

Excel Template

In this section we will run through the Excel template and the different ways you can navigate through it and understand the references and information contained in the template, as well as how to use it to your advantage and thus save time and effort while loading a **Master Data Package** into the MES.

Helper Sheets

The first worksheets you see in the Excel template are helper sheets that give you information and are also used as configuration for the entire template. To understand what information they hold and what they are used for, see [Help Sheets](#).

Explaining the Format

The different names and types of the sheets contained in the Excel template are described below:

Prefix	Type
No prefix	Sub-sheet of previous prefixed sheet
<DM>	Dynamic Model
<SM>	Static Model
<GT>	Generic Table
<ST>	Smart Table
<UP>	Update Model
<LOOKUP>	Reference for the longer name. i

Note

An example for <UP> could be the following:

Name	Team	ShiftPlan	Workgroup	Position
Operator_2	Team-E	Assembly Preparation	WeighAndDispense	WeighAndDispense Certification
Operator_3	Team-E	Assembly Preparation	Mixing & Injection	Mixing Certification

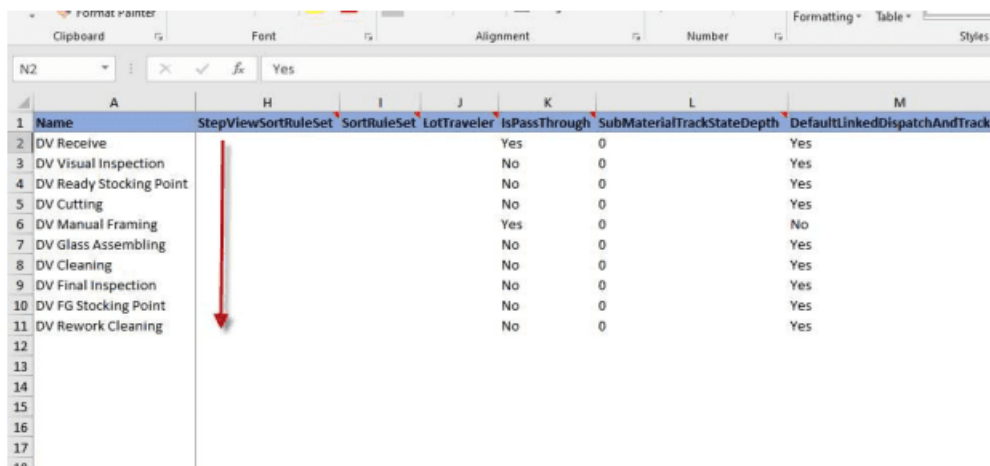
< > ... <UP>EmployeeShiftDetails

This tab is used to assign employees to a Shift Plan and then to a Workgroup of the Shift Plan.

Info

See [Help Sheets](#) for more information on the <LOOKUP>.

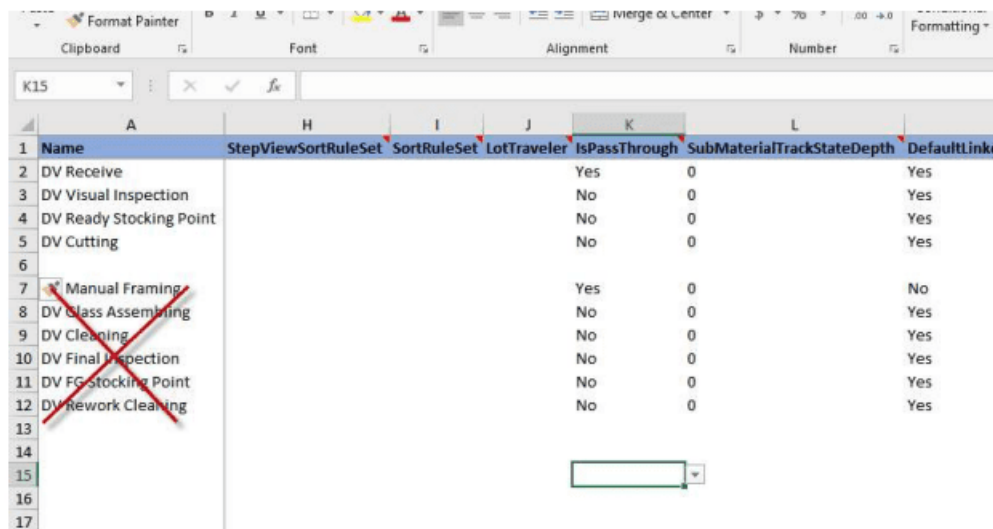
The system reads the Excel file in the order that the worksheets are placed in the file, starting from the left-most sheet and moving rightward. Each sheet is read from left to right and from top to bottom, creating fields as a linear FIFO (First-In-First-Out) sequence.



