



**Critical**  
manufacturing  
an ASM PT company

# Sub-Material Processing

11.0

March 2026

## DOCUMENT ACCESS

Public

## DISCLAIMER

The contents of this document are under copyright of Critical Manufacturing S.A. it is released on condition that it shall not be copied in whole, in part or otherwise reproduced (whether by photographic, or any other method) and the contents therefore shall not be divulged to any person other than that of the addressee (save to other authorized offices of his organization having need to know such contents, for the purpose for which disclosure is made) without prior written consent of submitting company.

# Sub-Material Processing

*Estimated time to read: 4 minutes*

The processing and tracking of **Sub-Materials** needs to follow procedures so that nothing deviates from its planned or expected path.

**Sub-Material Processing** is only possible when a main **Material** has **Sub-Materials** and the needed configurations are set at the **Step** and **Resource**.

Moreover, a **Sub-Material** is part of a main **Material**, and the **Sub-Material Processing** working mode, besides reducing Cycle Time, optimizes the handling of **Materials** throughout the process.

The image below shows **Materials** held in a PCB magazine, and each **Material** has **Sub-Materials** attached to it:



This document will guide you through the actions required for **Sub-Material Processing** in Critical Manufacturing MES.

## Overview

Critical Manufacturing MES implements a hierarchical **Material** and **Resource** model. When it comes to tracking **Material** with **Sub-Materials** there are different possibilities which are determined by two properties:

- **Step**
  - Sub-Material Track State Depth - defaults to 0 (main **Material** only) and determines the desired tracking depth.
- **Resource**
  - Enable Sub-Material Tracking - defaults to `false` and determines whether the immediate **Sub-Material** level can be tracked in and tracked out individually.

To better illustrate the usage of these two properties, some scenarios are presented here. In all the scenarios below, the color code should be interpreted as shown in this table:

Entity	Color	Description
Material	Mat 0	Queued
Material	Mat 0	In Process
Material	Mat 0	Processed
Resource	Res 0	Main
Resource	Res 1.1	Sub
Resource	Res 1.2.1	Sub-Sub

Table: Sub-Material Tracking Legend

**i Info**

In the examples below, the case of In-Step Sampling for Sampling Pattern where a Sub-Material is marked as Skipped is not considered. When a Sub-Material is marked as Skipped, that Sub-Material cannot be tracked in or tracked out at the Step.

### Scenario Summary

Scenario	Sub-Material Depth	Sub-Material Track State Depth	Enable Sub-Material Tracking	Sub-Resource Configuration
1	2	0	False	No Sub-Resources




Scenario	Sub-Material Depth	Sub-Material Track State Depth	Enable Sub-Material Tracking	Sub-Resource Configuration
2	2	1	True	No Sub-Resources
3	2	1	True	2 
4	2	2	True	2 

Table: Summary of Sub-Material Tracking Scenarios

 **Note**

Scenario 3 - All Resources allow Sub-Material tracking.

Scenario 4 - Only the main Resource allows Sub-Material tracking.

It is important to mention that Critical Manufacturing MES supports up to three **Material** depth levels: 0, 1, and 2. This is, level 0 is used for the main **Material**, level 1 for the **Sub-Material**, and level 2 for the **Sub-Sub-Material**.

A good example of this is the Semiconductor industry in which a lot is processed at level 0, wafers from this lot are processed at level 1, and if needed, each die of the wafers can be processed at level 2.

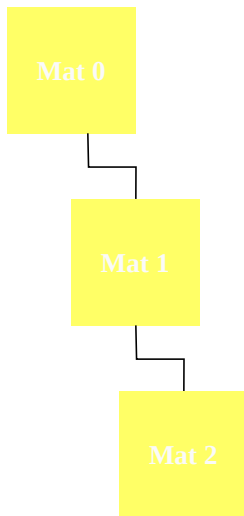
### Scenario 1

Sub-Material Depth	Sub-Material Track State Depth	Enable Sub-Material Tracking	Sub-Resource Configuration
2	0	False	No Sub-Resources

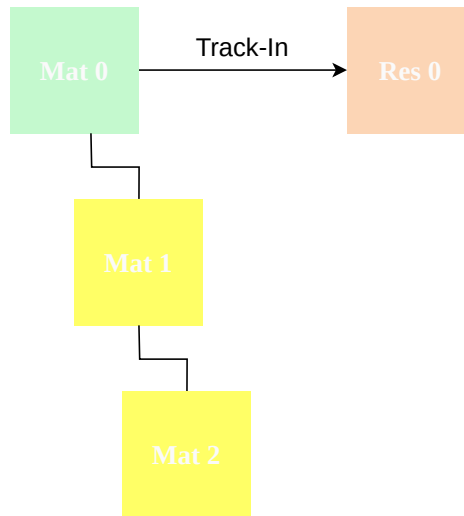
Table: Sub-Material Tracking Scenario 1

In this case, because the **Resource** does not allow **Sub-Material** tracking, only the main **Material** is tracked in and tracked out regardless of the **Step** state depth value.

