

WHITE PAPER



# RECIPE MANAGEMENT IN IFS APPLICATIONS

Purpose of the White Paper .....	3
Background Information .....	4
Recipe Structure Registration .....	5
Enter by Weight .....	6
Adjust Standard Batch Size .....	6
Adjust Yield .....	6
Enter by Weight Percent .....	6
Adjust Proportionally .....	7
Adjust Largest Share .....	8
Enter by Component UoM .....	8
General Recipe Functionality .....	9
Yield .....	9
By-products .....	9
Density .....	9
Recipes versus Product structure .....	9
Recipe Revision .....	10
Alternative .....	11
Recalculate Recipe .....	12
Status for Recipe .....	12
Tentative .....	12
Plannable .....	12
Buildable .....	12
Retired .....	13
Create Shop Order .....	13

## RECIPE MANAGEMENT IN IFS APPLICATIONS<sup>IT</sup>

### Purpose of the White Paper

This white paper provides a detailed description of recipe management functionality in IFS Applications, with a specific focus on issues for a paint and/or ink manufacturing company. IFS has, and will continue to build, knowledge and skills in the paint and adhesive segment.

Recipe management is part of the paint and adhesive solution. Supporting a market segment is not only a question of providing software—our understanding and experience of the segment is probably more important for a successful implementation. The paint and adhesive solution is streamlined for paint and adhesive manufacturing companies, which also means that it is packaged for fast payback.



## Background information

This document will provide a more detailed description of the recipe functionality in some crucial areas. It should be seen as an extended introduction to recipe management. There is a more detailed description of recipe management in IFS Applications in the training material.

A recipe structure is an alternative to the traditional product structure, allowing components to be entered by weight or volume for a batch. Units of measure for parts included in a recipe structure must either be weight or volume. If the unit of measure for a part is volume, information about density must be entered on the inventory part.

Planning functionality in IFS Application uses recipe structures to determine which ingredients are in demand. Discrete and repetitive manufacturing also use recipe structures, in order to determine the ingredients required to produce a recipe-based product.

For manufacturing, recipe structures are processed in the same way as product structures in the shop order process, including cost calculations and calculations of production lead times. When dealing with recipe parts, much of planning and manufacturing depends on the recipe structure definitions.

Recipe structures are divided into three elements: the recipe structure header, the recipe structure alternate, and the recipe structure line items.

This white paper has four major sections:

- Recipe registration
- General recipe functionality
- Recipe administration
- Manufacturing

## Recipe Structure Registration

A recipe is entered in one of three ways: by weight, by weight percent or by component unit of measure. You can switch between these three alternatives as long as a recipe is in the Tentative or Plannable state. It may also be possible to change a recipe in the Buildable state, depending on structure update setting. Recipe statuses will be described later in this document.

To build up a recipe, the following formula is used:

- Standard lot size = Total kg \* Yield.

This equals the following in the Recipe Structure tab (see figure below):

- Batch Size = Sum Quantity \* Yield

The screenshot shows the 'Recipe Structure - 01000' window. At the top, there are fields for Part No. (01000), Description (Base Varnish), Site (80), and Description (MTS/Batch). Below these are fields for Revision No. (1), Revision Text, Structure Type (Manufacturing), Latest Rev. (1), and Planner (DAVID). There are also checkboxes for Customer Warranty, Notes, and Document Text. The 'Recipe Structure' tab is active, showing fields for Alternative (1), Alternative Description, Yield (2), Batch Size (3), and Display Weight UoM (kg). Below this are fields for State (Buildable), Enter By (4), Total Weight Share (5), and Sum Quantity (6). A table with 10 columns is visible, with some cells containing numbers 7, 8, 9, and 10. The table data is as follows:

Line Item	Line Seq	Component	Description	Unit Meas	Weight Share	Qty In Display Weight	Qty Unit Meas	Fixed Qty Flag	Qty Per Assembly	Procedure Sta
1	1	00010	Deionized Water	l	45	450	450	Not fixed	0.45	1
2	2	00020	Thickener	kg	40	400	400	Not fixed	0.4	1
3	3	00030	Alberdink APU	kg	15	150	150	Not fixed	0.15	3
					7	8		9	10	

- |                |                          |                      |
|----------------|--------------------------|----------------------|
| 1. Alternative | 5. Total Weight Share    | 9. Fixed Qty Flag    |
| 2. Yield       | 6. Sum Quantity          | 10. Qty Per Assembly |
| 3. Batch Size  | 7. Weight Share          |                      |
| 4. Enter By    | 8. Qty In Display Weight |                      |

Form for recipe structure with reference to fields that are referred to in the text

RECIPE MANAGEMENT IN IFS APPLICATIONS<sup>IT</sup>

### Enter by Weight

Quantities are registered in the “Qty In Display Weight” field. The “Sum Quantity” field is updated for every new component added.

