master table. This field cannot be edited.

### Quantity

Enter the quantity of each byproduct produced by the laboratory formula. Required if you entered a byproduct.

### UOM

Enter the unit of measure in which this quantity is expressed in the next field. The item's inventory unit of measure is the default.

Required if you entered a byproduct.

## Products

### Seq

This field displays the line number for each product line. The field cannot be edited.

### Item

This field displays the code for each item produced by this laboratory formula.

### Description

This field displays a description of the product and defaults form the item master table.

### Quantity

This field displays the quantity of product that this laboratory formula yields

### UOM

This field displays the unit of measure in which the Quantity is expressed.

## Formula Byproducts - Additional Setup in Laboratory Management

The following options are available on the Formula ByProducts Actions Menu:

### Additional Information

With the cursor placed on a byproduct line, this menu choice accesses the Additional Information box. This allows you to enter additional information, such as scale type and release type, for each byproduct line.

### Scale

Accesses the Scale Formula box, which allows you to scale the quantities of the ingredients, products, and byproducts in the formula. This box is described later in this topic.

### Theoretical Yield

Accesses the Calculate Theoretic Yield box, which allows calculation of the product quantities based on the ingredient quantities and a yield factor. This box is described later in this topic.

# Entering Additional Formula Information

Most of the information on the Additional Information window is not directly relevant to the Laboratory application, but may be relevant if you copy a laboratory formula to the Formula Management application and use it as the basis for production batches. You can add additional information for any line in a laboratory formula (product, ingredient, or byproduct). You must be on the appropriate window to select a line (that is, to select a product you must be on the Laboratory Formulas window, to select an ingredient you must be on the Laboratory Formula Ingredients window, and to select a byproduct you must be on the Laboratory Formula Byproducts window).

## Entering Additional Formula Information Procedure

1. Navigate to the **Additional Information** box.
2. Place the cursor on the desired line to which you wish to add additional information.
3. Complete the fields as described.
4. Save the box.

## Additional Information Field Reference

The fields on this box are:

### Item

The code of the item on the line you selected displays from the previous screen. This field cannot be edited.

### Description

The description of the item on the line you selected displays from the previous screen. This field cannot be edited.

### Quantity

The quantity of the item on the line you selected displays from the previous screen. This field cannot be edited.

### Scrap Factor

Enter the scrap factor for this formula item, expressed as a percentage (for example, 5% is entered as 5). The value entered should represent the anticipated amount of ingredient loss during manufacturing.

This field works in conjunction with the Required Quantity field. When the scrap factor percentage is entered, the required quantity will automatically be calculated using the following algorithm:

required_qty = formula_qty + (formula_qty*(scrap_factor% / 100))

### Required Quantity

Enter the ingredient quantity required for manufacturing. The value entered should represent the amount of an ingredient needed to manufacture a given product. This includes the scrap, the amount of anticipated ingredient loss during manufacturing.

This field works in conjunction with the Scrap Factor field. When the required quantity is entered, the scrap factor value will be automatically calculated using the following algorithm:

scrap_factor%=(required_quantity / formula_qty)-1

### Scale Type

If scaling was enabled on the Laboratory Formulas window, specify the scale type for this formula line item.

Select one of the following:

- Fixed Quantity if the quantity of this item will not change when the formula is scaled.
- Linear Scaling if the item is scaled when the formula is scaled.

Required.

### Release Type

Select one of the following release types for each ingredient line:

- Automatic Release - when the ingredient line will be released for production when a batch that uses this formula is released.
- Manual Release - when the ingredient line must be released individually in a batch that uses this formula.

Required.

- Incremental Release - when the ingredient line will be released in steps based on the entries made using Partial Certification.

If you do not set this flag, the lines default to Automatic Release.

### Phantom Type

Select one of the following options:

- Not a Phantom
- Automatic Generation - if you want the system to generate a dependent phantom batch and production ID number to associate the related batches.
- Manual Generation - if you want to explode each phantom ingredient by selecting the Create Phantom menu option.

### Rework Type

For informational purposes only.

Select one of the following options:

- Not Rework
- Default Batch Quantity

Required.

### Cost Allocation

Displays the fraction of costs allocated to the selected product.

Required.

# Downloading a Production Formula

Use the Download Formula to Laboratory box to copy a formula from the Formula Management application to the Laboratory Management application. Once you have copied the formula to a laboratory formula, you can alter it to see how the alterations affect the values of the technical parameters for the product.

If there are any ingredients in the formula which are products of more than one other laboratory formula, the Item Technical Data Selection box will display after you select Accept.

