Kinetic Material Requirements Planning User Guide

Version 2025.1

Disclaimer

This document is for informational purposes only and is subject to change without notice. This document and its contents, including the viewpoints, dates and functional content expressed herein are believed to be accurate as of its date of publication. However, Epicor Software Corporation makes no guarantee, representations or warranties with regard to the enclosed information and specifically disclaims any applicable implied warranties, such as fitness for a particular purpose, merchantability, satisfactory quality or reasonable skill and care. As each user of Epicor software is likely to be unique in their requirements in the use of such software and their business processes, users of this document are always advised to discuss the content of this document with their Epicor account manager. All information contained herein is subject to change without notice and changes to this document since printing and other important information about the software product are made or published in release notes, and you are urged to obtain the current release notes for the software product. We welcome user comments and reserve the right to revise this publication and/or make improvements or changes to the products or programs described in this publication at any time, without notice.

The usage of any Epicor software shall be pursuant to an Epicor end user license agreement and the performance of any consulting services by Epicor personnel shall be pursuant to Epicor's standard services terms and conditions. Usage of the solution(s) described in this document with other Epicor software or third party products may require the purchase of licenses for such other products. Where any software is expressed to be compliant with local laws or requirements in this document, such compliance is not a warranty and is based solely on Epicor's current understanding of such laws and requirements. All laws and requirements are subject to varying interpretations as well as to change and accordingly Epicor cannot guarantee that the software will be compliant and up to date with such changes. All statements of platform and product compatibility in this document shall be considered individually in relation to the products referred to in the relevant statement, i.e., where any Epicor software is stated to be compatible with one product and also stated to be compatible with another product, it should not be interpreted that such Epicor software is compatible with both of the products running at the same time on the same platform or environment. Additionally platform or product compatibility may require the application of Epicor or third-party updates, patches and/or service packs and Epicor has no responsibility for compatibility issues which may be caused by updates, patches and/or service packs released by third parties after the date of publication of this document.

Table of Contents

Introduction

Purpose of this Guide

The Material Requirements Planning Technical Reference Guide explores how the MRP engine calculates both job suggestions and purchase suggestions. The guide examines, in detail, the primary components that make up the MRP engine, the base calculations that run the engine, and the modifiers used to refine the suggestion results.

Many of the primary components discussed in this guide perform more functions than what is described here.

When you finish reading this guide, you will understand the logic behind the Material Requirements Planning engine. This information will help you make accurate job planning and material purchasing decisions, because ou will be able to set up the MRP module to best estimate production needs within your manufacturing center.

Intended Audience

This guide is for individuals within your company responsible or partially responsible for planning jobs and their requirements.

Individuals who have this responsibility:

- Determine both the demand required for all the jobs that will be scheduled and the supply of the manufacturing center required to satisfy this demand.
- Sequence the demand to make the most efficient use of the resources available within the manufacturing center.
- Prepare the manufacturing documentation- items like the Job Traveler, engineering drawings, the Job Dispatch List and any other documents required for the production workflow.
- Communicate manufacturing information to individuals involved with the production workflow- shop floor managers, material planners, sales representatives, and so on.
- Maintain the quality of the production output.
- Complete all jobs on or before the Due Dates.

Individuals who perform all or some of these tasks will benefit from reviewing the Material Requirements Planning Technical Reference Guide.

How it is Organized

This guide first explores the concepts behind the MRP engine and then details the items that affect the outcome of the suggestion results. Each subsequent section explores more detailed information than the previous section.

