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SIMATIC

Process Control System PCS 7 Advanced Process Functions SIMATIC BATCH Integration

Function Manual

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Preface

Purpose of the manual

This document contains reference information for engineering and operation of the

Advanced Process Functions (APF) together withSIMATIC BATCH.

You can find additional information on APF in the following manuals:

- Advanced Process Functions (APF) Function Manual
- Advanced Process Functions Installation and Configuration
- Advanced Process Functions Engineering Manual
- Advanced Process Functions Operating Manual

Also refer to the SIMATIC BATCHmanuals.

Core content

The Advanced Process Functions (APF) provide functions for material master data management. Integration with SIMATIC BATCH allows the automatic synchronization and shared use of materials in APF and SIMATIC BATCH.
The APFs provide a dialogs that allows easy recording of data for orders and batches. Data are transferred to SIMATIC BATCH and the batches are created there. All further steps occur in SIMATIC BATCH.
The APFs provide a freely-programmable interface in the form of a WinCC global script, which allows the automatic creation, release and start of batches in SIMATIC BATCH . All relevant batch header data (basic recipe or formula, order or batch name, batch size, start mode and start time, unit assignment) as well as the batch parameters (process parameters, input material and output material) are transferred in the process.

The following core issues are covered in this document:

- Amendment to the Installation / Configuration Manual:
  - Installation of APF for shared operation with SIMATIC BATCH
- Amendment to the Engineering Manual:
  - Activating the integration of APF with SIMATIC BATCH
  - Configuration of the "Order Creation" dialog
  - Runtime-Interface and WinCC Script for the automatic creation, release and start of batches in SIMATIC BATCH

- Amendment to the Operating Manual:
  - Synchronization of the material master data between APF and SIMATIC BATCH
  - "Order Creation" dialog
- Amendment to the Function Manual:
  - "Order Creation" interface

Validity

This documentation is valid for V2.0 of the APF software package.

Table of contents

Amendment to the Installation and Configuration Manual

<div style="text-align: right;">

1

</div>

Please read the "Advanced Process Functions Installation and Configuration" manual before you read this section. The following only describes relevant changes that result when you use APF together with SIMATIC BATCH.

OS setup on all clients

When you use SIMATIC BATCH integration, the APF OS setup must be installed on all APF clients. (It is the same setup as for the OS servers. No additional APF licenses are required for the APF clients.)

For installation and license terms of SIMATIC BATCH refer to the corresponding SIMATIC BATCH manuals.

User rights

Please assign at least the "Process controlling" rights for the "Order Creation" dialog.

Amendment on Engineering Manual 2

Please read the "Advanced Process Functions Engineering Manual" before you read this section. The following only describes the relevant changes that result when you use APF together with SIMATIC BATCH .

2.1 Integration

The integration of APF with SIMATIC BATCH is configured using the "Einstellungen – Allgemein" / "Settings - General" dialog of the APF engineering tool:

The release of APF integration using SIMATIC BATCH occurs through the option box "Use SIMATIC BATCH" / "SIMATIC BATCH will be used".
This option box can only be activated if a SIMATIC BATCHprocess cell (installation) is configured in a PCS 7 project.

The name of the process cell (plant) in the Plant Hierarchy (PH) is specified with the PCS 7 project configuration where it is automatically determined. If you change the name of the process cell in the PCS 7 project, you must update the APF Engineering settings in the "Settings - General" dialog.

Run the APF Integrator once you have applied the settings.

2.2 Configuration of the "Order Creation" dialog

The "Order Creation" dialog offers numerous possible settings to tailor the dialog to customer-specific requirements. These settings are specified during the engineering phase directly at the dialog control @FB_OrderCreation.pdl using WinCC Graphics Designer or through a user-specific script.

Note

If extensive changes to the configuration are necessary, it is advisable to create a copy of @FB_OrderCreation.pdl.

Possible settings are described below:

Control Settings (object properties)

Name	Description
FormulaCategoryMode	Options: • enabled: The operator must select a formula category before he/she can select the relevant formula. • disabled (default): The operator can select the recipe or formula without previously selecting a formula category.
FormulaCategoryOperation	Options: • enabled (default): The operator can select a formula category. • disabled: The operator is not authorized to select a formula category.
FormulaCategoryFilter	• Filter for selectable formula category names. Formula categories are displayed when their name starts with FormulaCategoryFilter. • No default • Can be set in Graphics Designer or in script. • If only one formula category matches the filter, this will be selected automatically.
RecipeOperation	Options: • enabled (default): The operator can select a formula / recipe. • disabled: The operator is not authorized to select a formula / recipe.
RecipeFilter (In/Out)	• Filter for selectable formula or recipe names Formulas or recipes are displayed when their name starts with RecipeFilter. • No default • Can be set in Graphics Designer or in script. • If only one formula or recipe matches the filter, this will be selected automatically.
OrderCategoryMode	Options: • SelectExisting (select existing) • UserInput (manual input) • FormulaCategoryName (formula category name) • FormulaOrRecipeName (formula / recipe name) (default) • ProductCode (product code)
OrderCategoryOperation	Valid when OrderCatMode = SelectExisting or manual input Options: • enabled (default): The operator can select/edit the order category. • disabled: The operator is not authorized to select/edit the order category.