## Downloading a Production Formula Procedure

To download a production formula to the laboratory application:

1. Navigate to the **Download Production Formula to Laboratory** box.
2. Complete the fields as described.
3. Click **OK**.
4. The following message appears: "New formula added to database, please note."
5. Click **OK**

## Download Production Formula to Laboratory Field Reference

The fields on this box are:

### Production Formula

Enter the code that identifies the Formula Management formula that is to be copied to the Laboratory Management application.

### Version

Enter the version number of the Formula Management formula which is to be copied to the Laboratory Management application.

### Description

The description derived from the item description of the product. This cannot be edited.

### Laboratory Formula

Enter the code that will identify the formula in the Laboratory Management application.

### Version

You must enter a new version number. You cannot overwrite an existing Formula Management formula version. This field defaults to one number higher than the highest existing formula version, or to 1 if this formula does not already exist.

Enter the version number which will identify the formula in the Laboratory Management application.

# Listing Experimental Items

The List Experimental Items box lists all of the items in a laboratory formula which are marked as experimental on the Items window. It is also displayed automatically if you try to upload a laboratory formula containing experimental items to the Formula Management application. You cannot edit any of the fields on this window.

## Listing Experimental Items Procedure

1. To list experimental items:
2. Navigate to the **Laboratory Formulas** or **Laboratory Spreadsheet** windows.
3. From the **Actions** menu, select **List Experimental Items**.
4. The window displays one of the following:
    1. A list of experimental items as described in the List Experimental Items Field Reference.
    2. A message: "No experimental items found for this formula/version."
5. Click **OK**.

## List Experimental Items Field Reference

The fields on this window are:

### Laboratory Formula

The code identifying the laboratory formula is displayed.

### Laboratory Version

The version number of the laboratory formula is displayed.

**Items**

### Experimental Items

The code for each experimental item is displayed.

### Description

This description for each experimental item displayed.

# Uploading a Laboratory Formula to Production

Use the Upload Laboratory Formula to Production box to copy a formula from the Laboratory Management application to the Formula Management application. You cannot overwrite an existing Formula Management formula/version. A new version of the formula will be created.

Depending on the setting of the GMD:Effectivity on Upload variable in Profile Options, you may be prompted to enter an effectivity record when you upload the formula. Otherwise, the formula is created without an effectivity record and cannot be used until one is created.

## Uploading a Laboratory Formula to Production Procedure

To upload a laboratory formula to production:

1. Navigate to the **Upload Laboratory Formula to Production** box.
2. Complete the fields as described.
3. Click **OK**.
4. The following message appears: "New formula added to database, please note."
5. Click **OK**.

## Upload Laboratory Formula to Production Field Reference

The fields on this window are:

### Laboratory Formula

Enter the code that identifies the laboratory formula to be copied to the Formula Management application. Required.

### Version

Enter the version number of the laboratory formula to be copied to the Formula Management application. Required.

### Description

Enter a description of the formula as you wish it to appear in the Formula Management application. Required.

### Production Formula

Enter the code that will identify the formula in the Formula Management application. Required.

### Version

You must enter a new version number. You cannot overwrite an existing Formula Management formula version. This field defaults to one number higher than the highest existing formula version or to 1 if the formula does not already exist.

Enter the version number that will identify the formula in the Formula Management application. Required.

# Displaying Ingredient Technical Parameters

The Ingredient Technical Parameters window displays the values of the technical parameters for the highlighted ingredient. Only technical parameters for which values have been entered or calculated for the ingredient are displayed. None of the fields on this window can be edited.

To edit the item technical parameter values, you must use either the Item Technical Data window or the Laboratory Spreadsheet.

## Displaying Ingredient Technical Parameters Procedure

To display ingredient technical parameters:

1. Navigate to the **Ingredient Technical Parameters** window.
2. Select the desired ingredient and complete the fields as described.
3. Click **OK**.

## Ingredient Technical Parameters Field Reference

The fields on this window are:

### Ingredient

The code for the ingredient is displayed.

### Laboratory Type

The code for the current laboratory type is displayed.

**Parameters**

### Parameter

The name of the technical parameter is displayed.

### Value

The value of the technical parameter for the ingredient is displayed.

### UOM

The unit of measure in which the technical parameter value is expressed is displayed.

# Selecting Item Technical Data

The Item Technical Data Selection box is displayed each time an intermediate is added to a laboratory formula. An intermediate is an item that is a product in more than one laboratory formula. This can occur in the following circumstances:

- Entering a new laboratory formula
- Adding an ingredient to an existing laboratory formula
- Adding a laboratory formula using Ingredient Search and Replace
- Downloading a formula from the Formula Management application
- Adding an ingredient on the Laboratory Spreadsheet

Since a product (intermediate) can have different technical parameter values depending on which formula is used to produce it, you must indicate which formula to use to get the item's technical parameter values. These values can then be used to calculate the values of the product technical parameters in the formula in which the item is an ingredient.