Since the sum quantity of the components added to the recipe has been changed, either batch size or yield must be changed. When using recipes entered by weight, there are two ways to save the recipe: either by adjusting weight, or by adjusting yield. Both activities are available as right mouse click options.

#### Adjust Standard Batch Size

The “Adjust Standard Batch Size” functionality adjusts the Batch Size field on the Recipe Structure tab based on the sum of the components that is entered in the recipe structure. The batch size may only be adjusted if the change is registered as a quantity change, which implies that the recipe is entered by weight.

If the recipe is registered for the first time, all components are entered with their individual quantities. As each component is registered, the Sum Quantity will be recalculated. Before the recipe is saved, the Standard Batch Size can be adjusted using a right click option.

The Adjust Standard Batch Size option is also used when changing an already registered recipe. In such case, select this option after the quantity in the Qty In Display Weight field has been changed.

#### Adjust Yield

When registering a recipe, it is not necessary to calculate the batch size with the Adjust Standard Batch Size functionality. Instead, the batch size can be entered manually, and the yield calculated. In the first case, yield will automatically be set to 1; in the second case it will be calculated based on the manually entered batch size.

The Adjust Yield activity is connected to the calculation of batch size, which means that also this activity requires that the recipe be entered by weight.

### Enter by Weight Percent

A recipe does not necessarily have to be entered by weight. It is also possible to work with recipes based on weight percent. As with the weight method, recipes entered by the weight percent method can be updated in two ways: either by adjusting all parts proportionally, or by adjusting the part with the largest share.

At times, automatic batch size updates may need to be avoided. In such cases component changes or batch size changes must be performed manually. A recipe entered by weight percent could be updated by changing the weight share directly

RECIPE MANAGEMENT IN IFS APPLICATIONS<sup>IT</sup>

on the component line. The change must be balanced by changing at least one other component to maintain a total weight share of 100%.

To change the batch size automatically when a component is updated, two actions are available. Either a proportional adjustment is made to all components within the recipe, or a change to the one component with the largest share.

#### Adjust Proportionally

When performing a proportional adjustment, the batch size and all components within the recipe are updated. If the weight share is changed for one component, the change will be used to calculate a new batch size. The change will then be divided between the included components proportionally.

Weight share is calculated as follows:

Initially the recipe consists of:

Component 00010: 45 % or 450 kg

Component 00020: 40 % or 400 kg

Component 00030: 15 % or 150 kg

Weight share for a component 00020 is reduced from 40% to 35%.

Batch size is recalculated as  $(35\% - 40\%) * 1000\text{kg} = -50\text{ kg} \Rightarrow$  New batch size 950 kg.

Since the reduction was registered on Component 00020, the value in Qty In Display Weight is reduced from 400 to 350 kg. After the Adjust Proportionally activity is performed, new weight shares will be:

Component 00010: 450 kg of 950 kg or 47.368421 %

Component 00020: 350 kg of 950 kg or 36.842105 %

Component 00030: 150 kg of 950 kg or 15.789474 %

Unless all the components in the recipe should be updated, the Fixed Qty Flag on the component line should be used. If Fixed Qty is used for a component, the quantity per assembly will remain unchanged for that component.

If a component using a volume unit of measure is included, the density will be included in the calculation of values in the Qty Unit Meas and Qty per Assembly fields. It will not affect values in the Weight Share or Qty In Display Weight fields.

The example above shows the update of one component, but it is possible to update several components simultaneously.

## RECIPE MANAGEMENT IN IFS APPLICATIONS<sup>IT</sup>

### Adjust Largest Share

This function adjusts the component with the largest percentage, until weight share totals 100%.

Weight share is calculated as follows:

Initially we have a recipe of:

Component 00010: 450 kg of 950 kg or 47.368421 %

Component 00020: 350 kg of 950 kg or 36.842105 %

Component 00030: 150 kg of 950 kg or 15.789474 %

Change the weight share for component 00030 to 20%.

Batch size is recalculated as  $(20\% - 15,789474\%) * 950 \text{ kg} = 40 \text{ kg} \Rightarrow$  New batch size 990 kg. Adjust Largest Share is done by a simple right mouse click. The recalculated recipe now looks like this:

Component 00010: 427.263161 kg of 990 kg or 43.157895 %

Component 00020: 364.73684 kg of 990 kg or 36.842105 %

Component 00030: 198 kg of 990 kg or 20 %

The same calculation is used to determine the batch size, as described above. The difference from the Adjust Proportionally activity is that only one component will carry the change. The Fixed Qty Flag can also be used to direct the change to the second or third largest component.

### Change Yield

It is also possible to change the batch size and yield manually. If weight percent is used, a new relation for  $\text{Batch Size} = \text{Sum Quantity} * \text{Yield}$  must be calculated manually. Then both the batch size and yield must be updated before the recipe is updated.