Name	Description
OrderCategoryFilter	• Valid when OrderCatMode = SelectExisting • Filter for selectable order category names. Order categories are displayed when their name starts with OrderCategoryFilter. • No default • Can be set in Graphics Designer or in script. • If only one order category matches the filter, this will be selected automatically.
OrderCategoryPreselection	• Valid when OrderCatMode = manual input • Start value of OrderCategory input field • No default • Can be set in Graphics Designer or in script.
OrderNameCalculationMode	Options: • UserInput (manual input) • DateTimeAndUserInput (date + time + manual input) • ProductCodeAndUserInput (product code + manual input) • ProductCodeAndDateTime (product code + date + time)
OrderNameOperation	Options: • enabled (default): The operator can enter or overwrite order names. • disabled: The operator is not authorized to enter or overwrite order names.
OrderNamePreselection	• Valid when OrderNameMode includes manual input • Start value of the manual input part • No default • Can be set in Graphics Designer or in script.
OrderSizePreselection	• Start value of OrderSize field • Default is 0 • Can be set in Graphics Designer or in script.
OrderSizeOperation	Options: • enabled (default): The operator can select the order size. • disabled: The operator is not authorized to select the order size. The order size is calculated using the batch sizes.
OrderSplitModePreselection	Start value of selection of order split mode. Options: • Evenly (default) • MaxSizeWithRemain (maximum size + remainder) (default) • MaxSizeWithOverProd (maximum size rounded up) • MaxSizeWithUnderProd (maximum size rounded down) More information on the calculation principles for this mode can be found in *Amendment to Function Manual* under *Formula Split Mode.* Can be set in Graphics Designer or in script.

Name	Description
OrderSplitModeOperation	Options: • enabled (default): The operator can select the order split mode. • disabled: The operator is not authorized to select the order split mode.
BatchLimitsOperation	Options: • enabled: The operator can overwrite the minimum and maximum batch size. • disabled: The operator is not authorized to overwrite minimum and maximum batch sizes.
MinBatchSizePreselection	• Start value of the Minimum Batch Size field • Default is 0 • Can be set in Graphics Designer or in script.
MaxBatchSizePreselection	• Start value of the Maximum Batch Size field • Default is 0 • Can be set in Graphics Designer or in script.
BatchesSizeOperation	Options: • enabled: The operator can change the batch, including the remainder batch size. • disabled: The operator is not authorized to change the batch, including the remainder batch size. These are then calculated automatically. Note: • If BatchLimitsOperation is enabled, the recipe limits are checked against the Min and MaxSizePreselection setting of the Order Creation dialog when a recipe is selected for the first time. When a new recipe is selected, the recipe limits are checked against the entries in the Order Creation dialog. • If BatchLimitsOperation is disabled, the recipe limits are checked against the Min and MaxSizePreselection setting of the Order Creation dialog each time a recipe is selected.
NumberBatchesOperation	Options: • enabled: The operator can change the number of batches • disabled (default):The operator is not authorized to change the number of batches. These are then calculated automatically.
OrderCreationModeOperation	Options: • enabled (default): The operator can select the order creation mode. • disabled: The operator is not authorized to select the order creation mode.

Name	Description
OrderCreationModePreselection	Options: • Created (all batches are created) • Released (all batches are created and released) • FirstStarted (all batches are created, released and the first batch started) • AllStarted (all batches are created, released and started) (default) • FirstStartedAtTime (all batches are created, released and the first batch started in a time-controlled manner) • AllStartedAtTime (all batches are created, released and started in a time-controlled manner) • StartedChained (all batches are created, released and started in a chain) Can be set in Graphics Designer or in script.
OrderStartTimeOperation	Options: • enabled (default): The operator can select the start time of the order. • disabled: The operator is not authorized to select the start time of the order.
OrderStartTimePreselection	Start time of the order (the first batch of the order) Can be set using script.
BatchesWaitingTimeOperation	Options: • enabled (default): The operator can select the waiting time of the batch. • disabled: The operator is not authorized to select the waiting time of the batch.
BatchesWaitingTimePreselection	Waiting time after which the next batch is started. Can be set in Graphics Designer or in script.
BatchListNameOperation	Options: • enabled (default): The operator can overwrite the individual batch names. • disabled: The operator is not authorized to overwrite the individual batch names.
BatchListSizeOperation	Options: • enabled (default): The operator can overwrite the individual batch sizes. • disabled: The operator is not authorized to overwrite the individual batch sizes.
BatchListCreationModeOperation	Options: • enabled (default): The operator can overwrite the individual creation modes. • disabled: The operator is not authorized to overwrite the individual batch creation modes.

Name	Description
BatchListStartTimeOperation	Options: ● enabled (default): The operator can overwrite the individual batch start times. ● disabled: The operator is not authorized to overwrite the individual batch start times.
BatchListCustomColumn1Type	Type of the first user-defined column in the batch list Options: ● none (default): No user-defined column is displayed. ● Integer: One column with numerical content is displayed. ● Real: One column with floating-point content is displayed. ● String: One column with text content is displayed. ● Enumeration: One column with a combined box as content is displayed.
BatchListCustomColumn1Caption	Valid when BatchListCustomColumn1Type is not "none" Heading of column, if visible (default: Custom1)
BatchListCustomColumn1Operation	Options: ● enabled (default): The operator can change the values in the use-defined column. ● disabled: The operator is not authorized to change the values in the user-defined column.
BatchListCustomColumn1Min	Valid when BatchListCustomColumn1Type = Integer or Real Minimum input value for the user-defined column (default: 0)
BatchListCustomColumn1Max	Valid when BatchListCustomColumn1Type = Integer or Real Maximum input value for the user-defined column (default: 0)
BatchListCustomColumn1MaxChar	Valid when BatchListCustomColumn1Type = String Maximum number of characters for entry in the user-defined column (default: 0)
BatchListCustomColumn1Enumeration	Valid when BatchListCustomColumn1Type = Enumeration List of alternatives separated by | , which are to be shown in the combined box of the user-defined column. The default for new batches can be overwritten via SelectedBatchCustomColumn1Enumeration.
BatchListCustomColumn2Type	Type of the second user-defined column in the batch list Options: ● none (default): No user-defined column is displayed. ● Integer: One column with numerical content is displayed. ● Real: One column with floating-point content is displayed. ● String: One column with text content is displayed. ● Enumeration: One column with a combined box as content is displayed.
BatchListCustomColumn2Caption	Valid when BatchListCustomColumn2Type is not "none" Heading of column, if visible (default: Custom2)