## Selecting Item Technical Data Procedure

To select item technical data:

1. Navigate to the **Item Technical Data Selection** box.
2. Complete the fields as described.
3. Click **OK**.

## Item Technical Data Selection Field Reference

The fields on this box are:

### Ingredient

The code for the intermediate is displayed. You cannot edit this field.

### Laboratory Formula

Enter the name of the formula from which you want to get the item's technical parameter values.

### Version

Enter the formula version number from which you want to get the item's technical parameter values.

# Scaling Ingredient and Product Quantities

Access the Laboratory Scale box by selecting Scale from the Actions menu on the Laboratory Formulas, Laboratory Formula Ingredients, or Laboratory Formula Byproducts window.

Use the Scale Formula box to scale ingredient and product quantities in a laboratory formula. Scaling is the proportional increase or decrease of ingredient, product, and byproduct quantities in a formula.

When you enter the box, you are in percent-scaling mode. In this mode, you specify a percentage by which item quantities are to be scaled. You can switch to item quantity mode by placing the cursor on the Item Quantity field and press Enter. In item quantity mode, you specify the quantity for a specific item, and the rest of the formula is scaled accordingly.

## Scaling Ingredient and Product Quantities Procedure

1. Navigate to the **Scale Formula** box.
2. Click the:
    1. **Percent** button to scale the laboratory formula by a percent
    2. **Item Quantity** button to scale the laboratory formula by a specified quantity
3. Complete the fields as described.
4. Click **OK**.

## Scale Formula Field Reference

The fields on this box are:

### Scale By

#### Factor

(Only for Scale By Percent) Enter the percent value by which you wish to scale the item. A positive factor indicates a scale-up. A negative factor indicates a scale-down.

For example: If you scale up by 200%, you would enter a Factor of 200. This would yield two-times the original quantity plus the original quantity. An initial quantity of 100g scaled up 200% would yield (100g + 2(100g)) or 300g. If you choose to scale

down 100g by 20%, you would enter a Factor of -20. This would yield (100g - 0.2(100g)) or 80g.

### Line

The Seq line number brought forward from the previously displayed box. This field cannot be edited.

### Item

The item you are using as the basis for scaling brought forward from the previously displayed box. This field cannot be edited.

### Description

The description of the item you are using as the basis for scaling is displayed. This field cannot be edited.

### Old Quantity

The quantity before scaling (that is, the quantity indicated on the previous window) is displayed. This field cannot be edited.

### New Quantity

(Only for Scale By Item Quantity) Enter the new quantity for this item. The system calculates the percent difference between the old quantity and the new quantity and scales the rest of the laboratory formula accordingly.

# Calculating Theoretical Yield

You can access the Calculate Theoretical Yield box from the Actions menu on the Laboratory Formulas, Laboratory Formula Ingredients, or Laboratory Formula Byproducts windows.

Use the Calculate Theoretical Yield box to enter the percent yield for the laboratory formula. For a thorough discussion of theoretical yield, see *Oracle Process Manufacturing Formula Management User's Guide.*

If the laboratory formula yields 100 percent, you can still use this box to have the application calculate the product quantity for you, or to determine that you have added correctly. Simply use 100 percent as the yield percent.

## Calculating Theoretical Yield Procedure

To calculate a theoretical yield:

1. Navigate to the **Calculate Theoretical Yield** box.
2. Complete the fields as described.
3. Click **OK**.

## Calculate Theoretical Yield Field Reference

The fields on this box are:

### Yield Percent

Enter the percentage of ingredient quantities yielded in the product quantity. The program will add the ingredient quantities, taking unit of measure conversions into account, and multiply the sum of the ingredient quantities by this percentage.

The Yield Percent used to calculate the product quantity is not stored. You may wish to note it in an ingredient comment.

# 4

# Laboratory Spreadsheet

This topic explains the laboratory spreadsheet. You are shown how to use the laboratory spreadsheet window and how to save and retrieve a spreadsheet. You are also shown how to display calculation errors.