The following are the main sections of this guide:

- **MRP Concepts** - This section explores the underlying concepts behind the Material Requirements Planning engine. We recommend that you read this section first, as the rest of the guide references the information contained here.
- **Base Components** - This section documents the main records used by the MRP engine, such as calendars, parts, part classes, and so on.
- **Primary Calculations and Values** - This section explores the main calculations and base values of the MRP engine. Review this material to learn about MRP Processing, Infinite Capacity, and Short Horizon Planning.
- **Modifiers** - This section documents any fields or functions that you can use to adjust the outcome of the MRP engine. The material examines Days of Supply, Planning Time Fence, and Scheduled Start Date.
- **MRP Performance Tuning** - This section describes practices you should follow to gain the best MRP processing performance.
- **MRP Logs** - This section documents how you set up and use the MRP logs to measure performance, review process runs, and troubleshoot issues.
- **MRP in Action** - This section contains a series of complex examples that illustrate how the MRP engine calculates its results.

Please note that to clarify how the MRP engine works, the concepts behind each item are often repeated within other items. This is done to show how the various components, calculations, values, and modifiers work together to calculate unfirm jobs, transfer orders, and purchase suggestions.

Concepts and Logic of MRP

Material Requirements Planning (MRP) is a set of planning tools that lets you both estimate potential demand and propose the supply that will answer this demand. It does this by generating job, purchase, and transfer order suggestions.

MRP is designed primarily for companies that manufacture make to stock quantities or mixed-mode manufacturers that run both custom and stock products. Regular use of MRP lets you anticipate the future demand for your company's products, ensuring that materials are in the right place at the right time.

This functionality gives you the ability to forecast production and material demand. It also gives you a fast way to create suggestions that can be turned into job, transfer order, or purchase order records.

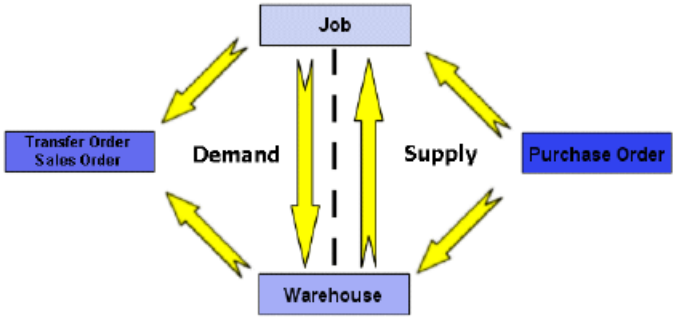
Before you use this functionality, you must have accurate methods of manufacturing designed for your part records, solid Engineering Change Order (ECO) control, accurate inventory records, thorough Lead Time values for purchased and transferred materials, and proven capacity estimates for resources and resource groups.

The MRP engine places demand against the above information to calculate the job, transfer order, and purchase suggestions. The source of the demand determines the part quantities needed to be either produced or purchased.

Supply and Demand Logic

Kinetic logic resolves how the demand requirements placed against your manufacturing center can be satisfied through various methods for delivering supply. There are several ways that you can create supply to satisfy demand requirements.

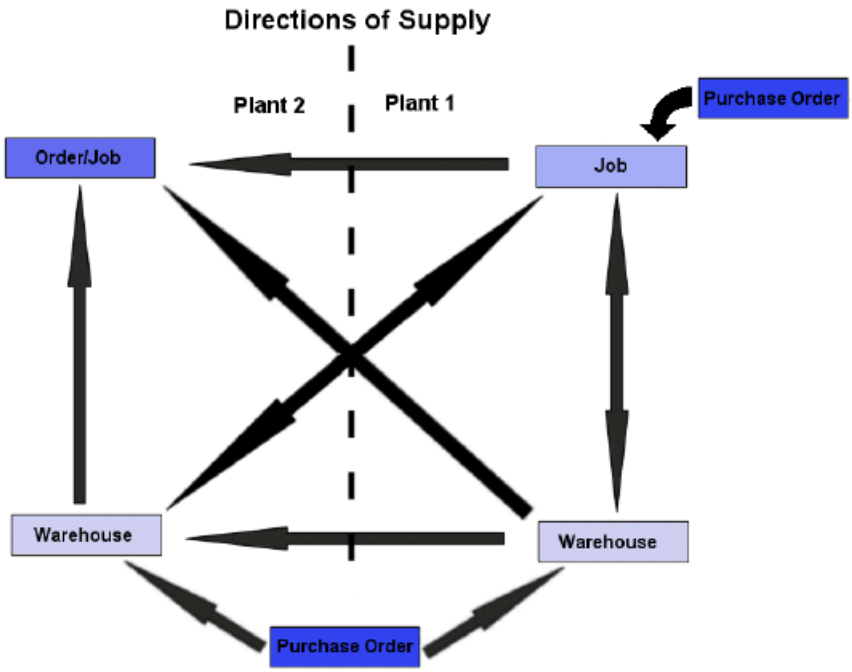
The following illustration shows you the different ways that are possible:



- **Demand** requirements can come from sales orders and internal sites (transfer orders), jobs that need component parts (materials), sales forecasts, master production schedules, purchase contract requirements, and inventory needs for minimum and stock quantity levels.

- The **Supply** sources that can answer this demand are jobs that manufacture part quantities, purchase orders that satisfy material needs on part methods, and warehouses that contain the requested stock quantities. MRP supports many combinations of demand and supply relationships, which lets you set up Kinetic to reflect how your production workflow handles supply and demand.

  The following illustration shows the various directions supply sources can be moved to satisfy demand requirements. This illustration assumes that your manufacturing center is a multi-site environment:



The following list explains how each item satisfies supply:

- **Job** - The quantity manufactured through a job is the primary source of supply. If the manufactured quantity is for a part that is not saved within inventory (a non-stock part) this quantity is assigned directly to the sales order, transfer order, or another job. If the quantity is manufactured for a part that is stored within inventory (a stock part), this quantity is assigned to one or more warehouses.
- **Purchase Order** - The quantity supplied through a purchase order is received differently if the purchased part is a stock or non-stock item. If it is a stock part, this quantity is received by one or more warehouses. If it is a non-stock part, this quantity is received by the job that needs the material.
- **Warehouses** - Warehouses receive quantities from both jobs and purchase orders. These quantities are then either assigned to a job to satisfy a material requirement on the job method or assigned to a sales order or transfer order. Typically a purchased quantity is assigned to a job. A production quantity is assigned to a sales order, transfer order, or another job.

Key Components

The MRP engine handles the supply and demand of material requirements through three main components - Calendars, Parts, and sites. The purpose of each component is discussed here, but each component is explored in more detail later within the Primary Components section.

- **Calendars** - These records define the number of days available for production. Made up of working days and non-working days, the MRP engine uses calendars to determine if demand and supply can be placed on a specific working day.
- **Sites** -These records define the production areas within your manufacturing center. Each site can contain several MRP values, like the Production Calendar, Production Preparation Time, and Finite Horizon. These values can be used as the default for any part quantity that will be manufactured at the site.
- **Parts** - These records define much of the primary information required for the MRP engine. Each part record, whether it is for a manufactured or purchased material, can be linked to multiple site details. Each of these site records can contain unique MRP values including Days of Supply, Production Prep Buffer, Reschedule Time In Delta, and so on. This allows the MRP engine to calculate suggestions based on how you manufacture each part within each site.
- Kinetic always performs MRP calculations using the base UOM (Unit of Measure) code assigned to the part in the **Primary UOMs- Inventory** field in Part Maintenance. The base UOM usually the smallest UOM in which the a part is normally stocked, and is the default UOM for most inventory related transactions in Kinetic.
- The **Track Multiple UOMs** check box located on Part card in Part allows you to specify if inventory balances for a particular part should be stored in a single base unit of measure (for example, Each), or if inventory balances for the part they should be stored and tracked in multiple units of measure (for example, Each, Feet, Inches). However, Kinetic always uses the base UOM code assigned to the part in the Primary UOMs - Inventory field, regardless of the setting of the Track Multiple UOMs check box when tracking WIP inventory, calculating purchase order suggestions, or performing MRP calculations.