Name	Description
BatchListCustomColumn2Operation	Options: • enabled (default): The operator can change the values in the use-defined column. • disabled: The operator is not authorized to change the values in the user-defined column.
BatchListCustomColumn2Min	Valid when BatchListCustomColumn2Type = Integer or Real Minimum input value for the user-defined column (default: 0)
BatchListCustomColumn2Max	Valid when BatchListCustomColumn2Type = Integer or Real Maximum input value for the user-defined column (default: 0)
BatchListCustomColumn2MaxChar	Valid when BatchListCustomColumn2Type = String Maximum number of characters for entry in the user-defined column (default: 0)
BatchListCustomColumn2Enumeration	Valid when BatchListCustomColumn2Type = Enumeration List of alternatives separated by | , which are to be shown in the combined box of the user-defined column. The default for new batches can be overwritten via SelectedBatchCustomColumn2Enumeration.

2.3 Runtime interface to SIMATIC BATCH

With the Runtime interface to SIMATIC BATCH you can do the following in APF:

- Create orders and batches

- Release and start batches

- Set batch header parameters: order and batch names, recipes or formula for the batch, batch size, batch start mode and start time

- Allocate units

- Set batch parameters: process values, input and output materials

Opening the Runtime interface to SIMATIC BATCH

You can open the Runtime interface to SIMATIC BATCH with the Global Script Template FB_BMBatchCreation.tpl under <…SIEMENS\WINCC\bin\Engineeringtool\Konfig\PAS>. You need to copy the template to the <OSProject>\<SERVERNAME>\PAS directory to use this functionality in the PCS 7 OS project. Then change the extension from .tpl to .pas. To use the script in a specific project, you need to adapt it in the Global Script editor. The script includes sections with the comment "//TODO" for this purpose.

To activate the script, you need to add a cyclic trigger (for example, 10 or 20 seconds cycle time). We recommend you also add all employed tags as tag triggers.

The Global Script consists of two sections. In the first section, an action is prepared and triggered in SIMATIC BATCH. Because these actions are mostly asynchronous, the return

values must be determined and checked in a later call of the Global Script; this is the job of the second part of the script.


Note

Use the SIMATIC BATCH OS Controls

The main applications for this Global Script are automatic background actions without user interaction, for example, based on trigger events from the production process. We recommend you use of SIMATIC BATCH OS Controls for user operations of SIMATIC BATCH in the context of PCS 7 OS.

NOTICE
This script cannot run without adaptation.
The project engineer / customer has to make these adaptations. This script cannot be used without adaptations.

Global Script flow diagram
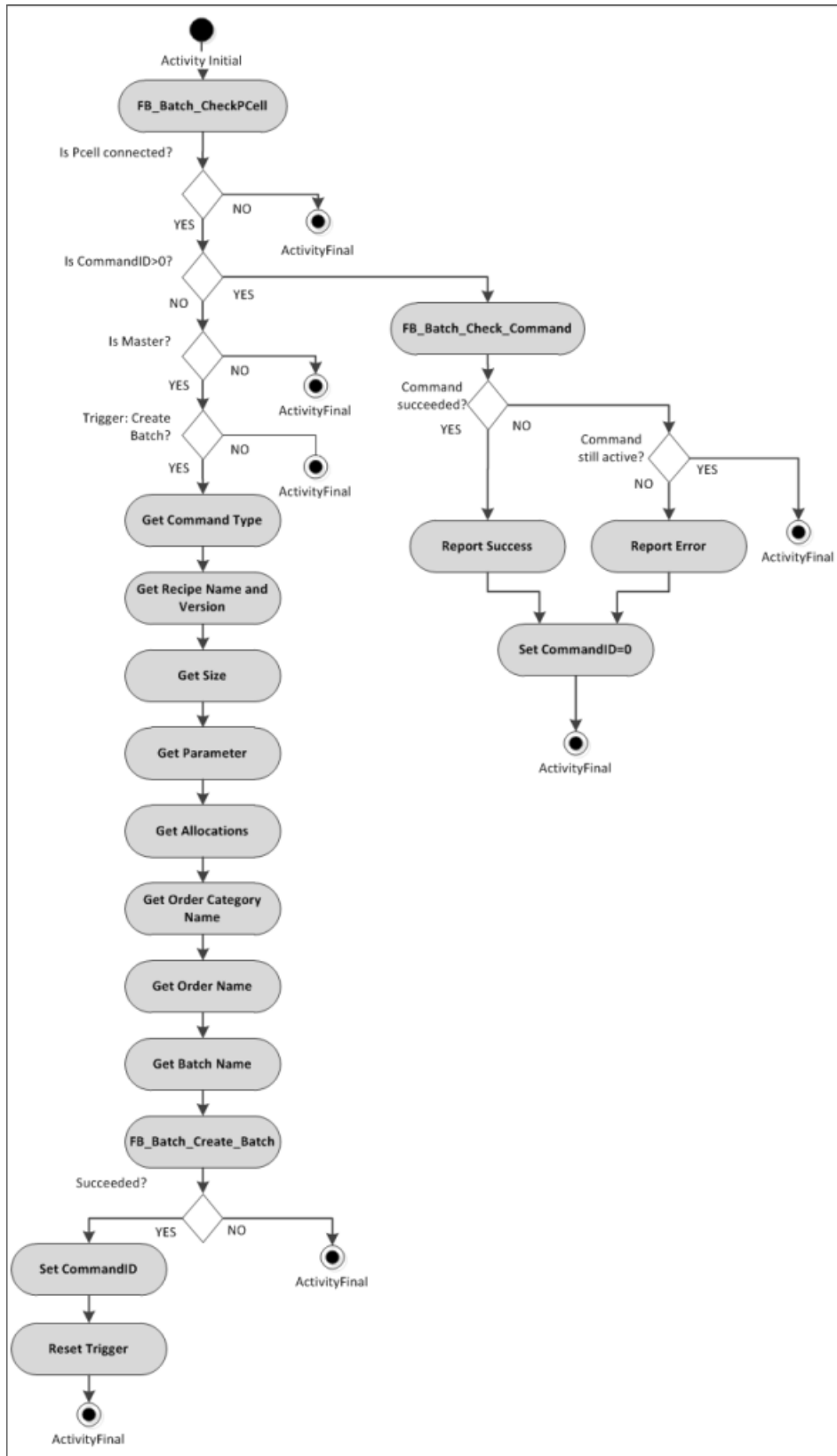
User-defined APF functions