The following topics are covered:

- Understanding the Laboratory Spreadsheet
- Using the Laboratory Spreadsheet Window
- Saving the Laboratory Spreadsheet
- Retrieving the Laboratory Spreadsheet
- Displaying Calculation Errors

# Understanding the Laboratory Spreadsheet

The Laboratory Spreadsheet displays each ingredient, product, and byproduct in a formula with the quantity and technical parameter values for each. The Laboratory Spreadsheet lets you manage ingredients and byproducts, and the quantities and technical parameter values for each ingredient and byproduct. Product technical parameter values are only calculated for the first product in a formula.

## Navigating in the Laboratory Spreadsheet

The Laboratory Spreadsheet has several panels. After you enter the Laboratory Formula and formula version that you want to display, the cursor is placed in the Ingredients panel. You can navigate to and from the Ingredients panel and the Technical Parameters panel using the Tab key, or you can just click in the desired field.

When you enter the Laboratory Spreadsheet, the Products tabbed region is displayed below the Ingredients panel.

You can display each tabbed region with its appropriate information:

- Products - displays the Item, Quantity, and Unit of Measure (UOM) for each product. Technical parameters are displayed to the right of each product.
- Byproducts - displays the Item, Quantity, and Unit of Measure (UOM) for each byproduct. Technical parameters are displayed to the right of each byproduct.
- Extended Information - displays the description of the ingredient on the line on which the cursor is positioned. If the cursor is positioned on a technical parameter calculated from an expression, the expression is displayed below the ingredient description.

## Making Changes to Spreadsheet Formulas

Making changes to the formula on the spreadsheet does not automatically change the formula as it is stored in the database. If you make changes to the items or the item quantities on the spreadsheet, and later retrieve the formula on the Laboratory Formulas window, you will not see the changes you have made. This is true even if you saved the spreadsheet, because the spreadsheet itself is saved to a table, and the laboratory formula table in the database is not updated. This prevents you from accidentally making permanent changes to the laboratory formula by trying "what if" scenarios on the spreadsheet.

## Using the Update Formula Command

You must select Update Formula before you exit the spreadsheet.

Use the Update Formula command if you want the formula changes you make on the spreadsheet to be saved to the formula in the database.

1. Begin with the desired changes displayed on the spreadsheet.
2. From the **Actions** menu, select **Update Formula**.

If you make changes on the spreadsheet, save it, exit, and then retrieve the spreadsheet for the formula, even though the changes you made will be visible on the Laboratory Spreadsheet window, the formula will not be updated with those changes when you select Update Formula.

## Using the Update Technical Parameters Command

You must select Update Technical Parameters before you exit the spreadsheet.

Use the Update Technical Parameters command if you want the formula changes you make on the spreadsheet to be saved to the formula in the database.

1. Begin with the desired changes displayed on the spreadsheet.
2. From the **Actions** menu, select **Update Technical Parameters**.

If you make changes on the spreadsheet, save it, exit, and then retrieve the spreadsheet for the formula, even though the changes you made will be visible on the Laboratory Spreadsheet window, the formula will not be updated with those changes when you select Update Technical Parameters.

## Understanding Calculation Errors in Laboratory Management

For technical parameters which are calculated from expressions the Laboratory Spreadsheet displays a string of question marks (?) or asterisks (*) if the application can not calculate a value.

A string of question marks (?????) indicates that a compilation error occurred (for example, the value of a variable used in the expression could not be found, or the syntax of the expression is incorrect).

A string of asterisks (*****) indicates that the expression could not be calculated for mathematical reasons (for example, division by zero). To display additional information, select Calculation Errors from the Actions menu.

# Using the Laboratory Spreadsheet Window

Use the Laboratory Spreadsheet to view and edit laboratory 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.

## Using the Laboratory Spreadsheet Window Procedure

1. To use the laboratory spreadsheet:
2. Navigate to the **Laboratory Spreadsheet** window.
3. Display Technical Parameters as follows:
    1. Click **Next** to display the next series of Technical Parameters (if they exist)
    2. Click **Previous** to display a previously shown set of parameters that are not currently displayed.
    3. Click **Recalculate** to recalculate the values displayed on the spreadsheet.
4. Complete the fields as described.

## Laboratory Spreadsheet Field Reference

The fields on this window are:

### Laboratory Type

Your current laboratory type is displayed. You cannot edit this field.

### Laboratory Formula

Enter the code for the laboratory formula for which you want to calculate the spreadsheet.

### Version

Enter the number of the version of the laboratory formula for which you want to calculate the spreadsheet.

### Description

This field displays the description of the laboratory formula/version.

## Ingredients

### Item

The code for each ingredient in the formula is displayed. You can add, change, or delete ingredients.

### Quantity

The quantity of each item in the formula is displayed. You can change quantities if desired.

### UOM

The unit of measure in which the quantity is expressed is displayed. You can change the unit of measure if desired.

