



Critical
manufacturing
an ASM PT company

Material Defects

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Material Defects

Estimated time to read: 7 minutes

Material Defects in manufacturing occur when a product is improperly manufactured and departs from its intended design. It is something or a lack of something that results in incompleteness, inadequacy, or imperfection (e.g.: a flaw in a product that creates an unreasonable risk of harm in its normal use).

A material defect in any item, whether tangible or intangible, is something that substantially prevents the item from operating or functioning according to its specifications.

Material Defects can result from the materials manipulation and fabrication processes, and in manufacturing, a defect, is one that the manufacturer did not intend.

Defects in materials are known to have a negative effect on the device performance. Removing or decreasing the number of such defects is a common challenge for every industry.

This document will guide you through the required configurations for the Material Defects functionality.

Overview

The Material Defects functionality is intended to support the inspection processes in the capture of Defects in a Material and by managing the lifecycle of those Defects. The Defects need to be recorded so that they can later be handled in a rework/repair/classification station. The concepts and functionalities of the Critical Manufacturing Material Defects functionalities will be described in more detail over the next sections.

Defect Lifecycle

After a Defect has been captured it needs to be handled in a rework/repair/classification station. A Defect can be:

- Marked as a false Defect
- Marked as accepted as-is
- Fixed, by performing a repair action (e.g.: by replacing the part)
- Considered as not fixable in which case, the Material is scrapped

Setting up Material Defects-Related Entities

To enable the Material Defects functionalities, it is necessary to set up specific Critical Manufacturing MES entities.

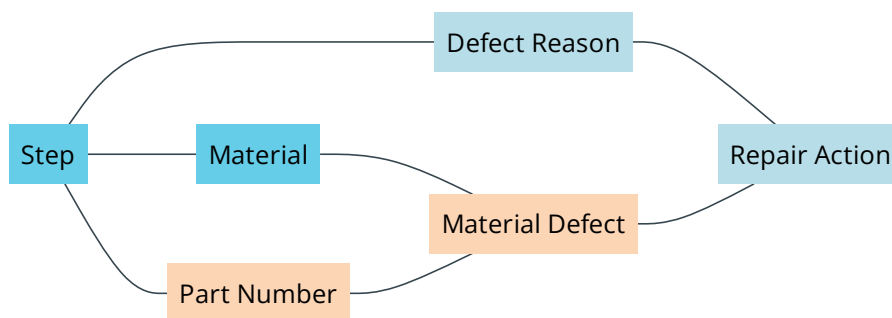
To set up the Material Defects-related Entities, it is necessary to follow the steps as described in the Table below.

Step Number	Step	Description
1	Create the necessary Reasons and Repair Actions	Create the necessary Defect Reasons and Repair Actions.

Step Number	Step	Description
2	Configure the Reasons in the Steps	Configure the Defect Reasons in the Steps.
3	Configure the Products' drawings, if applicable	Configure the drawings in the Products.

Table: Steps to setup the Material Defects-related Entities

The MES object model is displayed in the figure below.



The next sub-sections will cover the required configuration steps in more detail.

1 - Reason

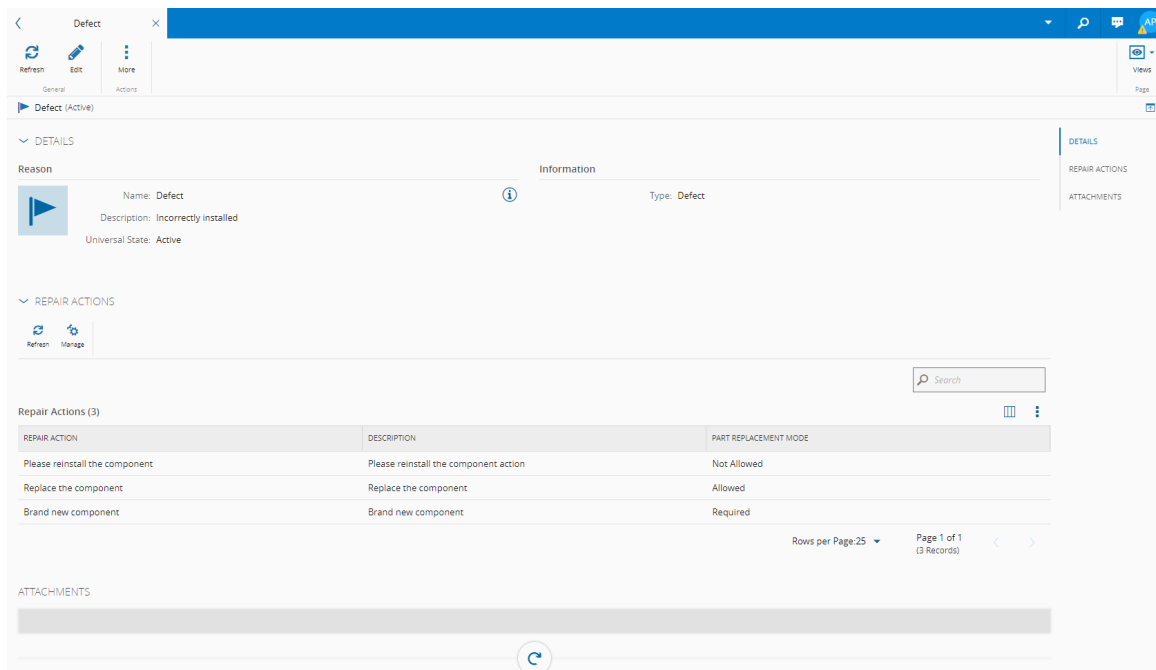
The classification of a Defect in a Material is registered under the Entity Type *Reason* having the Type defined as *Defect*.