	A	H	I	J	K	L	M
1	Name	StepViewSortRuleSet	SortRuleSet	LotTraveler	IsPassThrough	SubMaterialTrackStateDepth	DefaultLinkedDispatchAndTrack
2	DV Receive				Yes	0	Yes
3	DV Visual Inspection				No	0	Yes
4	DV Ready Stocking Point				No	0	Yes
5	DV Cutting				No	0	Yes
6	DV Manual Framing				Yes	0	No
7	DV Glass Assembling				No	0	Yes
8	DV Cleaning				No	0	Yes
9	DV Final Inspection				No	0	Yes
10	DV FG Stocking Point				No	0	Yes
11	DV Rework Cleaning				No	0	Yes

Warning

The system will stop reading if a blank line appears. You can look at each sheet as a specific entity type, with each column representing an entity property or relation and each row representing a new entity.



	A	H	I	J	K	L	M
1	Name	StepViewSortRuleSet	SortRuleSet	LotTraveler	IsPassThrough	SubMaterialTrackStateDepth	DefaultLink
2	DV Receive				Yes	0	Yes
3	DV Visual Inspection				No	0	Yes
4	DV Ready Stocking Point				No	0	Yes
5	DV Cutting				No	0	Yes
6							
7	DV Manual Framing				Yes	0	No
8	DV Glass Assembling				No	0	Yes
9	DV Cleaning				No	0	Yes
10	DV Final Inspection				No	0	Yes
11	DV FG Stocking Point				No	0	Yes
12	DV Rework Cleaning				No	0	Yes
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The name of the Excel sheets must match the MES entities being loaded and the name of the columns must match the entity properties exactly. When processing the data, the system will check if the object already exists, thus creating or updating it accordingly.

Note

The template does not have all the objects and fields that are available in the UI. You can, however, add more entity types (sheets) and entity properties (columns), provided they are available in the UI and exactly match the name of the entity and respective properties.

Versioned Entities

In the case of versioned entities, a new version is always created when loaded into the system. **Change Sets** are managed automatically by the tool so there is no need to create them manually either in the Excel template or in the GUI. However, the approval process for any versioned object can only be performed using the GUI and you can access any **Change Sets** currently under approval in the [Change Sets](#).

For more information on loading entity revisions and versions, see [Revision Configuration](#).

Modeling Sequence

It is highly recommended to follow an appropriate modeling sequence since there are a lot of interdependent fields that have strict rules of precedence.

Flow/Step example

A **Flow** is composed of **Flow Items** of type **Step** and **Flow**. When a **Flow** contains **Flow Items** of type **Flow**, they are denoted as **Child Flows** of the **Parent Flow** for clarity. To create a **Flow** structure, you should follow the sequence below:

1. Create the **Steps**.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name	Description	Type	IsTemplate	DataGroup	ProcessingType	DisplayOrder	StepViewSortRuleSet	SortRuleSet	LotTraveler	MaterialLabel	IsPassThrough	IsPackingStep
2	Step_1		Process			Process						Yes	
3	Step_2		Process			Process						No	
4	Step_3		Process			Process						No	
5	Step_4		Process			Process						No	
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2. Create the **Flows**.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Name	Revision	Description	Type	DataGroup	IsNonSequentialBlock	IsAlternate	IsLineFlow	AlternateFlowSelectionType	IsEnabled						
2	Flow_A			Sequential		No	No	No		Yes						
3	Flow_1			Sequential		No	No	No		Yes						
4	Flow_2			Sequential		No	No	No		Yes						
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< > ... <DM>Reason <DM>Step <DM>StepReason <DM>Flow FlowItems <DM>Parameter <DM>ProductGroup <GT>MoistureSensitivityLevel <DM>Product ProductParameters