### TPARM1...TPARM*n* (technical parameter-1. . .technical parameter-*n*)

Columns are labeled with the names of each of the technical parameters for the laboratory type. The value of each technical parameter for each item is displayed. You can change the technical parameter values for ingredients, then recalculate to determine the affect on the product's technical parameters.

## Products Region

### Item

The product item code is displayed.

### Quantity

The quantity of the product item is displayed.

### UOM

The unit of measure in which the quantity is expressed is displayed.Technical parameter values for the product are displayed on the same line.

## Byproducts Region

### Item

The byproduct item code is displayed.

### Quantity

The quantity of the byproduct item is displayed.

### UOM

The unit of measure in which the quantity is expressed is displayed. Technical parameter values for the byproduct are displayed on the same line.

#### Extended Information Region

### Description

Displays a description of the ingredient on the line in which the cursor is positioned.

### Expression

If the cursor is in a column for a technical parameter which is of type Expression, the expression used to calculate the technical parameter value is displayed in this field.

## Laboratory Spreadsheet - Additional Setup in Laboratory Management

The following options are available on the Laboratory Spreadsheet Actions Menu:

### List Experimental Items

Displays the List Experimental Items box, which displays any items on the spreadsheet which are marked as experimental on the Items window.

### Save Spreadsheet

Accesses the Save Spreadsheet box, which allows you to save the spreadsheet to a table.

### Retrieve Spreadsheet

Accesses the Retrieve Spreadsheet box, which allows you to retrieve a spreadsheet that you saved to a table.

### Update Formula

Updates the formula in the database with any changes you made to items or item quantities on the spreadsheet.

### Update Technical Parameters

Updates the technical parameter values in the database with the values entered or calculated on the spreadsheet.

### Calculation Errors

Displays the Display Calculation Errors window, which provides information about any calculation errors on the spreadsheet.

# Saving the Laboratory Spreadsheet

Use the Save Spreadsheet box to save a spreadsheet to a table.

## Saving the Laboratory Spreadsheet Procedure

To save a laboratory spreadsheet:

1. Navigate to the **Save Spreadsheet** box.
2. Complete the fields as described.
3. Click **OK**.

## Save Spreadsheet Field Reference

The field on this box is:

### Name

Enter the name for which you want to save the spreadsheet.

# Retrieving the Laboratory Spreadsheet

Use the Retrieve Spreadsheet Data box to retrieve a spreadsheet that you saved to a table.

## Retrieving the Laboratory Spreadsheet Procedure

To retrieve a laboratory spreadsheet:

1. Navigate to the **Retrieve Spreadsheet** window.
2. Complete the fields as described.
3. Save the window.

## Retrieve Spreadsheet Field Reference

The field on this window is:

### Name

Enter the name to be used to identify the spreadsheet has been saved.

# Displaying Calculation Errors

The Display Calculation Errors window displays information about any errors which OPM encountered in performing calculations on the Laboratory Spreadsheet.

## Displaying Calculation Errors Procedure

To display calculation errors:

1. Navigate to the **Laboratory Spreadsheet** window.
2. From the **Actions** menu, choose **Display Calculation Errors**.
3. Select **Product**, **Ingredient** or **Byproduct**.
4. Complete the fields as described.
5. Click **OK**.

## Display Calculation Errors Field Reference

The fields on this window are:

### Type

Displays the following item types for which a calculation error is listed:

- Product
- Ingredient
- Byproduct

### Item

- Product - displays the item code of the product for which an error occurred in calculating the values of a technical parameter.
- Ingredient - displays the item code of the ingredient for which an error occurred in calculating the values of a technical parameter.
- Byproduct - displays the item code for the byproduct for which an error occurred in calculating the values of a technical parameter

### Technical Parameter

This field displays the code for the technical parameter for which an error occurred in calculating its value.

### Error Code

This field displays a description of the calculation error.

### Expression

This field displays the expression in which the error occurred. A carat (^) will point to the approximate location in the expression where the error occurred.

# 5

# Ingredient Management

This topic explains how to manage ingredients. You are shown how to use the search and replace capability and how to replace ingredients in a formula.

The following topics are covered:

- Understanding the Search and Replace Capability
- Using Ingredient Search and Replace
- Replacing Ingredients in a Formula

# Understanding the Search and Replace Capability

The Laboratory Ingredient Search and Replace function allows you to search for each laboratory formula version that contains a specified ingredient, and to create a new formula version in which the specified ingredient is replaced by another ingredient.

There are several reasons you may want to replace one ingredient with another. For example, a comparable ingredient may be available at a lower cost, an alternate ingredient may possess superior qualities, or you may want to replace a hazardous ingredient with a safer one.