MRP Results

When the MRP engine finishes processing, it creates the following record types. You will handle each record type differently.

- **Unfirm Job** - When the MRP engine discovers a demand requirement for a manufactured part that has an approved method of manufacturing, it will generate an unfirm job to satisfy this demand requirement. A method of manufacturing defines the assemblies, operations, and materials required to produce a quantity of a manufactured part. Unfirm job records are displayed within the Job Entry app. While the job has the unfirm status, it can be changed by the MRP engine. If the demand requirement for an unfirm job changes, the MRP engine deletes the unfirm job and generates a new job record to replace it.
- **Job Suggestion** - When the MRP engine discovers a demand requirement for a manufactured part that does not have an approved method of manufacturing, it will create a job suggestion.

These are job shell records that you can turn into a job later on. You can view job suggestions within the Job Manager app. This app lets you turn job shell records into unfirm jobs. Job suggestions can be removed or updated by the MRP engine.

- **Purchase Suggestion** - When the MRP engine discovers a demand requirement for a purchased part, it generates a purchase suggestion. You can turn suggestions into a new purchase order or update an existing open purchase order. You can view suggestions within the New PO Suggestions app. You can then run the Generate PO command (Overflow Menu) to turn them into a purchase order. The open purchase orders display within the PO Entry app. Each demand requirement is a specific PO Release detail within the purchase order record. If the demand requirements for this purchase order change, however, you can pull the new purchase suggestion into the PO record and update the PO Release detail.
- **Transfer Order Suggestion** - When the MRP engine discovers a demand requirement for a transfer part, it generates a transfer order suggestion. You can turn suggestions into a new transfer order or update an existing open transfer order. You view, edit, delete and accept transfer order suggestions within the Transfer Order Workbench app. This app is launched from within Transfer Order Entry using this app's Overflow menu. There are a number of options within this app that you can select - Cancel, Expedite, Increase, Postpone, and Reduce. Use these options to create new transfer orders or make changes to existing transfer orders. You can then refine these selections within Transfer Order Entry.

MRP Engine Examples

At its base level, the MRP engine runs in two calculation modes - one for stock parts and the other for non-stock parts. If a part is defined as a non-stock item, it means that you do not store any significant quantities of this part within your inventory.

To account for this, MRP only calculates the demand for this part based on the day it is required (the Required By Date) and typically does not use stock calculations. If a part is defined as stock, however, the MRP engine always runs an additional layer of calculation. Besides calculating the demand, MRP also estimates the supply of the parts that are available from inventory on the same working day. It then subtracts this amount from the demand quantity while it generates the suggestions.

You can define other MRP variables, specifically on part-site detail records, that can further affect the suggestion results. To understand what these variables do, however, you should become familiar with how the base MRP engine runs by exploring different calculation examples. The following examples give you an overview of what occurs while the MRP engine calculates quantities for different basic part types.

Examples

The following example(s) illustrate how you use the MRP Engine runs.

The Scenario

You run Material Requirements Planning in order to estimate demand for Part Omega, a part your company manufactures. To calculate the demand for this part, you run Process MRP.

Process MRP begins its calculations with a specific date – the Schedule Start Date. It then moves forward through each working day to see when quantities for Part Omega need to be produced by which dates. MRP logic asks these basic questions:

- What quantities of Part Omega are coming in from different locations?
- If this is a stock part, what quantities of Part Omega are for inventory?
- What quantities of Part Omega are manufactured?
- What quantities of Part Omega are required each day?