### Enter by Component UoM

A third option is to use the Qty per Assembly field, instead of Qty in Display Weight or Weight Share when working with recipes.

Using Qty per Assembly means that the recipe is registered in the number of units needed to produce one unit of the recipe. It is also important that the density for the components is considered when calculating the recipe.

## General recipe functionality

This section briefly describes functionality that works for all methods. However, the practical handling might differ between the methods.

### Yield

It is possible to define yield for a recipe. The batch size is calculated as  $\text{Batch Size} = \text{Sum Quantity} * \text{Yield}$ . Both the batch size and yield must be updated before the recipe is updated.

### By-products

By-products can be entered in a recipe structure in the same way as for a product structure. A by-product is not actually part of the structure. It is created during the manufacturing process, and should be received into inventory along with the produced part. The by-product is not considered in any calculations of the total recipe and is ignored when calculating the quantity per assembly.

Quantity per assembly for the by-product is calculated separately, since it is not part of the recipe. This calculation is based on the total standard batch size.

### Density

Density is used for the recipe calculations and is registered for the inventory part, which means that the same part can have different density depending on site. The default is 1000 (e.g. 1000 kg per cubic m of water).

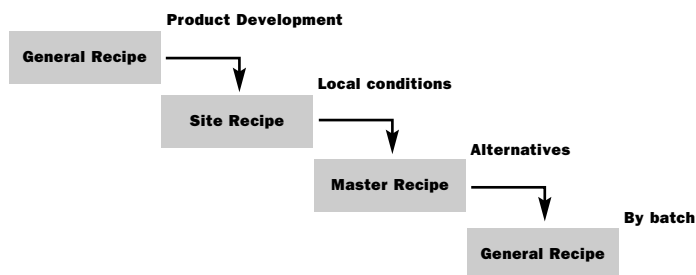
### Recipes versus product structure

Recipe structure can be mixed with product structure. This means that a product structure can be a component in a recipe structure, and a recipe structure can be a component in the product structure.

## Recipe administration

Recipe administration is important from several aspects. It is important to separate recipes that are being developed from those who are already approved for production. Another example is to keep track of which recipe is valid for production at a particular time. Site, Revisions and Alternatives, Recalculate Recipe and Status are tools for administering recipes in IFSApplications.

One way of handling recipes is to develop the product at one site. When the recipe is finished, the product development department copies the recipe to the manufacturing sites. Once the recipe is available at a manufacturing site, adjustments can be made locally for production equipment, batch sizes, etc.



## Recipe revision

As shown above, there are a number of ways a recipe can be changed. A drawback of changing recipes as described above is that it might be very difficult to trace what a recipe looked like at a certain point in time. This problem is solved by using revision handling.

The reason for creating a new revision compared with changing an existing version or creating a new alternative is the possibility to phase in and out recipes. This means that it is possible to keep track of exactly what a recipe looked like on a certain date or for a specific shop order.

Each revision has a phase-in and phase-out date that determines which recipe is, was or will be valid for a certain period of time. It is possible to create a new revision without setting phase-out dates manually. If a new revision is created, today or in the future, the preceding revision is automatically phased out before new revision is phased in.

RECIPE MANAGEMENT IN IFS APPLICATIONS<sup>™</sup>

It was also shown that all information in the Recipe Structure tab, except state, is copied to the new revision. A new revision is always created in the Tentative state, regardless of the state of the copied revision. The necessary changes must then be made in the new revision.

Alternative

There can be one or several alternatives for each revision. The default alternative is defined as the \* - alternative and must always be there as the material requirements planning (MRP) functionality uses this alternative.

Part No.	Description	Site	Revision	Structure Type	Phase In	Phase Out	No of Revisions
01000	Base Varnish	80	2	Manufacturing	2003-03-15		2
01000	Base Varnish	80	1	Manufacturing	1999-01-01	2003-03-14	

Line Item No	Line Sequence	Component Pt	Description	Unit Meas	Weight Share	Qty In Display Weight	Qty Unit Meas	Fixed Qty Flag	Qty Per Assent	Procedure Step	Operati
1	1	00030	Albersink-APL	kg	45	0	0	Not fixed	0.45	1	
2	2	00020	Thickeners	kg	40	0	0	Not fixed	0.4	2	
3	3	00030	Albersink-APL	kg	15	0	0	Not fixed	0.15	3	

Revision 1 and 2 for Part no 01000 Base Varnish

Alternative	Alternative Description	Yield	Batch Size	Display Weight UoM
1	Master	1	0	kg
Total Weight Share:		Sum Quantity:		
100		0		