In addition to replacing the ingredient, you can also specify a factor by which the new ingredient quantity will be scaled. For example, if the new ingredient is twice as potent as the old ingredient, you can enter a scale factor of 0.5, which will cause the quantity of the new ingredient in the new formula version to be half of the quantity of the old ingredient in the old formula version.

Note that the ingredient search and replace process does not actually replace the old ingredient with the new one in existing formulas. Instead, it creates a new formula version containing the new ingredient instead of the old ingredient. The old formula version will still exist and can still be used. The new version number will be one higher than the highest existing version number.

# Using Ingredient Search and Replace

Use Ingredient Search and Replace to change an ingredient in one, all, or a range of formulas. You may want to change an ingredient if the original ingredient is unavailable or if environmental factors prescribe that you use a different ingredient (for example, to satisfy regulatory requirements). Ingredient Search and Replace consists of two stages. At the Ingredient Search and Replace box, you enter the search and replace criteria: the old and new ingredients, and the formula selection criteria. The Ingredient Search and Replace window displays the formulas that meet the specified search criteria. This enables you to enter the quantity for the new ingredient and create a new formula version.

## Using Ingredient Search and Replace Procedure

To search for and replace ingredients:

1. Navigate to the **Ingredient Search and Replace** box.
2. Complete the fields as described.
3. Click **OK**.

## Ingredient Search and Replace Field Reference

The fields on this box are:

### Old Ingredient

Enter the item code for the ingredient to be replaced. Required.

### New Ingredient

Enter the item code for the new ingredient to replace the ingredient entered in the Old Ingredient field. If the new ingredient is a product in more than one laboratory formula, the Item Technical Data Selection box is displayed. Required.

### Scaling Factor

Enter a factor by which the old ingredient quantity should be scaled to determine the new ingredient quantity. For example, if you want to use half as much of the new ingredient as you used of the old ingredient, enter 0.5. Leave this defaulted to 1.0 if you want the same quantity of the new ingredient as of the old ingredient. Required.

### Laboratory Formula Selection

#### Formula

To search:

- all formulas containing the specified ingredient, leave the From and To fields next to Formula blank.
- a single formula for the specified ingredient, enter the Formula name in both the From field and the To field.
- a range of formulas for the specified ingredient, enter the starting Formula in the From field and the ending Formula in the To field.

#### Version

To search:

- all versions of formulas containing the specified ingredient, leave the From and To fields next to Version blank.
- a single version for the specified ingredient, enter the starting Version in the From field and the ending Version in the To field.
- a range of versions for the specified ingredient, enter the starting Version in the From field and the ending Version in the To field.

# Replacing Ingredients in a Formula

This window is displayed after you complete the Ingredient Search and Replace box and click OK.

This window displays each of the formulas and versions found to contain the old ingredient. You can replace the old ingredient in some or all of the displayed formula versions. You can also specify the quantity of the new ingredient in each formula version.

## Replacing Ingredients in a Formula Procedure

To replace old ingredients found in a search:

1. Navigate to the **Ingredient Search and Replace** window.
2. Select the check box beneath **Select** to mark Old Formulas in which you want to replace the New Ingredient listed.
3. From the **Action** menu select **Save** to create the new formula versions.

## Ingredient Search and Replace Field Reference

The fields on this window are:

### Old Ingredient

The code and description of the ingredient being replaced is displayed. You cannot edit this field.

### New Ingredient

The code and description of the new ingredient is displayed. You cannot edit this field.

### Scaling Factor

The scaling factor you entered on the Ingredient Search and Replace box is displayed. The old ingredient quantities are multiplied by this factor to give the new ingredient quantities. You cannot edit this field.

### Candidates

This field displays the number of formula versions which contain the old ingredient and meet the criteria specified on the Ingredient Search and Replace box (that is, the number of formula versions displayed on this window). You cannot edit this field.

### Selected

This field displays the number of formula versions currently selected. You cannot directly edit this field.

## Laboratory Formulae for Replacement

### Select

New formula versions will be created based only on those formula versions marked with a check mark in the Select column when you select Save from the Action menu.

- Select each check box next to the Old Formula version in which you want to substitute the New Ingredient.
- Clear each check box next to the Old Formula in which you do not want to substitute the New Ingredient.

### Old Formula

The code for the formula in which the ingredient will be replaced is displayed. You cannot edit this field.

## Old Ingredient

### Version

The number of the existing version containing the old ingredient is displayed. You cannot edit this field.

### Line

The line in the existing formula version which contains the old ingredient is displayed. You cannot edit this field.