The User can define a set of Repair Actions for a Reason that are operations which can be performed in the Material in order to fix a Defect. For each Repair Action, the User can also define if a replacement of a part can take place, as displayed in the Figure below. The following Part Replacement Modes are available:

- Not Allowed: the User cannot select a Material to replace the defective part
- Allowed: the User is allowed to select a Material to replace the defective part
- Required: the User must select a Material to replace the defective part

Info

A Part can only be replaced if the Product of the Material has a Default BOM defined.

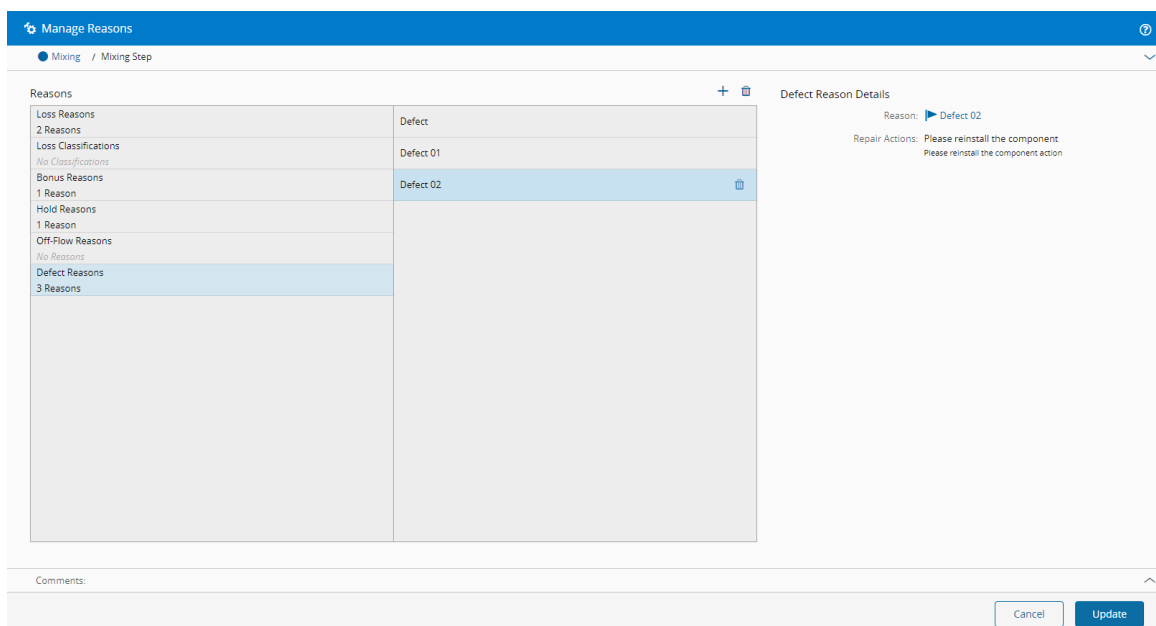


The screenshot shows the 'Defect (Active)' details page. It includes a 'DETAILS' section with fields for Name (Defect), Description (Incorrectly installed), and Universal State (Active). Below this is a 'REPAIR ACTIONS' section with a table of actions. The table has three columns: REPAIR ACTION, DESCRIPTION, and PART REPLACEMENT MODE. The actions listed are 'Please reinstall the component', 'Replace the component', and 'Brand new component'. The 'PART REPLACEMENT MODE' for these actions are 'Not Allowed', 'Allowed', and 'Required' respectively. The page also includes a search bar, a table view icon, and a pagination control showing 'Page 1 of 1 (3 Records)'.