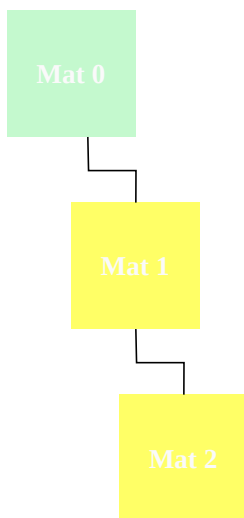
### Before Track-In



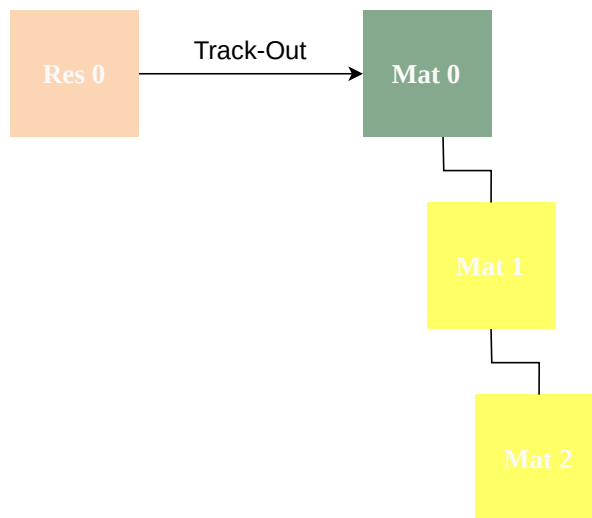
### After Track-In Main Material



### Before Track-Out



### After Track-Out Main Material

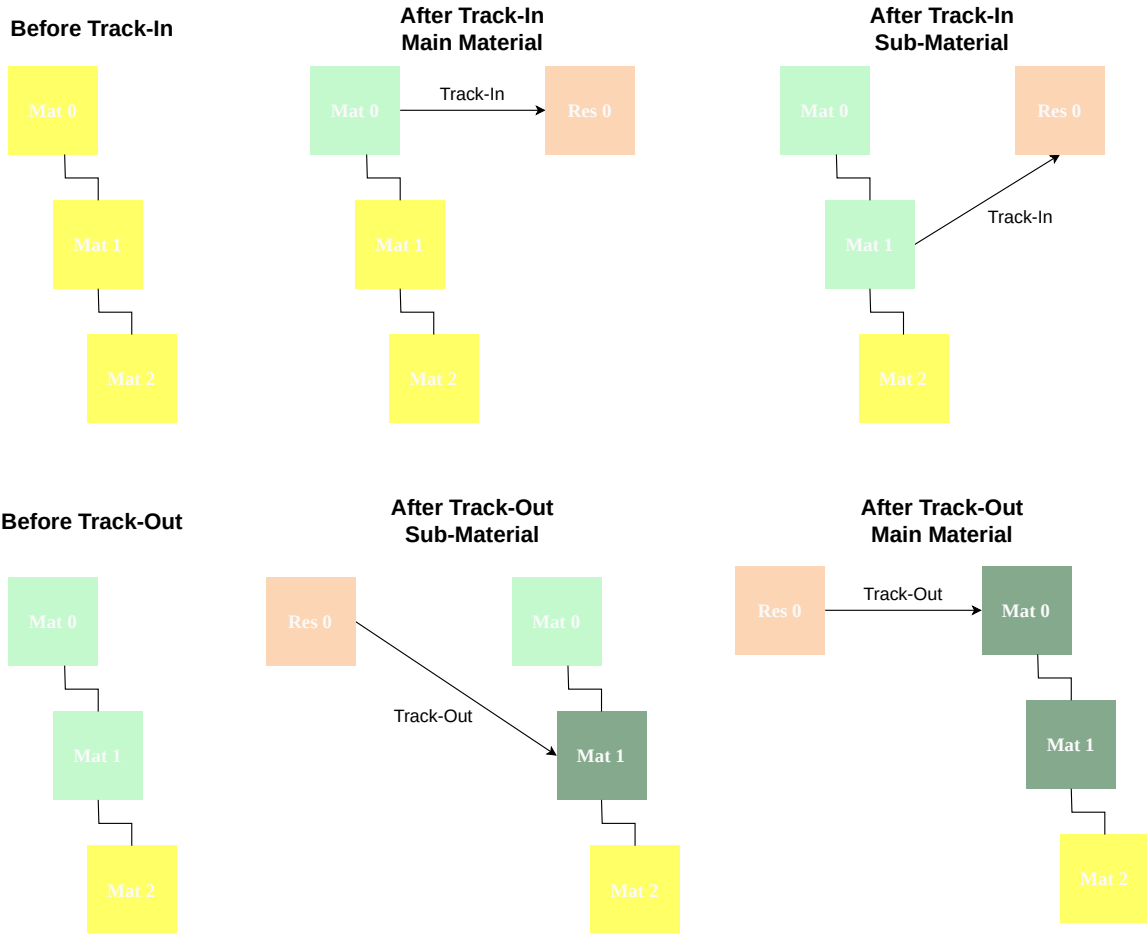


## Scenario 2

Sub-Material Depth	Sub-Material Track State Depth	Enable Sub-Material Tracking	Sub-Resource Configuration
2	1	True	No Sub-Resources

Table: Sub-Material Tracking Scenario 2