### Quantity

The quantity of the old ingredient in the existing formula version is displayed. You cannot edit this field.

### UOM

The unit of measure for the Old Ingredient. You cannot edit this field.

### New Ingredient

#### Quantity

The quantity of the new ingredient in the new formula version is displayed. This defaults to the old ingredient quantity multiplied by the scaling factor.

#### UOM

The unit of measure in which the quantity is expressed. This defaults to the unit of measure for the Old Ingredient. You cannot edit this field.

#### Version

The version of the New Ingredient. This field updates when you save your work.

## Ingredient Search and Replace - Additional Setup in Laboratory Management

Select or clear all displayed formula versions from the Ingredient Search and Replace window Actions Menu using:

#### New

To return to the Ingredient Search and Replace window to perform another search and replace operation.

#### Set All

To select all displayed formula versions.

#### Clear All

To deselect all displayed formula versions.

# 6

# Laboratory Management Scenario

This topic explains a generic laboratory management scenario and shows you how to integrate all the functions of laboratory management.

The following topic is covered:

- Integrating All the Functions of Laboratory Management

# Integrating All the Functions of Laboratory Management

This section presents a hypothetical scenario using the Laboratory Management application. It is designed to illustrate most of the functions available in Laboratory Management. You may not need to use all of the steps illustrated here in your business.

Imagine that you wish to make a sweetened orange juice drink from unsweetened orange juice and sugar. The unsweetened orange juice is made by mixing orange juice concentrate with water.

You need to make the sweetened orange juice drink using a new, experimental sweetener that you are testing. Here is how you could proceed.

## Create an Experimental Item

In the Inventory Control application, enter the experimental sweetener on the Items window. Make sure that you select the Experimental check box. This will prevent the sweetener from accidentally being used in bona fide production batches.

## Define a Laboratory Type

Define a Laboratory type on the Laboratory Type window. Laboratory types are used to group the technical parameters that you measure and calculate. You may want to set up a laboratory type for beverages and a laboratory type for food, or a laboratory type for fruit beverages and a different laboratory type for other types of beverages. This choice depends on what you manufacture and what types of characteristics are relevant for your products. You can only work with one laboratory type at a time, and you can only work with the technical parameters assigned to that laboratory type. In this scenario, we will use a laboratory type for beverages.

## Specify a Default User Laboratory Type

Enter the code for the beverage laboratory type in the Default Laboratory field in the OPM System Administration application for each of the users who will be working primarily with this laboratory type.

## Define Technical Parameters

Define all of the technical parameters for the beverage laboratory type. You should define a technical parameter for each characteristic of the ingredients and products in your beverage formulas which you want to measure and enter in the Laboratory

Management application. For example, you may want to define a technical parameter for percent solids by weight.

## Define Technical Parameter Sequences

Once you have defined the technical parameters for the laboratory type, set up the technical parameter sequence on the Technical Parameter Sequences window. This determines the sequence in which the technical parameters will be displayed. The only rules to keep in mind are the following:

- The Density technical parameter must be set at the number 1.
- If you have any expression technical parameters that reference other technical parameters, the referenced technical parameters must precede the expression technical parameter in the sequence.

## Enter Technical Parameter Data for Items

Enter the values of the technical parameters for the items in your orange juice formulas on the Item Technical Data window. Enter data for your raw materials and byproducts using the expression, weight%, volume%, specific gravity, cost, equivalent weight, or quantity / unit technical parameter types since you will want to calculate the values for your products.

## Download an Intermediate Formula from Formula Management

Download your formula or formulas for the unsweetened orange juice from the Formula Management application to the Laboratory Management application using the Download Production Formula to Laboratory box.

## Calculate Technical Parameter Values for the Intermediate

Bring up each formula for the unsweetened orange juice (using each orange juice concentrate) on the Laboratory Spreadsheet. The spreadsheet will calculate the values of the technical parameters for the products, and the values for any expression technical parameters you have defined. Select Update Technical Parameters from the Actions menu on the Laboratory Spreadsheet to save the calculated values to the database.

## Download the Formula for Finished Product to Laboratory

Now download your formulas for the sweetened orange juice drink. Since these formulas contain the unsweetened orange juice as an ingredient, you will have to specify, for each sweetened orange juice formula, which unsweetened orange juice formula to use to get the technical parameter values for the unsweetened orange juice. The Item Technical Data Selection box will automatically display for this.