REPAIR ACTION	DESCRIPTION	PART REPLACEMENT MODE
Please reinstall the component	Please reinstall the component action	Not Allowed
Replace the component	Replace the component	Allowed
Brand new component	Brand new component	Required

2 - Step

After the creation of the Defect Reasons, these can be configured in the Step through the Manage Reasons wizard available in the Reasons section of the Step Details page, as displayed in the Figure below.



The screenshot shows the 'Manage Reasons' wizard. It has a left sidebar with a list of reasons categories: Loss Reasons (2 Reasons), Loss Classifications (No Classifications), Bonus Reasons (1 Reason), Hold Reasons (1 Reason), Off-Flow Reasons (No Reasons), and Defect Reasons (3 Reasons). The 'Defect Reasons' category is selected. The main area shows 'Defect Reason Details' for 'Defect 02'. It includes a 'Reason' field with a play button icon and a 'Repair Actions' field with the text 'Please reinstall the component'. At the bottom, there is a 'Comments' section and 'Cancel' and 'Update' buttons.

3 - Product

When recording a Defect it's possible to indicate the location of the Defect in a CAD snapshot or a drawing. To enable this, the User can configure a CAD File and/or a Drawing and Schematic for the Product. Alternatively, a picture can also be provided at the time of recording the Defect.

Furthermore, if a Default BOM is defined for the Product it will be possible to replace defective parts.

Using Material Defects

After setting up the required configurations mentioned in the previous sections, the Material Defects functionalities can be used, as described in the next sections.

Record Defect

MaterialDefect.**Record**

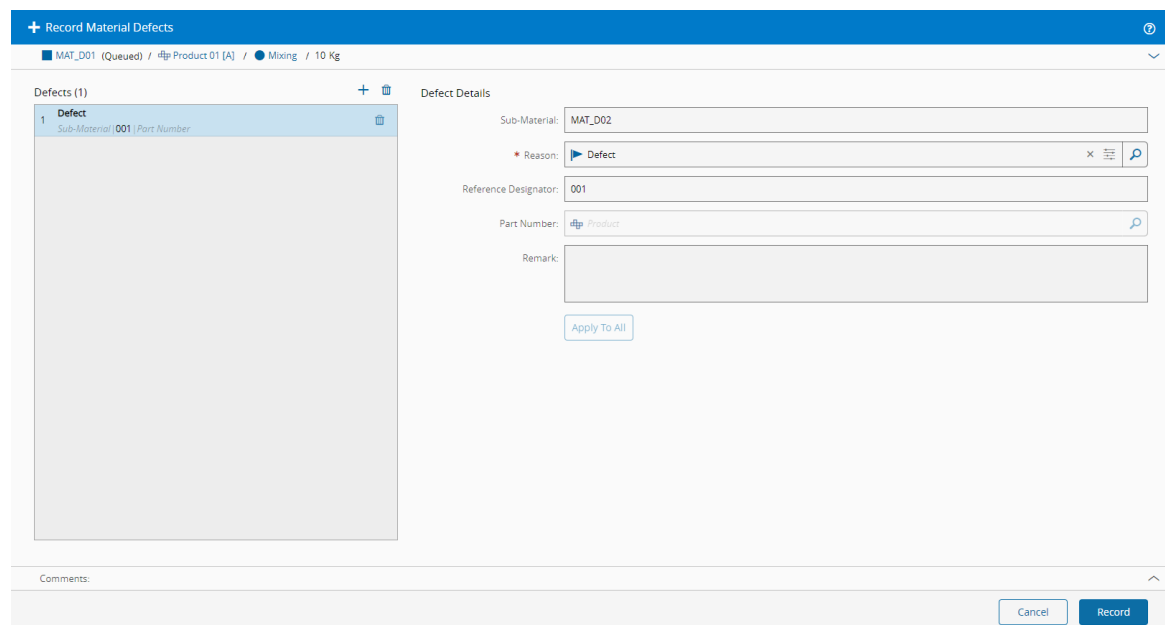
If a Material is in a Step with Defect Reasons defined, it is possible to record a Defect through the Record Material Defects wizard available in the Defects view of the Material.