The Global Script uses three "User-defined APF functions":

- FB_Batch_GetOrderCatName(): Determine the name of the order category (can be adapted by the user, returns "Order Category" as default).

- FB_Batch_GetOrderName(): Determine the name of the order (can be adapted by the user, returns "Order" as default).

- FB_Batch_GetBatchName(): Determine the name of the batch (can be adapted by the user, returns "Batch_YYYYMMDD_hhmmss" as default).

These scripts are available under <Projectfunctions>\apf\fb_ua_user_specific. You can adapt the scripts with the Global Script editor.

Reference

Additional information on the topic Performance data of the SIMATIC BATCH interface (for example, creating, releasing, starting batches) is available in the SIMATIC BATCH Manual, section 3.7.

Sections of the Global Script template with TODO

```
// TODO insert condition for Batch Creation
…
// TODO: Set Command type
// Choose one of the following commands:
// BMS_SBIF_BATCH_COMMAND_CREATE =     1,   // Create the batch only
// BMS_SBIF_BATCH_COMMAND_RELEASE=     2,   // Create and release
the batch
// BMS_SBIF_BATCH_COMMAND_START =      3    // Create, release and
start according start mode
…
// TODO: If Command is set to BMS_SBIF_BATCH_COMMAND_START  then set
start modes
// Choose one of the following start modes:
// BMS_SBIF_BATCH_STARTMODE_MANUAL =  0,   // The batch will be
started by the operator
// BMS_SBIF_BATCH_STARTMODE_INSTANT=  1,   // The batch will be
started immediately
// BMS_SBIF_BATCH_STARTMODE_TIME_ABS= 2,   // The batch will be
started at a given time
// BMS_SBIF_BATCH_STARTMODE_TIME_REL= 3    // The batch will be
started after a given waiting time
…
// TODO: If start mode is set to BMS_SBIF_BATCH_STARTMODE_TIME_ABS
then set the start time
// Set the absolute start time based on local time
…
// TODO: If start mode is set to BMS_SBIF_BATCH_STARTMODE_TIME_REL
then set the waiting time
// Set the waiting duration in days, hours, minutes and seconds
…
```

```
// TODO: Set Recipe Name and Version
…
// TODO: Set Batch Size
…
// TODO: Use parameter by setting the name
…
// TODO: If parameter name is set then set parameter type:
// BMS_SBIF_PARAMETER_TYPE_INT=0:            //Set integer value
at BatchData.Parameters[iParameterIndex].iValue
// BMS_SBIF_PARAMETER_TYPE_DOUBLE=1:         //Set real value at
BatchData.Parameters[iParameterIndex].dblValue
// BMS_SBIF_PARAMETER_TYPE_STRING=2:         //Set string at
BatchData.Parameters[iParameterIndex].szValue
// BMS_SBIF_PARAMETER_TYPE_INPUT_MATERIAL=3:   //Set amount at
BatchData.Parameters[iParameterIndex].dblValue and material name at
BatchData.Parameters[iParameterIndex].szMaterial
// BMS_SBIF_PARAMETER_TYPE_OUTPUT_MATERIAL= 4: //Set amount at
BatchData.Parameters[iParameterIndex].dblValue and material name at
BatchData.Parameters[iParameterIndex].szMaterial

…
// TODO: Set parameter value depending on type
…
// TODO: Use allocation by setting the RUP name
…
// TODO: If RUP Name is set then set unit name
…
// TODO: Reset trigger
…
```

Amendment to the Operating Manual

3

Please read section 2 "Material Management" in the "Advanced Process Functions Operating Manual" before you read this section. The following only describes relevant changes that result when you use APF together with SIMATIC BATCH.

3.1 Material management

Overview

- A material in APF as well as SIMATIC BATCH (in SIMATIC BATCH: a material) is identified by 2 unique codes: <Material Name> and <Material ID>. These two codes are then identical in both systems.

- If you are using APF together with SIMATIC BATCH, APF becomes the material master. You may only generate, edit and delete materials using APF material management and not SIMATIC BATCH.

- The data is transferred to SIMATIC BATCH as described below. Only a subset of the APF material model is represented in SIMATIC BATCH.

- The use of materials in SIMATIC BATCH (in recipes, batches, phases, SFCs, etc.) is not influenced by APF. You can continue working with it as usual.

Representation of APF materials in SIMATIC BATCH

- The material is represented with its class, type, name, ID and description in SIMATIC BATCH.

- The material name in SIMATIC BATCH corresponds to the material name in APF.

- The material code in SIMATIC BATCH corresponds to the material ID in APF.

- The material description in SIMATIC BATCH corresponds to <description> in APF.

- Because the material description is language-neutral in SIMATIC BATCH, the names of the class and the type are transferred in the APF standard language.