## Experiment with the Formula on the Laboratory Spreadsheet

Bring up a formula for the sweetened orange juice drink on the Laboratory Spreadsheet. The values for expression technical parameters, and the values of expression, weight%, volume%, specific gravity, cost, equivalent weight, or quantity / unit technical parameter types are calculated. You can now substitute the experimental sweetener for the sugar in the formula and recalculate the technical parameter values by selecting the Recalculate button on the Laboratory Spreadsheet. You can experiment with changing the formula until you get the technical parameter values you want. When you have a formula you are happy with, select Update Formula from the Actions menu.

## Upload the New Formula to Formula Management

When you decide to use the new formula in production, upload the formula to the Formula Management application by selecting Upload Laboratory Formula from the Actions menu on the Laboratory Formulas window.

# A

# Appendixes

This topic explains typical navigation paths and specific Profile Options that need to be set up.

The following topics are covered:

- Laboratory Management Navigator Paths
- Setting Laboratory Management Profile Options

# Laboratory Management 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 |
|---|---|
| Additional Information | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:Additional Information |
| Calculate Theoretical Yield | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:Theoretical Yield |
| Display Calculation Errors | OPM Product Development:Laboratory Mgmt:Spreadsheet:Actions:Calculation Errors |
| Download Production Formula to Laboratory | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:Download Formula |
| Find Item Technical Data | OPM Product Development:Laboratory Mgmt:Setup:Item Technical Data:View:Find... |
| Find Laboratory Formulas | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:View:Find... |
| Find Laboratory Types | OPM Product Development:Laboratory Mgmt:Setup:Laboratory Types:View:Find... |
| Find Technical Parameters | OPM Product Development:Laboratory Mgmt:Setup:Technical Parameters:View:Find... |
| Formula Byproducts | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Byproducts |
| Formula Ingredients | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Ingredients |
| Ingredient Search and Replace | OPM Product Development:Laboratory Mgmt:Item Search/Replace |
| Ingredient Technical Parameters | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:Ingredient Technical Parameters |
| Items | OPM Product Development:Laboratory Mgmt:Setup:Items |

| Window | Path |
|---|---|
| Item Technical Data | OPM Product Development:Laboratory Mgmt:Setup:Item Technical Data |
| Item Technical Data Selection | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Technical Data Selection |
| Laboratory Formulas | OPM Product Development:Laboratory Mgmt:Laboratory Formulas |
| Laboratory Spreadsheet | OPM Product Development:Laboratory Mgmt:Spreadsheet |
| Laboratory Types | OPM Product Development:Laboratory Mgmt:Setup:Laboratory Types |
| List Experimental Items | OPM Product Development:Laboratory Mgmt:Spreadsheet:Actions:List Experimental Items<br>or<br>OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:List Experimental Items |
| Retrieve Spreadsheet | OPM Product Development:Laboratory Mgmt:Spreadsheet:Actions:Retrieve Spreadsheet |
| Save Spreadsheet | OPM Product Development:Laboratory Mgmt:Actions:Save Spreadsheet |
| Scale Formula | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:Scale |
| Technical Parameter Sequences | OPM Product Development:Laboratory Mgmt:Setup:Tech Parameter Seq |
| Technical Parameters | OPM Product Development:Laboratory Mgmt:Setup:Technical Parameters |
| Upload Laboratory Formula to Production | OPM Product Development:Laboratory Mgmt:Laboratory Formulas:Actions:Upload Laboratory Formula |

# Setting Laboratory Management Profile Options

During your implementation, you set a value for selected profile options to specify how your Laboratory Management application controls access to and processes data. Laboratory Management uses the listed profile options:

- GMD:Default Lab Type
- GMD:Density
- GMD:Effectivity on Upload
- GMD:UOM Mass Type
- GMD:UOM Volume Type

You can set up these profile options when you set up other applications prior to your Laboratory Management 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.

# Glossary

### Boolean

A logical combinatorial system that represents symbolically the relationships between entities. Typical logical operators are: AND, OR, and NOT. The term" boolean" refers to a system of logical thought developed by the English mathematician and computer pioneer, George Boole (1815-64). In boolean searching, an "and" operator between two words or other values (for example, "pear AND apple") means one is searching for information containing both of the words or values, not just one of them. An "or" operator between two words or other values (for example, "pear OR apple") means one is searching for information containing either of the words.

### Density

The quantity of a material per unit volume. In general, density is weight / volume.

### Equivalent Weight

The mass of a substance esp. in grams that combines with or is chemically equivalent to eight grams of oxygen or one gram of hydrogen: the atomic or molecular weight divided by the (total positive ionic) valence.

### Exponentiation

The act or process of raising a quantity to a power.

### Gravimetric

Of or relating to measurement by weight.

### 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).

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