There are two options to record a Defect:

- Record using no Drawing: the User specifies a Sub-Material (optional), a Defect Reason (mandatory), Reference Designator (optional), Part Number (optional), and a Remark (optional) as shown in the Figure below.

Info

It is only possible to select a Part Number if a Default BOM is defined for the Product.



- Record using Picture: the User specifies a Defect Reason in a Drawing, either in a snapshot of the CAD file or in an image. The image can either be provided by the Drawings linked to the Product of the Material or provided when recording the Defect, as displayed in the Figure below.

+ Record Material Defects

FILE

DEFECTS

MAT_D01 (Queued) / Product 01 [A] / Mixing / 10 Kg

Select Image From File

985172b_odb_withTopBottom.zip

07/25/2023 12:55 AM | 2 MB

From Product

Custom File

Drag files to upload

or

Browse Files

Comments:

Cancel

< Back

Next >

In the Drawing, it is possible to select where the Defect is found by using either a pre-defined shape, such as a square or circle, or the User can draw a specific shape, as displayed in the Figure below.

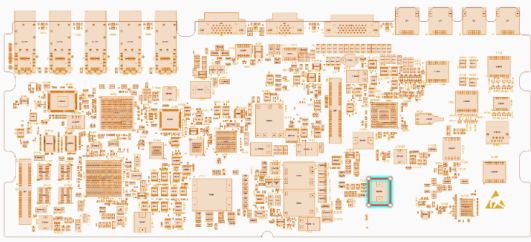
+ Record Material Defects

FILE

DEFECTS

MAT_D01 (Queued) / Product 01 [A] / Mixing / 10 Kg

Border: 1



Defect Details

< Back

Sub-Material:

Reason:

Defect

Part Number:

Product

Remark:

Apply To All

Comments:


100% Upload Completed (1 file uploaded)

Cancel

< Back

Record

Modify Defect

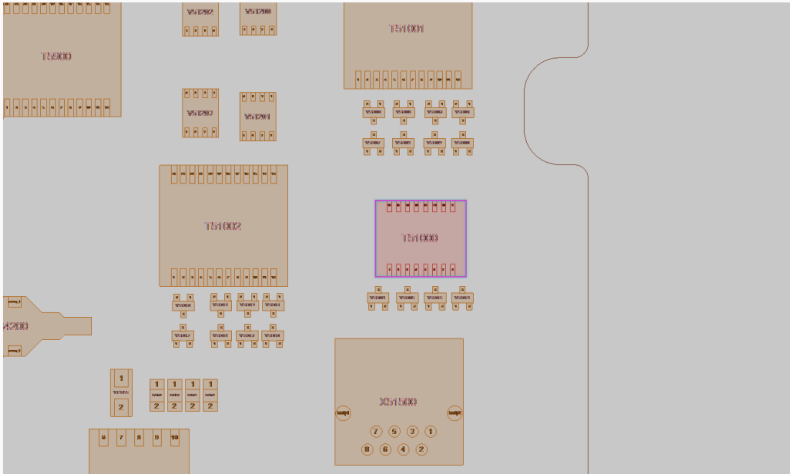
 MaterialDefect.**Edit**

If the User wishes to change the information of the Defect, it can be done through the Modify Material Defect wizard as displayed in the Figure below.

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Modify Material Defect

MAT_D01 (Queued) / Product 01 [A] / Mixing / 10 Kg



Defect Details

Sub-Material:

* Reason: Defect

Reference Designator: TS1000

Part Number: 3640646

Pin:

Step: ☒ Mixing

Remark:

Open Date: 07/25/2023 09:29 AM

Comments:

Cancel Update

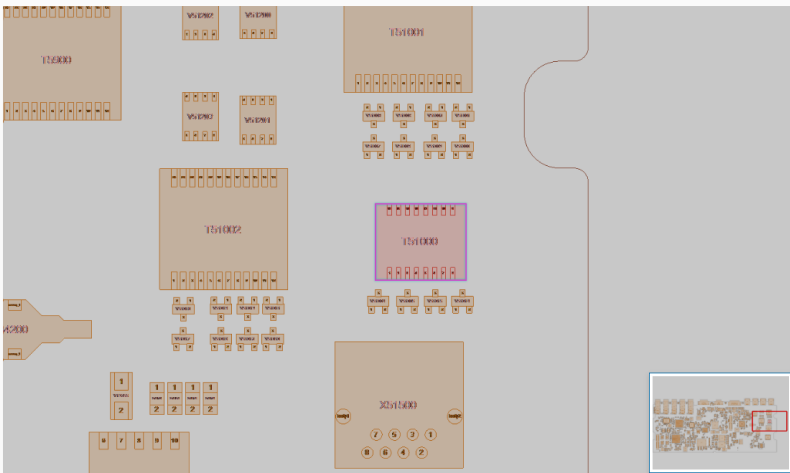
Mark as False

MaterialDefect.**MarkAsFalse**

If a Defect is identified as a false Defect - that is, it has been opened in error, it can be closed through the Mark Material Defect as False wizard, as displayed in the Figure below.

Mark Material Defect as False

MAT_D01 (Queued) / Product 01 [A] / Mixing / 10 Kg



Defect Details

Sub-Material:

Reason: Defect

Side: Top

Reference Designator: TS1000

Part Number: 3640646

Pin:

Step: ☒ Mixing

Remark:

Open Date: 07/25/2023 09:29 AM

Manage Defect

Closing Remark:

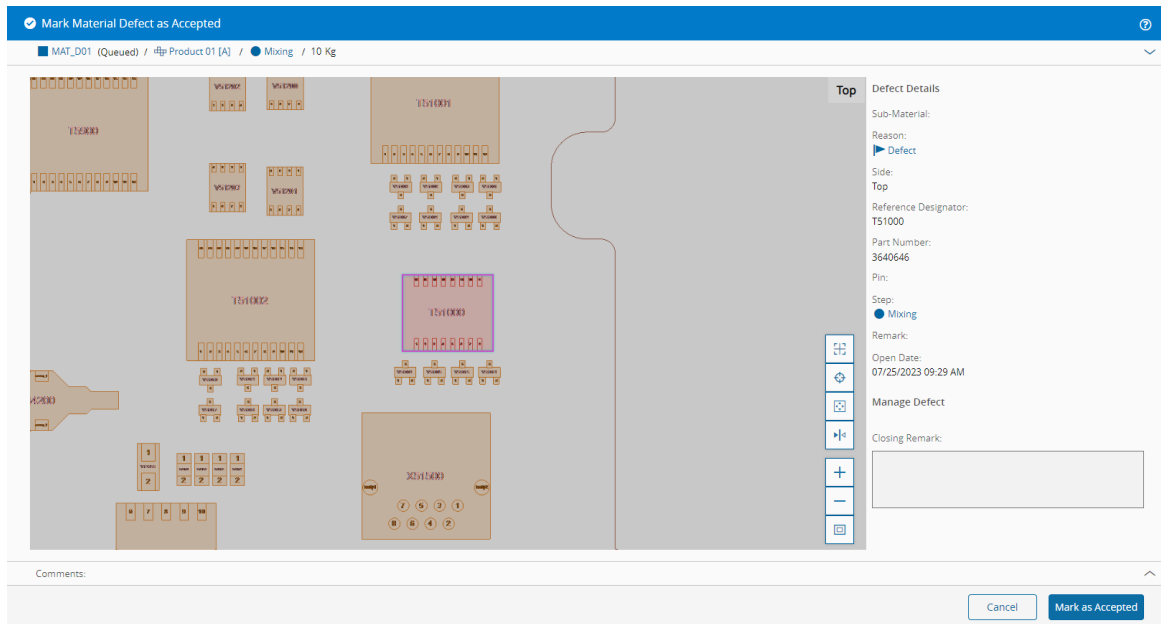
Comments:

Cancel Mark as False

Mark as Accepted

MaterialDefect.**MarkAsAccepted**

If the User wishes to acknowledge and accept the Defect as-is, it can be accepted using the Mark Material Defect as Accepted wizard, as displayed in the Figure below.



