Critical manufacturing
an ASM PT company

Material Defects

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Material Defects

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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.

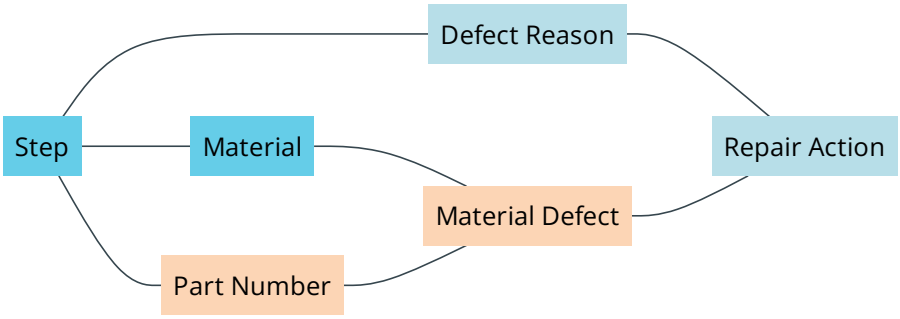
To set up the Material Defects-related Entities, it is necessary to follow the steps as described in the Table below.

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

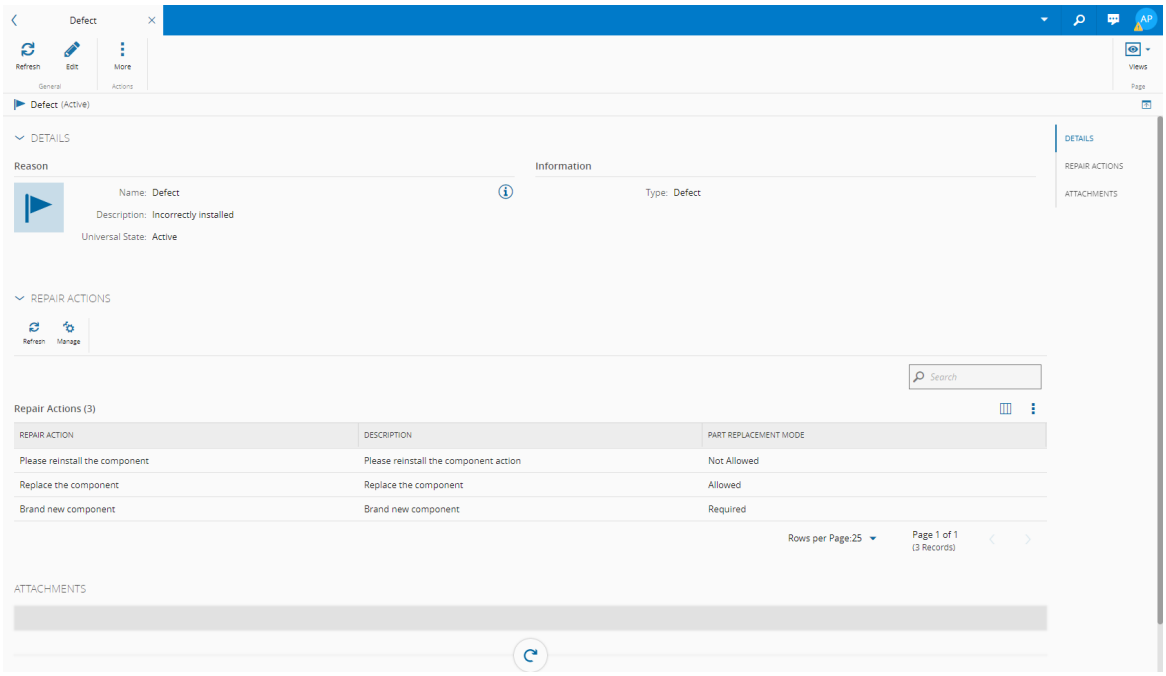
The classification of a Defect in a Material is registered under the Entity Type *Reason* having the Type defined as *Defect*.