In this case, the **Resource** allows **Sub-Material** tracking. The **Step** state depth defines tracking until level **1**, so each **Sub-Material** until level **1** needs to be individually tracked in and tracked out.



### Scenario 3

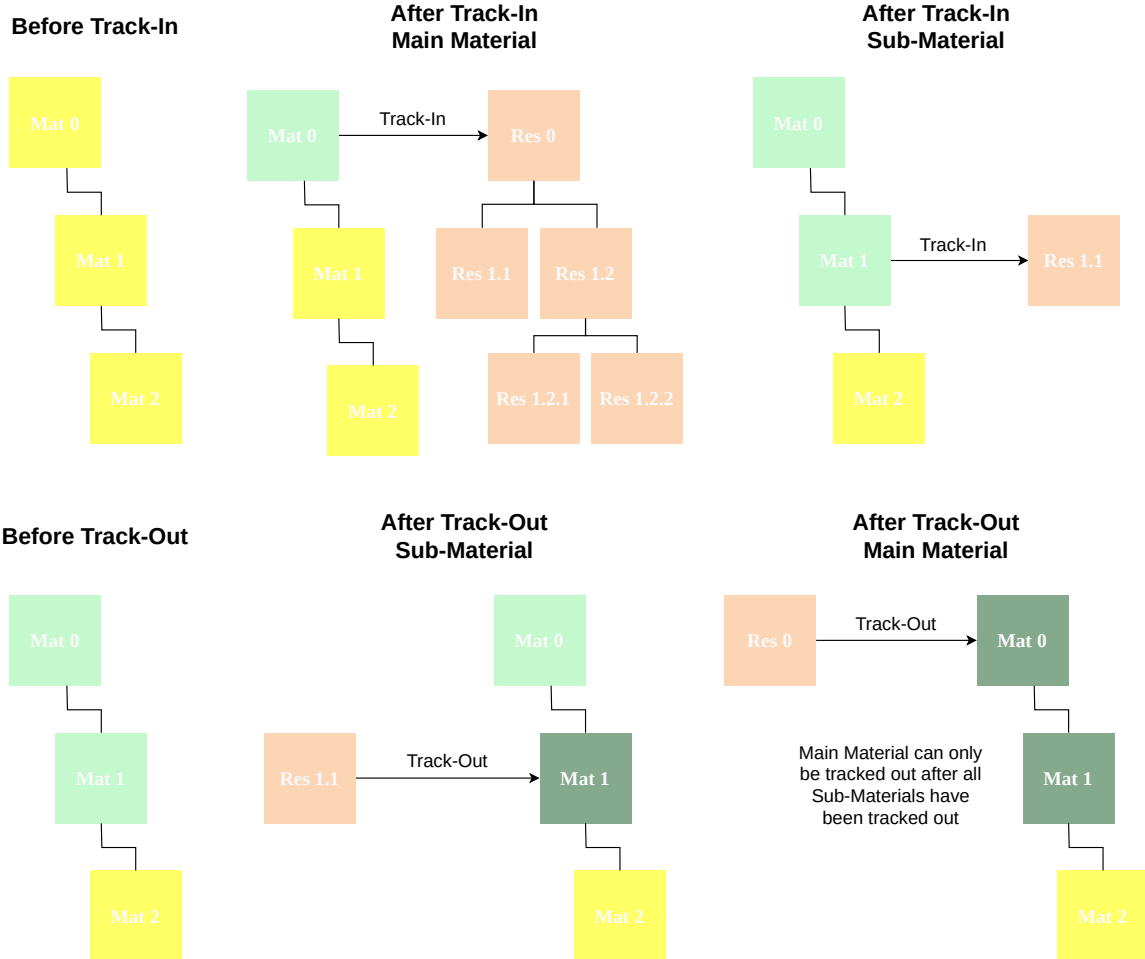
Sub-Material Depth	Sub-Material Track State Depth	Enable Sub-Material Tracking	Sub-Resource Configuration
2	1	True	2

Table: Sub-Material Tracking Scenario 3

 **Note**

All the Resources of this structure allow Sub-Material tracking.

