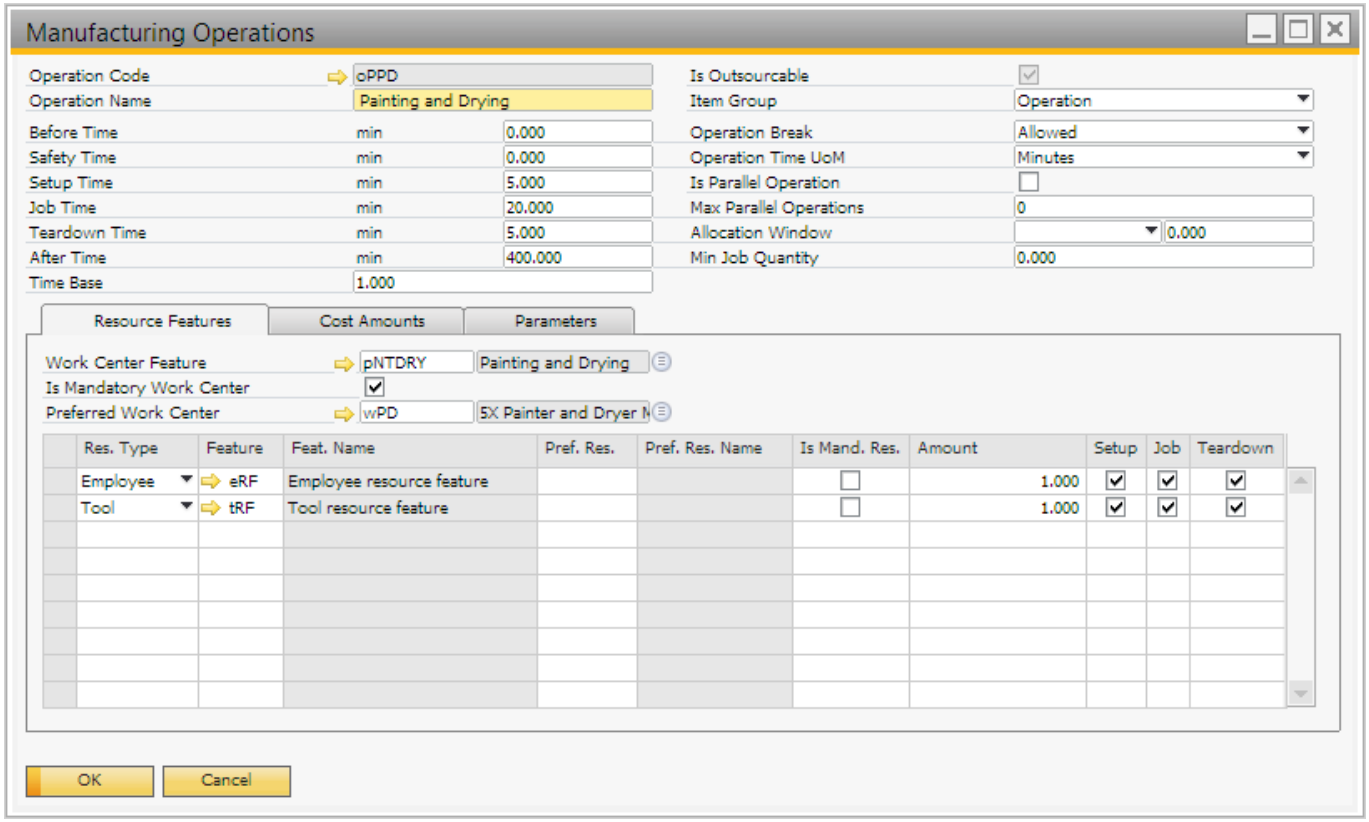
# Manufacturing Operations

On the Manufacturing Operations form the manufacturing details of an operation type item can be defined and new operations type items can be added. New operations should be created from the Manufacturing Operations screen and not directly from the Item Master Data.

Open the form via:

- Production module> Manufacturing operations.
- Right-click menu on the Item Master Data of an operation.




## Header

*Operation code*
The code of the operation item.

*Operation name*
The name of the operation.

*Time Values*
The duration each operation step requires, displayed in the selected 'Operation Time UoM'.
The safety, setup, job and teardown time consume the capacity of the work center. Before and after times do not consume work center capacity but the job scheduling logic will take them into account when calculating the beginning of the jobs in the sequence of operations.

- Before time: The duration of the tasks to be done before allocating the work center for the

operation. No work center is allocated for the before time period.
- Safety time: Duration of the time buffer. No PDC bookings can be created for the safety time.
- Setup time: Duration of the tasks to be done before the production starts.
- Job time: The actual production time for the amount of units defined in time base.
- Teardown time: The duration of the tasks after the production finished but before the work center is released.
- After time: The duration of the tasks to be done after releasing the work center. The work center is released and available for other operations.