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

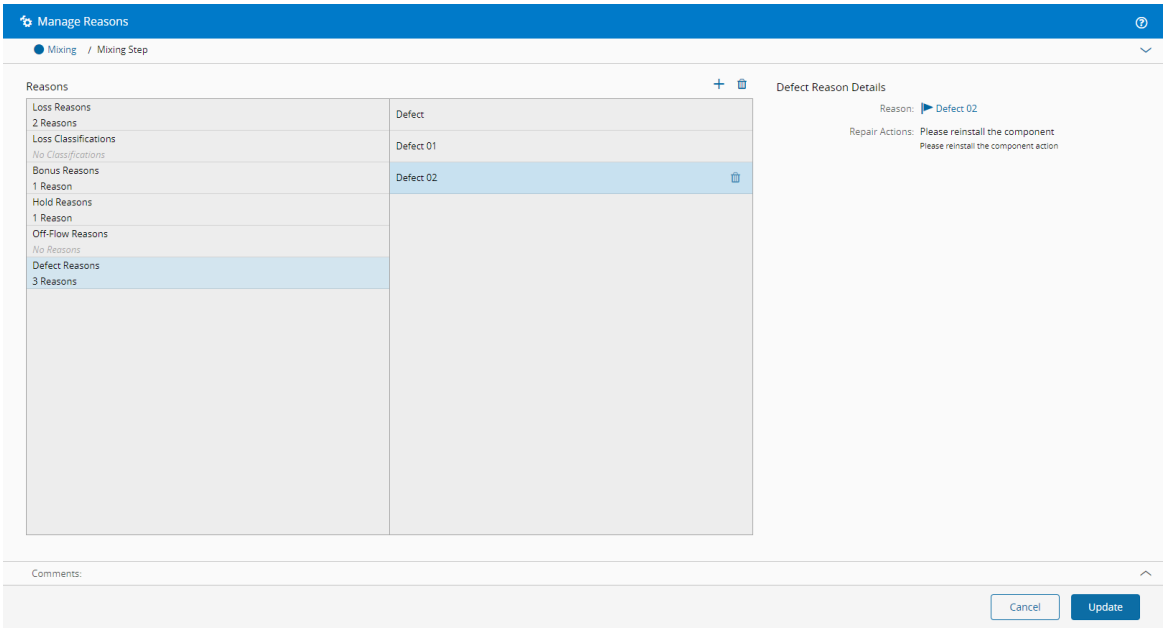
Info

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



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.



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

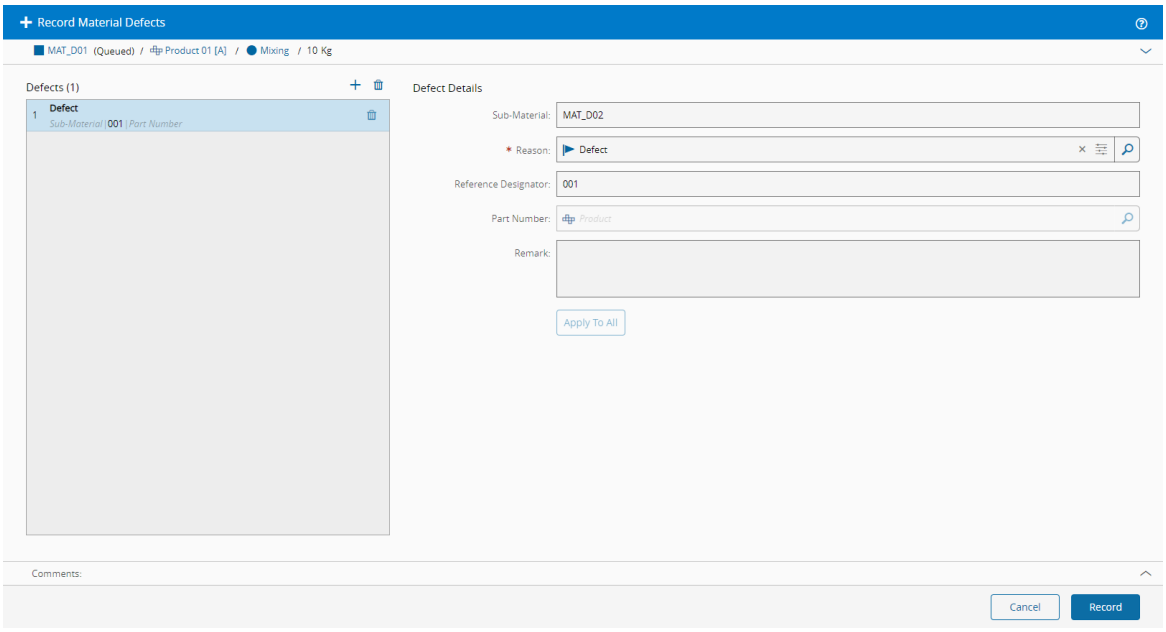
MaterialDefect.**Record**

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.