In this example, each **Material** and **Sub-Material** needs to be tracked in and tracked out individually.



### Scenario 4

Sub-Material Depth	Sub-Material Track State Depth	Enable Sub-Material Tracking	Sub-Resource Configuration
2	2	True	2

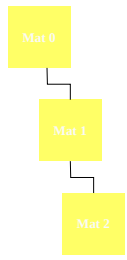
Table: Sub-Material Tracking Scenario 4

**Note**

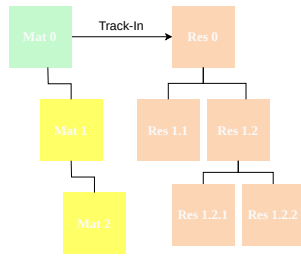
All the Resources allow Sub-Material tracking.

In this example, the **Step** defines a tracking depth of 2, and all the **Resources** within the structure support **Sub-Material** tracking. This means that after the main **Material** is tracked in, the **Sub-Material** (level 1) must also be tracked in at the **Sub-Resource**. After that, the **Sub-Sub-Material** (level 2) is tracked in at the **Sub-Sub-Resource** because its main **Material** was tracked in at the **Sub-Resource** 1.2.

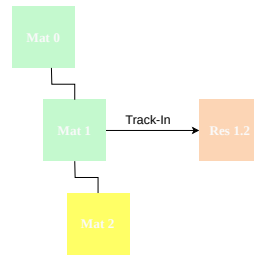
**Before Track-In**



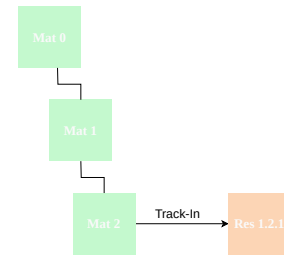
**After Track-In Main Material**



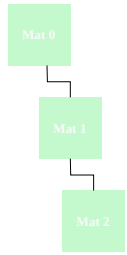
**After Track-In Sub-Material**



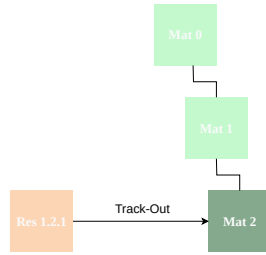
**After Track-In Sub-Sub-Material**



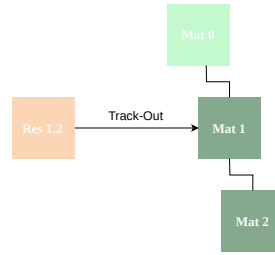
**Before Track-Out**



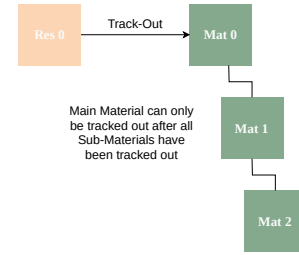
**After Track-Out Sub-Sub-Material**



**After Track-Out Sub-Material**



**After Track-Out Main Material**





# Legal Information

## **Disclaimer**

The information contained in this document represents the current view of Critical Manufacturing on the issues discussed as of the date of publication. Because Critical Manufacturing must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Critical Manufacturing, and Critical Manufacturing cannot guarantee the accuracy of any information presented after the date of publication. This document is for informational purposes only.

Critical Manufacturing makes no warranties, express, implied or statutory, as to the information herein contained.

## **Confidentiality Notice**

All materials and information included herein are being provided by Critical Manufacturing to its Customer solely for Customer internal use for its business purposes. Critical Manufacturing retains all rights, titles, interests in and copyrights to the materials and information herein. The materials and information contained herein constitute confidential information of Critical Manufacturing and the Customer must not disclose or transfer by any means any of these materials or information, whether total or partial, to any third party without the prior explicit consent by Critical Manufacturing.

## **Copyright Information**

All title and copyrights in and to the Software (including but not limited to any source code, binaries, designs, specifications, models, documents, layouts, images, photographs, animations, video, audio, music, text incorporated into the Software), the accompanying printed materials, and any copies of the Software, and any trademarks or service marks of Critical Manufacturing are owned by Critical Manufacturing unless explicitly stated otherwise. All title and intellectual property rights in and to the content that may be accessed through use of the Software is the property of the respective content owner and is protected by applicable copyright or other intellectual property laws and treaties.

## **Trademark Information**

Critical Manufacturing is a registered trademark of Critical Manufacturing.

All other trademarks are property of their respective owners.