- The materials transferred to SIMATIC BATCH are defined there as "input material" as well as "output material".

- Class-specific attributes are not transferred to SIMATIC BATCH.

Synchronizing material data

This function lets you transfer APF materials to SIMATIC BATCH in form of a group transfer as well as an individual transfer.

When the check box "Use SIMATIC BATCH" is selected in the Engineering tool, a new button "synchronize material data" is displayed in the APF material management dialog. Once the Batch PCell is connected to the runtime, this button is released (this can take a few seconds during the first initialization).

In order to transfer the materials to SIMATIC BATCH, click on the button "synchronize material data" / "Materialdaten synchronizieren". The materials in the SIMATIC-BATCH structure tree will then be filed under Material class name\Type name\Material name.

The transfer of materials depends on the selection of the material class, type and material:

- If no class is selected, all materials of all classes are transferred.

- If a class is selected, all materials of this class are transferred.

- If a class and a type is selected, all materials of this class of of this type are transferred.

- If an individual material is selected, this material is transferred.

The following message is displayed during the material transfer:

- English: "Please wait while synchronizing materials…"

- German: "Bitte warten während Materialien synchronisiert werden…"

You will be notified if a material cannot be transferred to SIMATIC BATCH:

- English: "Unable to transfer materials to SIMATIC BATCH!"

- German: "Materialien konnten nicht nach SIMATIC BATCH übertragen werden!"

Example: Another material with different code but identical name already exists in SIMATIC BATCH.

Creating material

You can use this function to create and save an individual material in APF and SIMATIC BATCH.

When the check box "Use SIMATIC BATCH" is selected in the Engineering Tool, the selected material is saved in APF and transferred to SIMATIC BATCH by pressing the "Save" button in the APF material management dialog.

Deleting material

You can use this function to delete an individual material in APF as well as SIMATIC BATCH.

Before a material is deleted in APF, there is a check to see if it can also be deleted in SIMATIC BATCH. If this is not the case, the material cannot be deleted from APF or SIMATIC BATCH. Example: A material is still being used in a recipe in SIMATIC BATCH.

The operator is notified when a material is deleted:

- English: "Please wait while deleting materials…"
- German: " Bitte warten während das Material gelöscht wird…"

The operator is notified if a material cannot be transferred to SIMATIC BATCH:

- English: "Unable to transfer materials to SIMATIC BATCH!"
- German: "Materialien konnten nicht nach SIMATIC BATCH übertragen werden!"

The following message is displayed while the material is being deleted:

- English: "Please wait while deleting materials…"
- German: " Bitte warten während das Material gelöscht wird…"

If a material cannot be deleted in SIMATIC BATCH, the following message is displayed:

- English: "Unable to delete material in SIMATIC BATCH! Deleting not possible"
- German: "Material konnte in SIMATIC BATCH nicht gelöscht werden! Löschen nicht möglich"

Other

Any modification of a material in APF is logged with date / time, user = "APF", action, etc. in SIMATIC BATCH (see Audit Trail / Log in SIMATIC BATCH material dialog).

3.2 "Order Creation" dialog

The "Order Creation" dialog provides you with the following functions:

- The acquisition of order data
- The acquisition of batch data
- Transferring the data to SIMATIC BATCH

In the engineering phase, the dialog can be tailored specifically to the user in many different ways. Dependent on this, some input fields can be used in various ways.

For example:

The first field of the interface can either be called "Recipe" or "Formula Category". For this reason, the following description will only be given as an example.

The possible parametrization can be found in the chapter "Amendments to the Engineering Manual" under "Configuration of the "Order Creation" dialog".

Note

This dialog is used exclusively for entering data for new orders / batches. It is not possible to manage orders / batches that already exist.

Layout of the user interface

The following figure shows an example of the operator interface of the dialog:
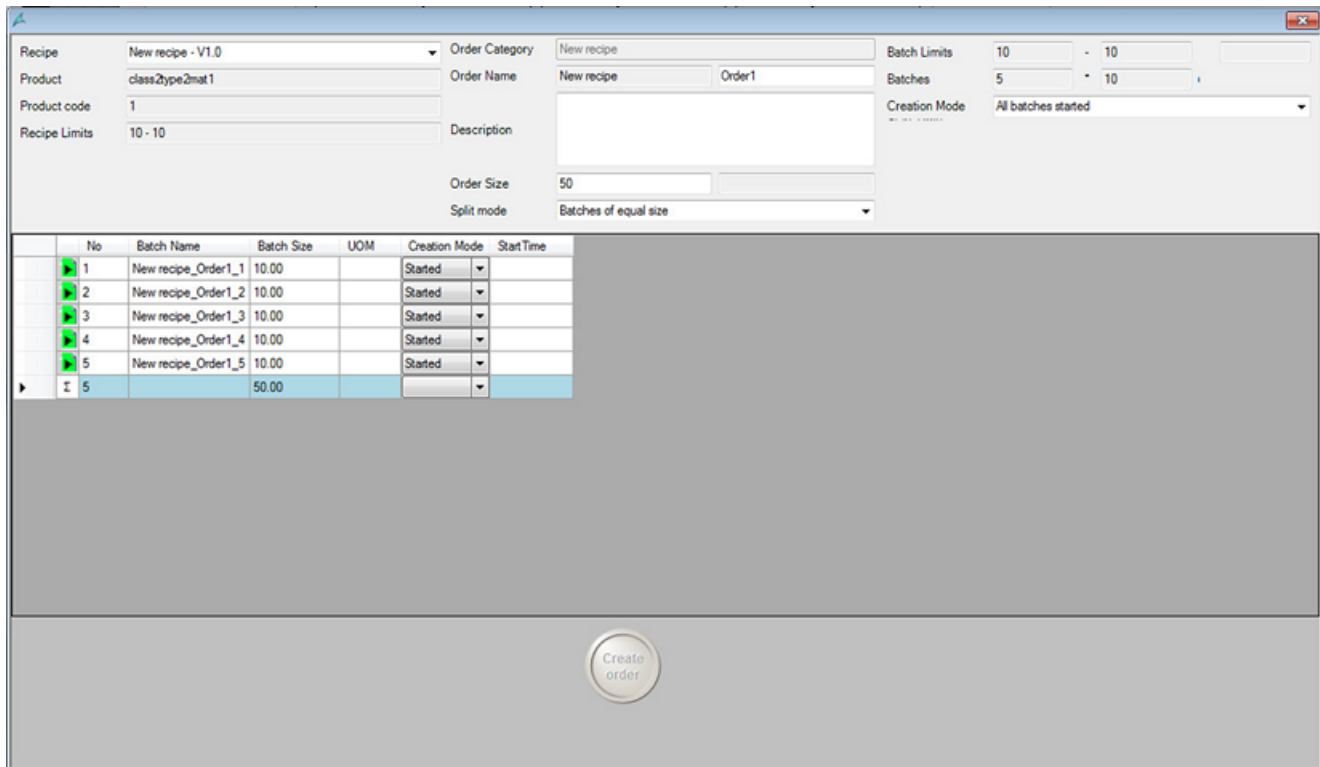
The operator interface is divided into the following areas:

- Top left and top center: Details about the order
- Top right: Details about the batch
- Center area: List of the batches calculated in the dialog
- Low range: Round button "Create order" - Transfer to SIMATIC BATCH

The acquisition of order data

The order data include the following, amongst others:

- Formula category
- Recipe / formula selection combined box
- Recipe quantity text box
- Order category
- Order name (The combination of order category + order name cannot already exist in SIMATIC BATCH)

- Order quantity

- Split mode (order split mode)
  More information on the calculation principles for this mode can be found in *Amendment to the Function Manual* under *Split Mode formulas*.

The acquisition/calculation of batch data

Depending on the configuration and the order split mode, the batch data are calculated automatically.

- Minimum batch size

- Maximum batch size

- Number of batches

- Batch size

- Remaining quantity

- Creation mode (order creation mode) specifies the types of generation and/or start of baches.

- Batch list with following columns:

  – Symbol of creation mode

  – Sequential number

  – Batch name

  – Batch size

  – UOM (unit of measurement)

  – Creation mode

  – Start time

  – 2 additional columns can be configured specific to the user

  Total line at the end of the list

Note

In the case of manual input in the batch list, you can only exit the field after a correct input.

Transferring the data to SIMATIC BATCH

Note

Check the data displayed on the operator interface!

Data transfers cannot be undone. You can still make later changes directly in SIMATIC BATCH .

Click on the "Create order" button in the lower area of the dialog. The recorded data will now be transferred to SIMATIC BATCH . The order and the batches will be created here.

Amendment to the Function Manual

4

4.1 "Order Creation" interface

If you want to access the user-specific scripts on this dialog, WinCC-Dialog provides the following properties and events:

Properties

- PCellName (In)
  - Name of the PCell to connect to
- FormulaCategory (Out)
  - Name of the formula category which is selected/calculated.
- Recipe (Out)
  - Name and Version of the formula or recipe which is selected.
- RecipeName (Out)
  - Name of the formula or recipe which is selected.
- RecipeVersion (Out)
  - Version of the formula or recipe which is selected.
- ProductName (Out)
  - Name or the product which is associated with the selected Recipe
  - Will be updated if Recipe has changed
- ProductCode (Out)
  - Code or the product which is associated with the selected Recipe
  - Will be updated if Recipe has changed
- MinRecipeSize (Out)
  - Minimum amount of selected recipe
  - Will be updated if Recipe has changed
- MaxRecipeSize (Out)
  - Maximum amount of selected recipe
  - Will be updated if Recipe has changed
- UOM (Out)
  - Unit of measurement which is associated with the selected recipe
  - Will be updated if Recipe has changed

- OrderCategory (Out)
  - Name of the order category which is selected.
- OrderName (Out)
  - Name of the order which is to be created.
- OrderNameIsAvailable (Out)
  - Indicates whether the selected order name already exists in SIMATIC BATCH or not.
- OrderDescription(Out)
  - Description of the order which is to be created.
- OrderSize (Out)
  - Selected amount of the order
- OrderSplitMode (Out)
  - Selected order split mode
- MinBatchSize (Out)
  - Selected minimum batch size
- MaxBatchSize (Out)
  - Selected maximum batch size
- NumberOfBatches (Out)
  - Selected number of batches
- BatchesSize (Out)
  - Selected size of batches
- RemainingBatchSize (Out)
  - Selected size of the remaining batch
- OrderCreationMode (Out)
  - Selected order Creation Mode
- OrderStartTime (Out)
  - Selected Order Start Time
- BatchesWaitingTime (Out)
  - Selected Batches Waiting time
- SelectedBatch (In)
  - Sets the index in the batch list for getting or setting batch data with subsequent "SelectedBatch ..." properties.

    Note

    This is independent from operator selection!