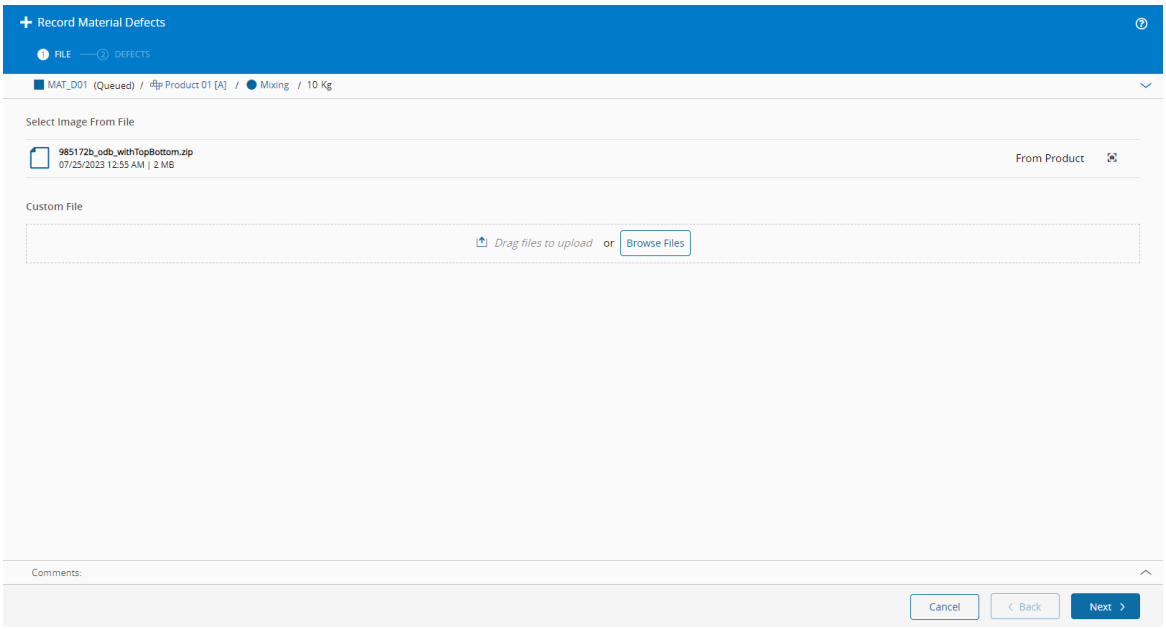
There are two options to record a Defect:

- 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.

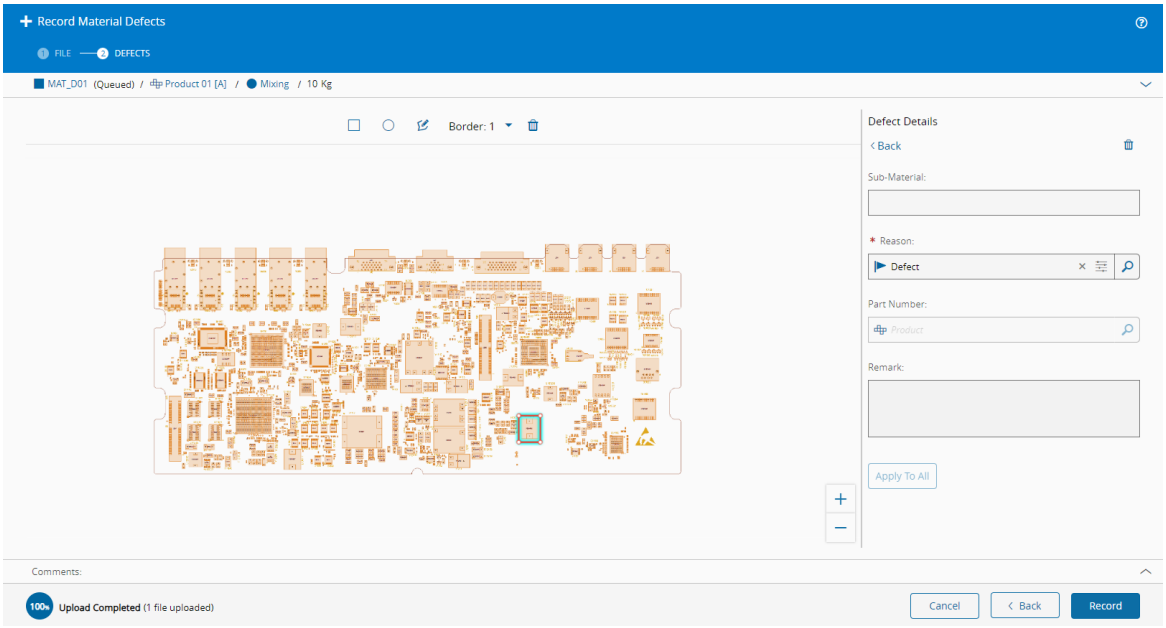
> **Info**
>
> It is only possible to select a Part Number if a Default BOM is defined for the Product.