3. Utilize the **FlowItems** sheet to create the desired **Flow** structure.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Flow	Type	Target	IsOptional	Reworks	IsLine	IsSkippable	LineFlows	LogicalName	OnEnterRule	OnExitRule	ConditionType	ConditionExpression	ConditionRule	ConditionSamplingStep
2	Flow_A	Step	Step_1	No		No	No								
3	Flow_A	Step	Step_2	No		No	No								
4	Flow_A	Step	Step_3	No		No	No								
5	Flow_1	Flow	Flow_A	No		No	No								
6	Flow_1	Step	Step_4	No		No	No								
7	Flow_2	Step	Step_5	No		No	No								
8	Flow_2	Step	Step_6	No		No	No								
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< > ... <DM>Reason <DM>Step StepLogicalName <DM>StepReason <DM>Flow FlowItems <DM>Parameter <DM>ProductGroup <GT>MoistureSensitivityLevel

Resource/Service example

In another quick example, the **Service** must be created before the **Resource** creation and only after it is possible to fulfill the **ResourceService** sheet.

	A	B	C	D	E	F	G	H	I
1	SourceEntity	TargetEntity	Priority	IsEnabled					
2	Resource_1	Service_Resource_1	Yes						
3	Resource_2	Service_Resource_2	Yes						
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< > ... ResourceMeasurementCapability <DM>ResourceService <DM>DataCollection DataCollectionParameters <DM>Data

State Model/Protocol example

In the case of **Protocols**, you must create the **State Model** and load both the **State Model** and the **Protocol** at the same time.

	A	B	C	D	E	F
1	Name	Description	EntityType			
2	8D-A-1	StateModel for 8D	ProtocolInstance			
3	PDCA-A-1	StateModel for PDCA	ProtocolInstance			
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	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name	Revision	Description	Type	DataGroup	StateModel	Severity	DefaultOwner	RootCauseSource	DisableOverride	AllowProtocolStateRoleOverride	DefaultInhibitMoveFromStep	Default
2	8D		8D Protocol	Standard		8D-A-1	Neutral				No	No	No
3	PDCA		PDCA Protocol	Standard		PDCA-A-1	Warning				No	No	No
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Smart Table example

A custom Smart Table is often created through the CM MES interface, but it is also possible to create it through the Master Data Package. To create a Smart Table, you should follow the steps below:

1. Create the custom Smart Table using the Excel template <ST>SmartTable sheet:

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
2	SmartTable	Name	Description	Position	IsKey	IsMandatory	IsIndexed	ReferenceType	ReferenceName	ScalarType	Size	Precision	ValidationRange	ValidationRegex	ResolutionMode
3	CustomMatChecklistContext	Used to resolve the checklist for the specific context	Yes	180	No	Yes									
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2. Populate the required Properties for the custom Smart Table using the Excel template SmartTableProperties sheet:

1	SmartTable	Name	Description	Position	IsKey	IsMandatory	IsIndexed	ReferenceType	ReferenceName	ScalarType	Size	Precision	ValidationRange	ValidationRegex	ResolutionMode
2	CustomMatChecklistContext	Step	Reference to a Step	1	Yes	Yes	Yes	EntityType	Step.Name	NVarChar	256				
3	CustomMatChecklistContext	LogicalFlowPath	The Logical Flow Path	2	Yes	No	No	None		NVarChar	512				
4	CustomMatChecklistContext	Operation	Operation Name	3	Yes	Yes	Yes	LookupValue	MaterialChecklistOperations	NVarChar	256				
5	CustomMatChecklistContext	Product	Product Name	4	Yes	No	Yes	EntityDefinition	Product.Name	NVarChar	256				
6	CustomMatChecklistContext	ProductGroup	Product Group Name	5	Yes	No	Yes	EntityDefinition	ProductGroup.Name	NVarChar	256				
7	CustomMatChecklistContext	Flow	Flow Name	6	Yes	No	Yes	EntityDefinition	Flow.Name	NVarChar	256				
8	CustomMatChecklistContext	Material	Material Name	7	Yes	No	Yes	EntityDefinition	Material.Name	NVarChar	256				
9	CustomMatChecklistContext	MaterialType	Material Type	8	Yes	No	Yes	LookupValue	MaterialType	NVarChar	256				
10	CustomMatChecklistContext	Resource	Resource Reference	9	Yes	No	Yes	EntityDefinition	Resource.Name	NVarChar	256				
11	CustomMatChecklistContext	ResourceType	Resource Type Name	10	Yes	No	Yes	LookupValue	ResourceResourceType	NVarChar	256				
12	CustomMatChecklistContext	Model	Model Name	11	Yes	No	Yes	LookupValue	ResourceModel	NVarChar	256				
13	CustomMatChecklistContext	Recipe	Recipe Name	12	Yes	No	Yes	EntityDefinition	Recipe.Name	NVarChar	256				
14	CustomMatChecklistContext	Checklist	Checklist Name	13	No	Yes	No	EntityDefinition	Checklist.Name	NVarChar	256				
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3. Define the required Precedence Keys for the custom Smart Table using the Excel template SmartTablePrecedenceKeys sheet:

1	SmartTable	PrecedenceKey1	PrecedenceKey2	PrecedenceKey3	PrecedenceKey4	PrecedenceKey5	PrecedenceKey6
2	CustomMatChecklistContext	Step+Operation+Material	Step+Operation+Recipe	Step+LogicalFlowPath+Operation+Product+Flow+MaterialType	Step+Operation+Product+Flow+MaterialType	Step+Operation+ProductGroup+Flow+MaterialType	Step+LogicalFlowPath+Operation+Product
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4. If data is to be uploaded directly into the Smart Table via Master Data, create a new Excel sheet named <ST>ST Name. The column names in this sheet must correspond to the properties defined in Step 2:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1		Step	LogicalFlowPath	Description	Product	ProductGroup	Flow	Material	MaterialType	Resource	ResourceType	Model	Recipe	Checklist									
2	Inspection	After Dry	Trackin											CHK Measurement After Dry									
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Moreover, because the fields to fill in the Master Data and in CM MES are the same, for more information on how to create a custom Smart Table, see [Smart Tables](#) in the Critical Manufacturing Documentation Portal.

In relation to the creation of custom Generic Tables using Master Data, you should follow steps 1, 2, and 4 above as the creation process is similar.

For Generic Tables, you can find more information in [Generic Tables](#), and your Excel template sheets would be as in the following example:

<GT>GenericTable	GenericTableProperties	<GT>GT Name
------------------	------------------------	-------------

Relations

Most of the relations between objects are added automatically when two objects require contextual sharing of information due to their current operation state. You can manually add relations between objects by using the **EntityType** sheet and filling in the **SourceEntity** and the specific **TargetEntity**.

	A	B	C	D	E	F	G	H	I	J
1	Name	Description	IsRelation	SourceEntity	SourceAccessLevel	TargetEntity	TargetAccessLevel	RelationLock	IsVersioned	AllowImplicitChangeSet
2	Example_1		Yes	Resource	0	Employee	0	LockNone	Yes	No
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Note

If you want to create a relation between versioned entities, use the **EntityTypeProperty** sheet to define whether the Source or Target entities belong to the version, to the definition or to the complete entity. The **Reference Type** field in that sheet defines that relationship and has three possible options:

- EntityDefinition
- EntityVersion
- Entity

Attributes

If you want to add specific attributes to an entity, you must create the attribute in the **EntityTypeProperty** sheet and then add the columns with the attribute names in the target Entity.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	EntityTyp	Name	Description	PropertyType	DataGrou	IsEnable	ReferenceType	ReferenceName	ScalarType	ScalarSiz	ScalarPrecisio	DefaultValue	IsArray	CopyOnClon
2	Resource	WarrantyStart		Attribute		Yes	None		DateTime	0			No	No
3	Resource	WarrantyEnd		Attribute		Yes	None		DateTime	0			No	No
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	A	B		DE	DF	DG	DH	DI	DJ
1	Name	Description	tions	AllowEmployeeCheckOutOnCheckIn	LogCheckInActivity	WarrantyStart	WarrantyEnd		
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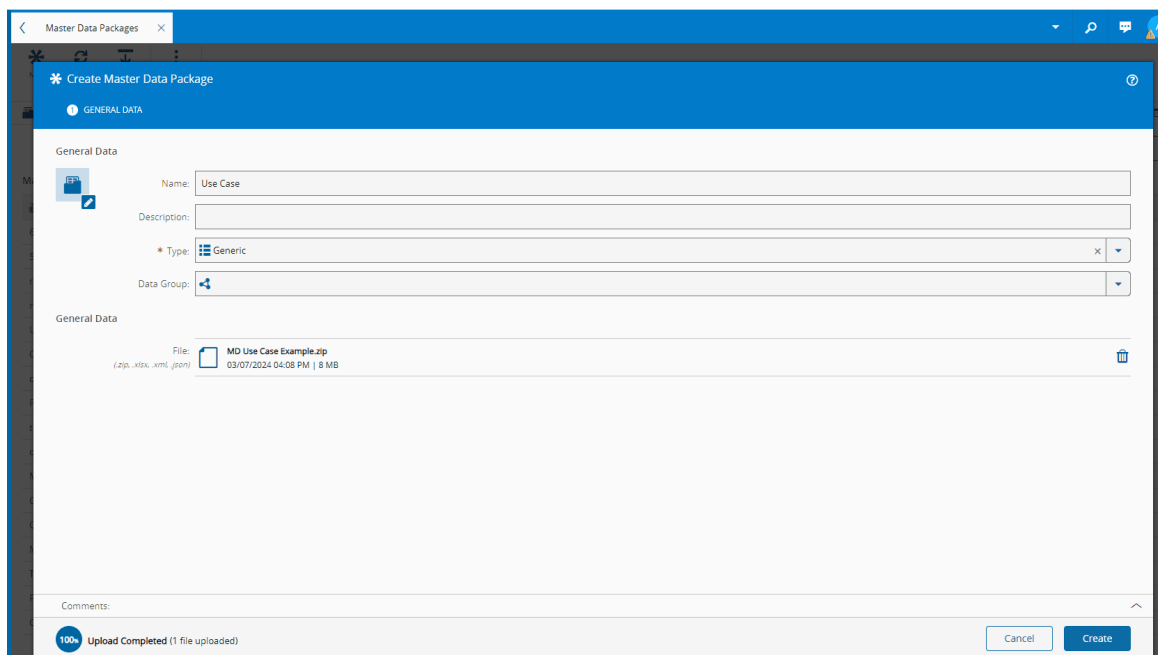
Warning

The empty spaces in the entity names are taken into consideration and can cause failures when loading the **Master Data Package**. Make sure you trim all leading and lagging spaces from the labels of any data element.

External Files

You can upload specific types of external files that will be included in the **Master Data Package**. They must be specified manually and included in a `.zip` file that will be used to upload the data into the system:

- Images - used in **Checklists**, **Data Collections** and Notes in Future Actions, among others.
- Objects - system objects like **Queries**, **Printable Documents** or **FabLives**, among others.
- Documents - files can be associated to most entity types, like PDFs or other files that can be displayed in the system.

















To reference the files in a **Checklist**, you must delimit the file name and the specific format with `[]` and `[]`, like the example below:

1	A	B	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
2	Checklist	Name	Group	DocumentationURL	ActivityType	TrackingType	ValidFrom	ValidTo	IsFloating	IsOptional	Rule	Instruction	DiagramFile	DiagramFileAnnotation		
3	Checklist_1	Item_1			ManualTask	End			No	No		[[Image.PNG]]				
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For **Document** loading the user must fill the appropriate values for `RelativeFileLocation` and `Filename`, the latter with the name of the object that will be included in the `.zip` file.

1	A	B	C	D	E	F	G	H	I	J
2	Name	Revision	Description	Type	DataGroup	ContentStorageType	RelativeFileLocation	Filename	ContentURL	ChangeDescription
3	Procedure Video			Generic		Internal	Video.mp4	Video.mp4		
4	Procedure PDF File			Generic		Internal	PDF File.pdf	PDF File.pdf		
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The content of a `.zip` file that reflects the model shown above would look like this:

<div>   > MD Use Case Example </div>				
<div>      <div>  Sort ▾ </div> <div>  View ▾ </div> <div>  Extract all </div> <div>⋮</div> </div>				
Name	Type	Compressed size	Password ...	Size
 Image	PNG File	142 KB	No	142 KB
 MD 10.2 Use Case	Microsoft Excel Worksheet	2,256 KB	No	3,593 KB
 PDF File	Microsoft Edge PDF Docu...	382 KB	No	387 KB
 Video	MP4 File	5,986 KB	No	5,995 KB