Alternative	Alternative Description	Unit Meas	Weight Share	Qty In Display Weight	Qty Unit Meas	Fixed Qty Flag	Qty Per Assent	Procedure Step	Operati
1	Production line 1 alt 1	kg	45	0	0	Not fixed	0.45	1	
2	Production line 1 alt 2	kg	40	0	0	Not fixed	0.4	2	
3	Production line 1 alt 3	kg	15	0	0	Not fixed	0.15	3	
4	Production line 2								
5	Production line 3 alt 1								
6	Production line 3 alt 2								
7	Manually - small batch								

Alternative \* and 1-7 for part no 01000 Base Varnish and revision 2

## Recalculate Recipe

Sometimes components are entered in volume, which means that density is needed to calculate the weight used in the Qty In Display, Weight and Qty Per Assembly fields. IFS Applications has a special background job for recalculating recipes in case density is changed on an inventory part.

The background job is started from Manufacturing Standards/Calculations/Recalculate Recipe. The Calculations folder is only available in an application containing a complete version of Manufacturing Standards.

If density is changed for a part, there is no need to recalculate each recipe manually. By using the Recalculate Recipe function, all recipes containing the changed component will be recalculated.

## Status for Recipe

Recipe alternatives have different statuses depending on where they are in the lifecycle. The different statuses are Tentative, Plannable, Buildable and Retired.

### Tentative

A new recipe alternative will get the status of Tentative. This is used during the composition of the recipe. MRP does not consider Tentative recipe alternatives.

### Plannable

Once a recipe alternative has been developed and material needs to be purchased according to determined lead times, the status can be changed to Plannable. A Plannable recipe can still be changed. MRP calculates for the demand, but a Shop Order or Production Schedule cannot be created.

### Buildable

When the recipe is developed and ready for production, the status is changed to Buildable. Depending on the settings for the site a Buildable recipe alternative can be changed or not. There are three settings that define what can be done with a recipe in Buildable status. The first setting is Simplified, which means that changes are allowed. The strictest setting is Restricted, where no changes are allowed. There is also a setting in between called Enhanced.

## RECIPE MANAGEMENT IN IFS APPLICATIONS™

## Retired

A recipe that is no longer used or is invalid is set to Retired status. A Shop Order or Production Schedule cannot be created for a Recipe alternative that is Retired.

## Manufacturing

The following describes how the recipes are handled in the manufacturing process.

It is possible to choose between alternatives when a shop order is created. The revision used is determined by dates on the shop order. If a future start date is entered, the system will choose a recipe structure that is valid for that date. It is also possible to use recipe structures that have been phased out. This can be done by actively choosing which revision should be used on the Detail tab.

The screenshot shows the 'Shop Order - 200116' window with the following data:

Order No:	Ret:	Seq:	Part No:	Description:	Site:
200116	*	*	01000	Base Varnish	80

Sched Direction:	Earliest Start Date:	Start:	Lot Size:
Backwards schedulin	2002-04-22	2003-04-21	960

Priority Category:	Need Date:	Finish:	State:
	2003-04-22	2003-04-21	Planned

Detail | Material | Operation | Operation Tools | Tracking and History | Byproduct | Shop Order Splits | MRBs

Order Code:	Planner:	Configuration:
Manufacturing	DAVID	Not Configured

Qty Complete:	Production Line:	Has Configuration:
0		<input type="checkbox"/>

Operation Scrapped:	Proposed Loc:	Demand:
0	TANK V	Invent Order

Products:	Process Type:	State:
No Receive		No Issues

Picklist Type:	Auto Close:	Operations:
Standard	Auto Close	No Report

Revision/Alternative:	Date:	Tolerance:
Structure: 2		0
Routing: 1		

Shop Order for 01000 Base Varnish with revision 2 and alternative\*

## About IFS and IFS Applications

IFS develops and supplies component-based business applications for medium and large enterprises and organizations. IFS Applications, which can be implemented step by step, is based on web and portal technology. The solution offers 60+ enterprise application components used in manufacturing, supply chain management, customer relationship management, service provision, financials, product development, maintenance and human resource administration. IFS offers customers an easier, more open alternative.

IFS is a leading global business applications supplier with sales in 45 countries and more than 350,000 users worldwide. The company is listed on the Stockholm Stock Exchange (XSSE: IFS).

If you need further information, e-mail to [info@ifsworld.com](mailto:info@ifsworld.com), contact your local IFS office or visit our web site:

**[www.ifsworld.com](http://www.ifsworld.com)**

IFS and all IFS product names are trademarks of IFS. The names of actual companies and products mentioned herein may be the trademarks of their respective owners. The example companies, organizations, products, domain names, email addresses, logos, people and events depicted herein are fictitious.

No association with any real company, organization, product, domain name, email address, logo, person or event is intended or should be inferred.

This document may contain statements of possible future functionality for IFS' software products and technology.

Such statements of future functionality are for information purposes only and should not be interpreted as any commitment or representation.