- 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.



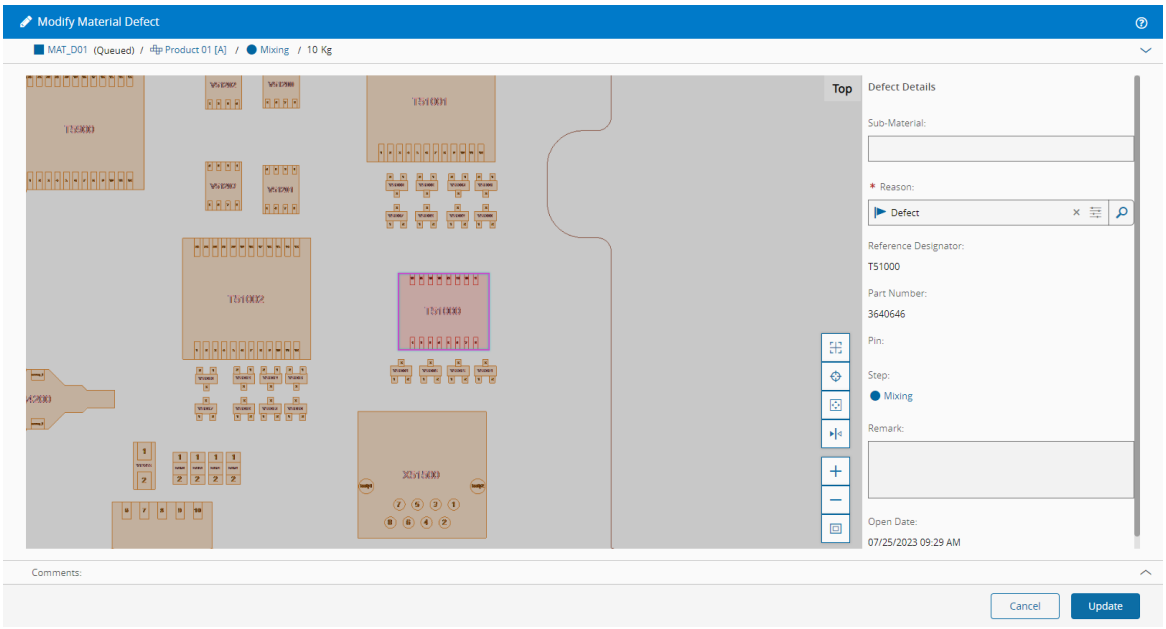
In the Drawing, it is possible to select where the Defect is found by using either a pre-defined shape, such as a square or circle, or the User can draw a specific shape, as displayed in the Figure below.