*Time Base*
The number of the units of the operation the job time refers to.

*Is outsourceable? (Y/N)*
Indicates whether the operation is outsourceable or not. This option cannot be changed after the operation was created. If the operation is outsourceable the item is set as Purchased Item.

*Item Group*
The item group the operation belongs to. Item groups with 'Standard' valuation method can be selected. When changing the 'Item Group' either on the Item Master Data or on the Manufacturing Operations form, the 'Item Group' on the other form will be changed too.

*Operation break*
During manufacturing, an operation can be stopped and restarted or the work center can be changed. With the Operation Break setting the user can define whether these break types are allowed or not.

- Allowed: Intermissions and work center changes are allowed during the operation.
- Denied: No breaks are allowed during the operation.
- Allowed WC: Other operations may get in between the sequence of the operation, but the work center cannot be changed during the operation.
- Allowed NBP: The work center can be changed, but intermissions are not allowed during the operation, therefore other operations cannot get in between the sequence of the operation.
- Allowed WCNBP: Neither the change of the work center, nor intermissions are allowed. It is recommended to use this option instead of the old 'Denied' option.

> The 'Allowed WC', 'Allowed NBP' and 'Allowed WCNBP' operation break types are not allowed in multi-dimensional allocation environment and do not work with parallel operations.

*Operation Time UoM*
The unit of measurement of the operation time. Possible values: Days, Hours, Minutes, Seconds, Weeks.

*Is Parallel Operation (Y/N)*
Indicates whether an operation can be performed on multiple work centers at the same time or not. This way the overall duration of an actual manufacturing operation may be much shorter if enough resource capacities are available.

*Max Parallel Operations*

The maximum number of work centers where the operation can be performed if it is a parallel operation.

*Allocation Window*
Defines the horizon of the allocation. ‘Weeks’, ‘Days’, ‘Hours’, ‘Minutes’ and ‘Seconds’ can be selected as the time scale.

*Min Job Quantity*
The minimum quantity that must be produced during an allocation.

# Resource Features tab

*Work Center Feature*
Select a work center feature for the operation. This is a mandatory field. The parameter is used extensively by the job scheduler; when the scheduler tries to find work center capacities for an operation, it will search for work centers that have the selected feature for the operation.

*Is Mandatory Work Center (Y/N)*
Indicates whether the operation must take place on the preferred work center or not.

*Preferred Work Center*
A preferred work center can be set. Every work center with the feature linked to the operation can be selected.

The work center set here will be preferred during the allocation process. If the work center is free, the operation will be allocated there. If the work center is busy, the system will calculate the delay the usage of this work center could cause. If this delay exceeds the maximum delay set on the *‘MRP Max Delay For Pref. WC (s)’* option on Produmex Manufacturing settings, the operation will be allocated to another work center, otherwise the system will schedule it to the preferred work center.

When using the multi-dimensional allocation strategy, employee, tool and constraint requirements can be added to the operation too. Select a resource type then add the feature and a preferred resource. The ‘Feature Name’ and ‘Resource Name’ fields will be automatically filled. Only resources linked to the selected feature and features linked to the selected resource type can be added.

Indicate whether the resource is mandatory or not on the *‘Is Mand. Res.’* cell.

On the ‘Amount’ field in an employee row indicate the employee capacity the operation uses. If the Amount is set to one, it means that the operation requires 100% of the employee capacity. Therefore the amount set for an employee cannot be greater than one.

On the amount field of a tool set the needed quantity of the tool during an operation.

Additional resources might not being used during the entire operation. On the Setup, Job and Teardown fields mark that the resource is required in which step of the operation. The setup, job and teardown time of a supplementary resource will be the same as the work center time of the respective step.

# Cost Amounts tab

Cost types with parameters can be set on this tab for cost calculation purposes.

*Cost Type*
Select a 'Cost Type'. Multiple cost type rows can be defined for an operation. Define cost types on the 'Cost Type' form that can be reached via: Production > Cost Calculation > Cost Type.

- Setup Amount: The Setup Amount for the given operation from the cost amounts.
- Job Amount: The Job Amount for the given operation from the cost amounts.
- Teardown Amount: The Teardown Amount for the given operation from the cost amounts.
- Cycle Amount: The Cycle Amount for the given operation from the cost amounts.
- Quantity Amount: The Quantity Amount for the given operation from the cost amounts.
- Fix Amount: The Fix Amount for the given operation from the cost amounts.

For more information about cost calculation please see: Cost and Price Calculations

# Parameters tab

When the *'Use Operation Parameters'* setting is enabled on the PDC tab of the Produmex Manufacturing settings, an additional 'Parameter' tab is displayed on the form.

On this tab parameters for shopfloor Quality Controlling can be set. Parameters types can be set up on the *OperationParameterTypes* UDT.

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