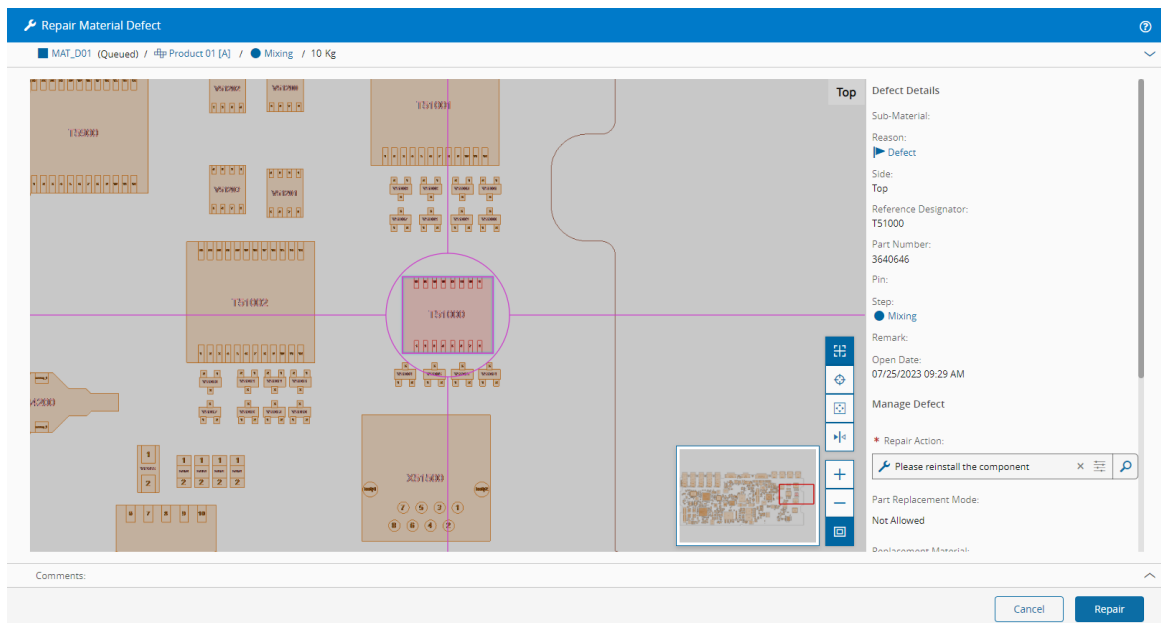
Repair Defect

MaterialDefect.Repair

To fix a Defect, the User can access the Repair Material Defect wizard and select a Repair Action, as displayed in the Figure below. Depending on the Parts Replacement Mode of the Repair Action, the User can (or must) select a Replacement Material. The Materials available for selection must have the same Product as the Material Defect Part Number and they must be in the same Facility as the Material being fixed.

Info

The Repair Actions available for selection are the ones defined in the Defect Reason of the Defect.



Mark as Not Fixable

MaterialDefect.**MarkAsNotFixable**

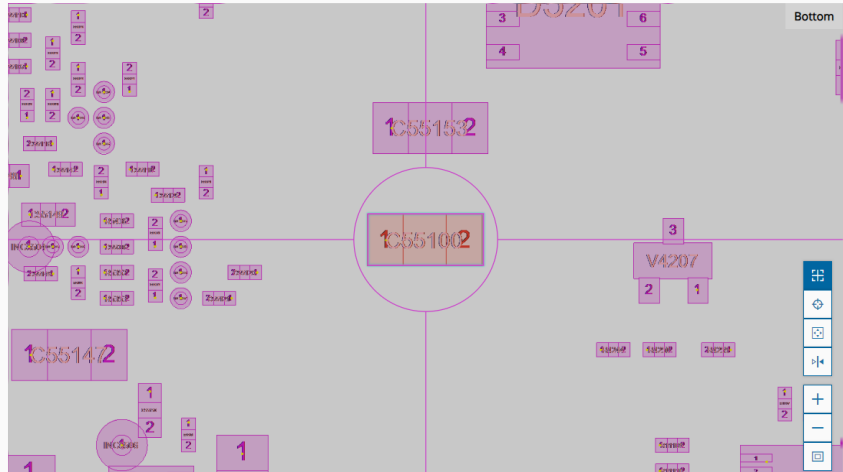
If the Defect cannot be fixed, it can be marked as non-fixable using the Mark Material as Not Fixable wizard, as displayed in the Figure below.

i
Info

As the Material will be scrapped (terminated), a Scrap Reason should be defined in the current Material Step.

✕
Mark Material Defect as Not Fixable
?

■ MAT_D01 (Queued) / ■ Product 01 [A] / ● Mixing / 10 Kg
⌵



Bottom

Defect Details

Sub-Material:

Reason: ▶ Defect 02

Side:

Bottom

Reference Designator: C55100

Part Number: Z313756

Pin:

Step: ● Mixing

Remark:

Open Date: 07/25/2023 08:12 AM

Manage Defect

* Scrap Reason:

▶ Broken

Closing Remark:

Comments:

Cancel
Mark as Not Fixable



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