  - Restricted to 1 to Number of batches
  - Defaulted to 1

- SelectedBatchName (In/Out)
  - Name of the selected batch
- SelectedBatchSize (In/Out)
  - Size of the selected batch
- SelectedBatchCreationMode (In/Out)
  - Creation mode of the selected batch
- SelectedBatchStartTime (In/Out)
  - Start time of the selected batch
- SelectedBatchCustomColumn1Value (In/Out)
  - Value of the 1st Custom Column of the selected batch formatted as string
- SelectedBatchCustomColumn1Enumeration (In/Out)
  - Valid if BatchListCustomColumn1Type = Enum
  - |-Separated list of alternatives which are selectable within the custom column combo box of the selected batch
- SelectedBatchCustomColumn2Value (In/Out)
  - Value of the 2nd Custom Column of the selected batch formatted as string
- SelectedBatchCustomColumn2Enumeration (In/Out)
  - Valid if BatchListCustomColumn2Type = Enum
  - |-Separated list of alternatives which are selectable within the custom column combo box of the selected batch

Events

- FormulaCategoryChanged
  - Raised if the FormulaCategory has changed
  - Includes the new formula category name
- RecipeChanged
  - Raised if the RecipeName or RecipeVersion have changed
  - Includes the new recipe or formula name, version, product name, product code, min and max amount and unit of measurement
- OrderCategoryChanged
  - Raised if the OrderCategory has changed
  - Includes the new order category name
- OrderNameChanged
  - Raised if the OrderName has been changed
 - Includes the new order name and the availability of the order name

- OrderDescriptionChanged
  - Raised if the SelectedOrderComment has been changed
  - Includes the new order comment
- OrderSizeChanged
  - Raised if the OrderSize has been changed
  - Includes the new order size
- OrderSplitModeChanged
  - Raised if the OrderSplitMode has changed
  - Includes the new split mode
- BatchLimitsChanged
  - Raised if the MinBatchSize or MaxBatchSize have changed
  - Includes the minimum and maximum batch size.
- BatchesChanged
  - Raised if NumberOfBatches, BatchesSize or RemainingBatchSize has changed
  - Includes the new size and number of batches and the remaining size of batches
- OrderCreationModeChanged
  - Raised if SelectedOrderCreationMode, OrderStartTime or BatchesWaitingTime have changed
  - Includes the new creation mode, order start time and waiting time for the following batch
- BatchNameChanged
  - Raised if a batch name has changed
  - Includes index and new name of the batch
- BatchSizeChanged
  - Raised if the size of a batch has changed
  - Includes index and new size of the batch
- BatchCreationModeChanged
  - Raised if the creation mode or start time of a batch have changed
  - Includes index , new creation mode and start time of the batch
- BatchCustomValue1Changed
  - Raised if the value within the first custom column of a batch has changed
  - Includes new custom value 1 of the batch
- BatchCustomEnum1Changed
  - Raised if the selected value within the first custom column of a batch has changed
  - Includes index and new custom value 1 of the batch

- BatchCustomValue2Changed
  - Raised if the value within the second custom column of a batch has changed
  - Includes index and new custom value 2 of the batch
- BatchCustomEnum2Changed
  - Raised if the selected value within the second custom column of a batch has changed
  - Includes index and new custom value 2 of the batch

4.2 Formula Split Mode

Evenly

Split the order amount in batches of equal size.
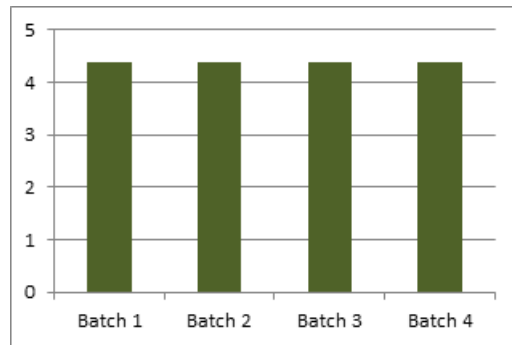
From SB:	$Q_{RecipeMin}$, $Q_{RecipeMax}$
Configuration/Operator Input:	$Q_{BatchMin}$, $Q_{BatchMax}$
Constraint:	$Q_{RecipeMin} \leq Q_{BatchMin} \leq Q_{BatchMax} \leq Q_{RecipeMax}$

Input Option a

Operator Input:	Q_{Order}
Constraint	$Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$
Calculate	N, Q_{Batch}
Number of Batches	$N = Q_{Order} / Q_{BatchMax}$ (rounded up)
Batch Size	$Q_{Batch} = \max(Q_{Order} / N, Q_{BatchMin})$
Actual Production	$Q_{Prod} = N * Q_{Batch}$

Input Option b

Operator Input:	Q_{Order}, N
Constraint	$Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$
	$1 \leq N \leq 100$

Calculate	Q_{Batch}
Batch Size	Q_{Batch} = min (max (Q_{Order} / N, $Q_{BatchMin}$), $Q_{BatchMax}$)
Actual Production	Q_{Prod} = N * Q_{Batch}

Input Option c

Operator Input:	Q_{Batch}, N
Constraint	$Q_{BatchMin} \leq Q_{Batch} \leq Q_{BatchMax}$
	$1 \leq N \leq 100$
Calculate	Q_{Order}
Order Size	Q_{Order} = N * Q_{Batch}
Actual Production	Q_{Prod} = Q_{Order}

MaxSizeWithRemain

Split the order amount in batches of maximum size plus one batch with the remaining amount.
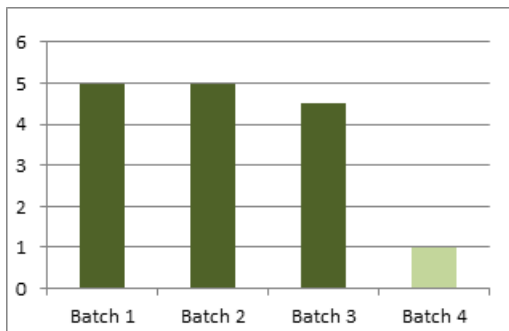
From SB:	$Q_{RecipeMin}$, $Q_{RecipeMax}$
Configuration/Operator Input:	$Q_{BatchMin}$, $Q_{BatchMax}$
Constraint:	$Q_{RecipeMin} \leq Q_{BatchMin} \leq Q_{BatchMax} \leq Q_{RecipeMax}$