Modify Defect

MaterialDefect.**Edit**

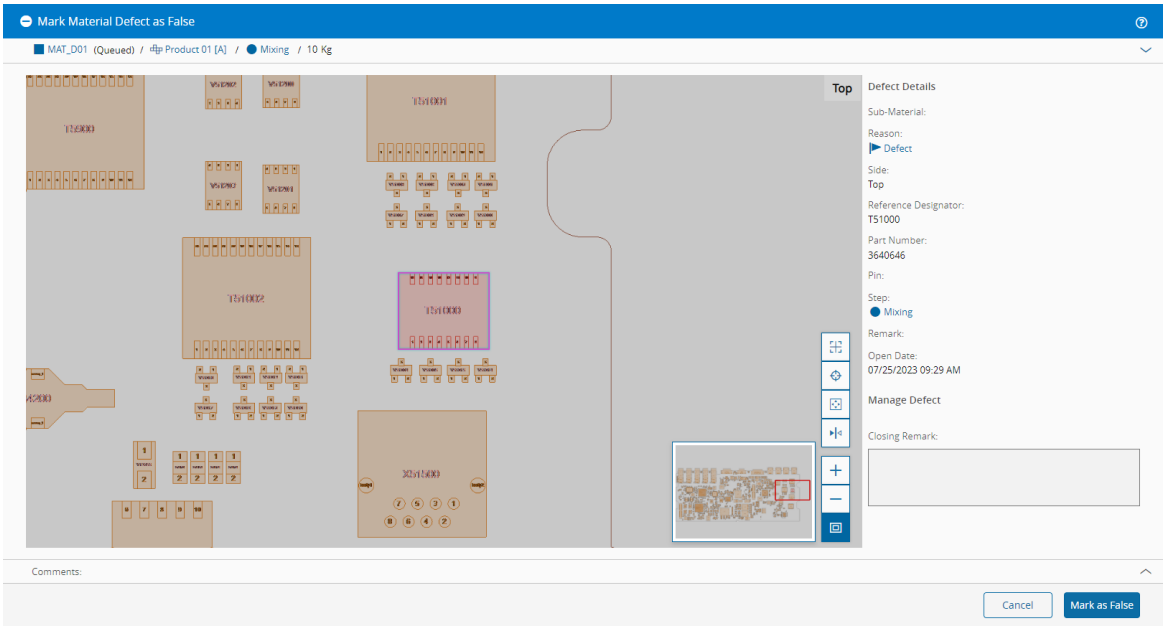
If the User wishes to change the information of the Defect, it can be done through the Modify Material Defect wizard as displayed in the Figure below.



Mark as False

MaterialDefect.**MarkAsFalse**

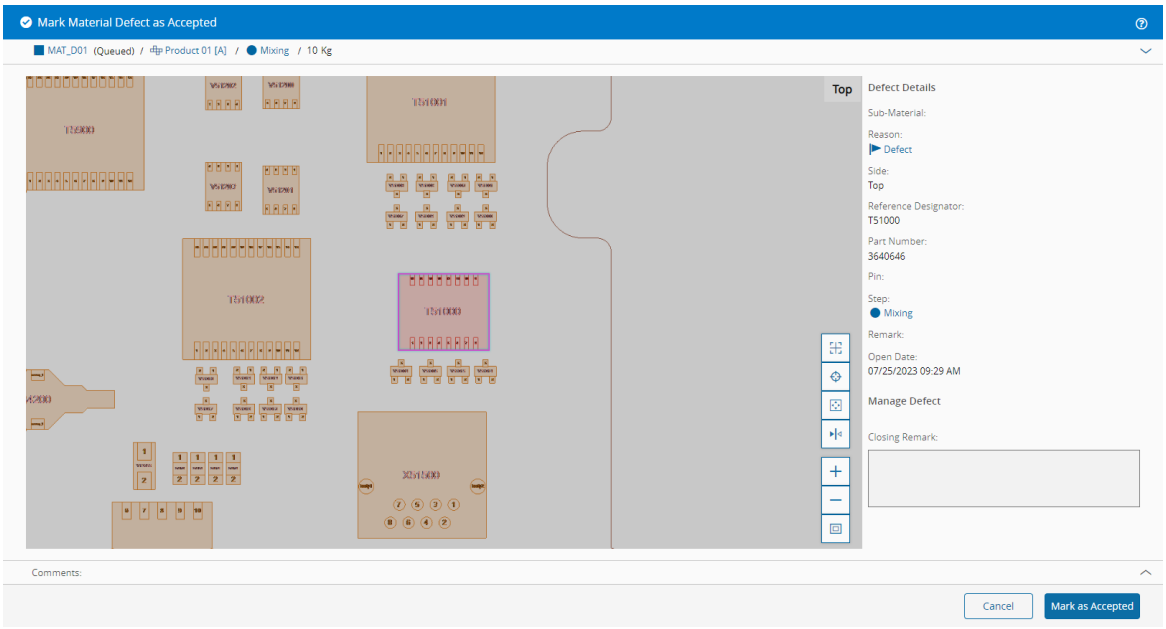
If a Defect is identified as a false Defect - that is, it has been opened in error, it can be closed through the Mark Material Defect as False wizard, as displayed in the Figure below.



Mark 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.

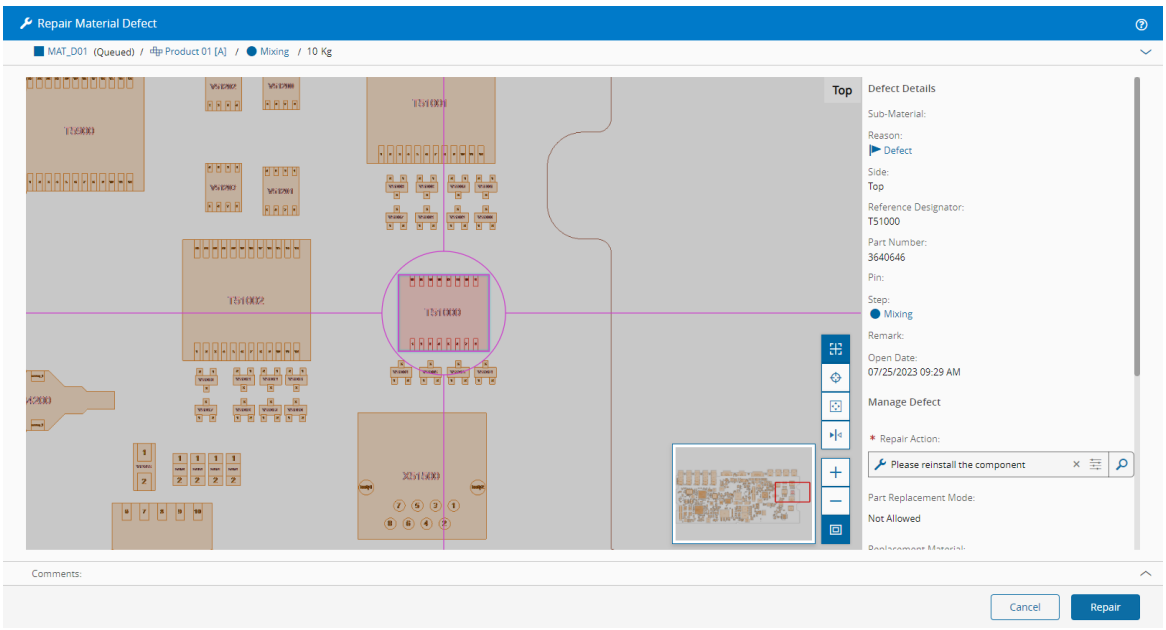


Repair Defect

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.

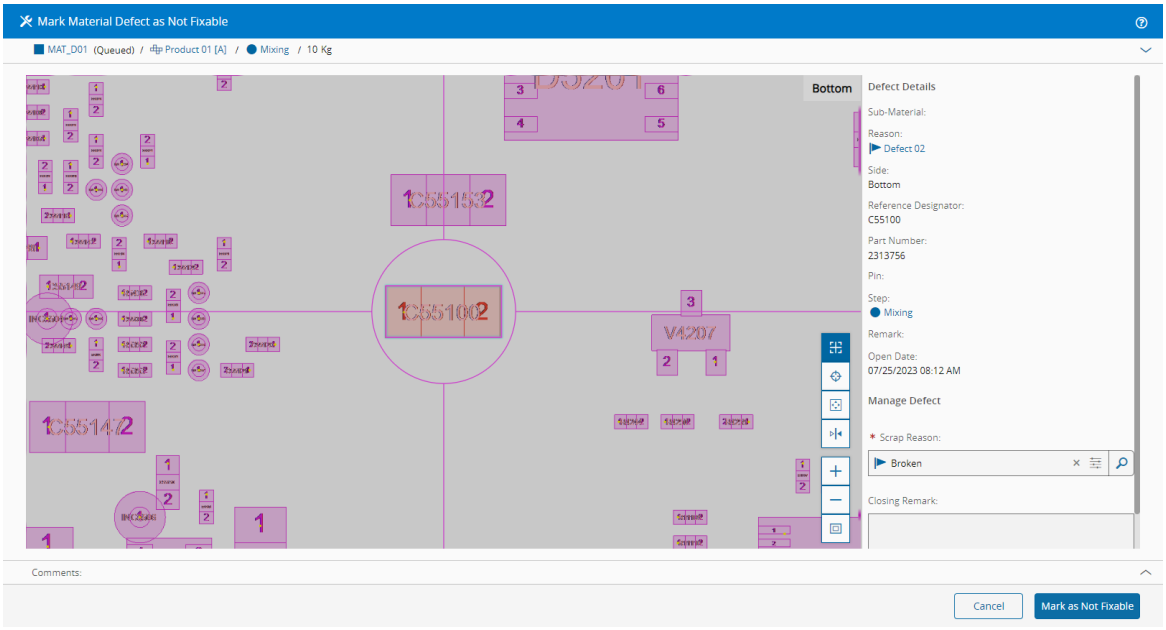


Mark as Not Fixable

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.

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



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