Input Option a

Operator Input:	Q_{Order}
Constraint	$Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$
Batch Size	Q_{Batch} = $Q_{BatchMax}$
Calculate	N, $Q_{BatchRemain}$, $Q_{BeforeLast}$
Number of Batches	N = Q_{Order} / $Q_{BatckMax}$ (rounded down)
Remaining Batch	$Q_{BatchRemain}$ = Q_{Order} - N * $Q_{BatchMax}$

Before last Batch	if $Q_{BatchRemain} < Q_{Batchmin}$ then
	$Q_{BeforeLast} = Q_{Batch} - Q_{BatchMin} + Q_{BatchRemain}$
	$Q_{BatchRemain} = Q_{BatchMin}$
	else
	$Q_{BeforeLast} = Q_{Batch}$
Actual Production	$Q_{Prod} = Q_{Order}$

Input Option b

Operator Input:	Q_{Order}, Q_{Batch}
Constraint	$Q_{BatchMin} \leq Q_{Batch} \leq Q_{BatchMax}$
	$Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$
Calculate	$N, Q_{BatchRemain}$
Number of Batches	$N = Q_{Order} / Q_{Batch}$ (rounded down)
Remaining Batch	$Q_{BatchRemain} = max(Q_{Order} - N * Q_{Batch}, Q_{BatchMin})$
Actual Production	$Q_{Prod} = N * Q_{Batch} + Q_{BatchRemain}$

Input Option c

Operator Input:	$N, Q_{Batch}, Q_{BatchRemain}$
Constraint	$Q_{BatchMin} \leq Q_{Batch} \leq Q_{BatchMax}$
	$Q_{BatchMin} \leq Q_{BatchRemain} \leq Q_{BatchMax}$
	$1 \leq N \leq 100$
Calculate	Q_{Order}
Order Size	$Q_{Order} = N * Q_{Batch} + Q_{BatchRemain}$
Actual Production	$Q_{Prod} = Q_{Order}$

MaxSizeWithOverProd

Split the order amount in batches of same size and allow overproduction.
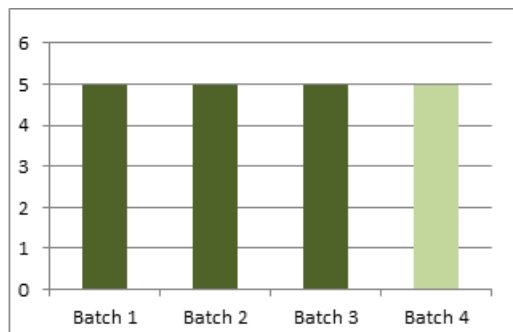
From SB:	$Q_{RecipeMin}, Q_{RecipeMax}$
Configuration/Operator Input:	$Q_{BatchMin}, Q_{BatchMax}$

Constraint: $Q_{RecipeMin} \leq Q_{BatchMin} \leq Q_{BatchMax} \leq Q_{RecipeMax}$

$Q_{Order} \geq Q_{RecipeMin}$
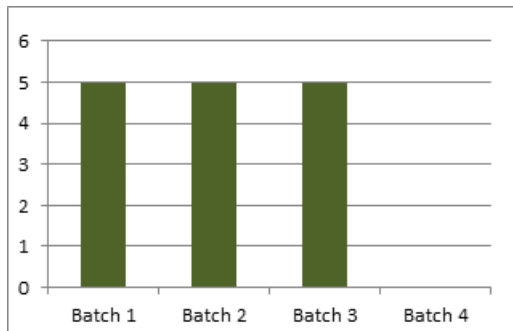
Input Option a

Operator Input: Q_{Order}

Constraint $Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$

Batch Size $Q_{Batch} = Q_{BatchMax}$

Calculate N

Number of Batches $N = Q_{Order} / Q_{BatchMax}$ (rounded up)

Actual Production $Q_{Prod} = Q_{BatchMax} * N$

Input Option b

Operator Input: Q_{Order}, Q_{Batch}

Constraint $Q_{BatchMin} \leq Q_{Batch} \leq Q_{BatchMax}$

$Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$

Calculate N

Number of Batches $N = Q_{Order} / Q_{Batch}$ (rounded up)

Actual Production $Q_{Prod} = Q_{Batch} * N$

MaxSizeWithUnderProd

Split the order amount in Batches of same size and allow underproduction.

From SB: $Q_{RecipeMin}$, $Q_{RecipeMax}$

Configuration/Operator Input: $Q_{BatchMin}$, $Q_{BatchMax}$

Constraint: $Q_{RecipeMin} \leq Q_{BatchMin} \leq Q_{BatchMax} \leq Q_{RecipeMax}$

Input Option a

Operator Input: Q_{Order}

Constraint $Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$

Batch Size $Q_{Batch} = Q_{BatchMax}$

Calculate	N
Number of Batches *1)	$N = Q_{Order} / Q_{BatchMax}$ (rounded down)
Actual Production	$Q_{Prod} = Q_{BatchMax} * N$

Input Option b

Operator Input:	Q_{Order}, Q_{Batch}
Constraint	$Q_{BatchMin} \leq Q_{Batch} \leq Q_{BatchMax}$
	$Q_{BatchMin} \leq Q_{Order} \leq 100 * Q_{BatchMax}$
Calculate	N
Number of Batches *2)	$N = Q_{Order} / Q_{Batch}$ (rounded down)
Actual Production	$Q_{Prod} = Q_{Batch} * N$

*1) In case $Q_{Order} < Q_{BatchMax} \rightarrow$ one Batch with $Q_{BatchMax}$ will be added to the batch list.

*2) In case $Q_{Order} < Q_{Batch} \rightarrow$ one Batch with Q_{Batch} will be added to the batch list.