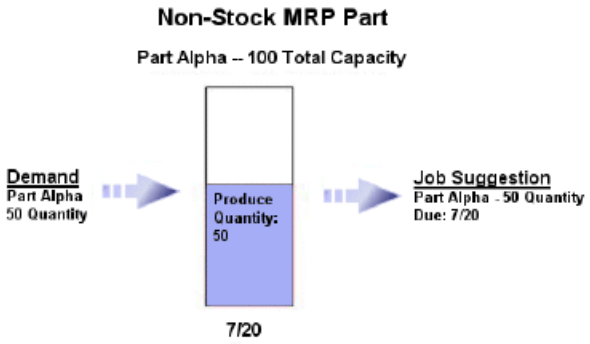
Part Omega has a method of manufacture with one assembly that requires two component materials – parts Alpha and Beta. Because these component materials must be manufactured as separate part quantities, these quantities are manufactured on separate jobs. Then the Alpha and Beta material quantities are sent to the assembly that combines the parts to create part Omega.

> You could also engineer the Omega part method to include Alpha and Beta as subassemblies; in this case, the MRP engine will not create separate jobs for them. However, for the purpose of the following examples, the Omega part method is set up with Alpha and Beta as materials.

Non-Stock Part Example

During this example, Part Omega, and all of its component parts (Alpha and Beta), are non-stock parts.

A sales order for a 50 quantity of Part Omega needs to ship by 7/25. This means a 50 quantity of Part Alpha must be manufactured first. The MRP engine evaluates the method for Part Alpha and discovers that to meet the 50 quantity due 7/25, a 50 quantity of Part Alpha must be manufactured on 7/20. This value is the total demand for Part Alpha that the MRP engine determines is required by this date.



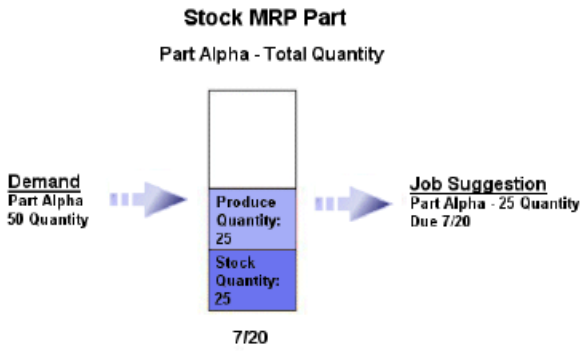
Using these parameters, the MRP engine creates a single job suggestion for Part Alpha due on 7/20. This date becomes the Required By Date calculated for the job suggestion. Because this is a non-

stock part, no other calculations are required to determine whether stock quantity is available by the required date; the MRP engine observes the demand requirement and creates a job suggestion to handle the demand on time.

Stock Part Example

In this example, Part Alpha is now a stock part, which significantly changes how MRP calculates part quantities. Everything else is the same, as Part Omega's method of manufacturing requires Part Alpha and Part Beta to assemble Part Omega.

Once again, you receive a sales order for a 50 quantity of Part Omega due on 7/25. To meet this deadline, you need a 50 quantity of Part Alpha ready by 7/20. However, since Alpha is now a stock part, the MRP engine checks the stock quantities and finds there is a 25 On-Hand Quantity available from inventory on 7/20.

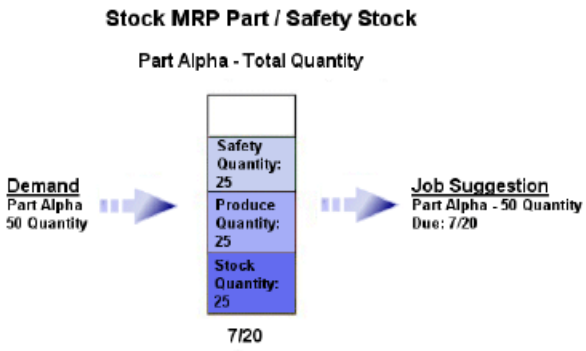


Because a 25 quantity is available in stock, the MRP engine subtracts this stock quantity and now creates a job suggestion for a 25 quantity. This job suggestion makes up for the remaining amount that must be manufactured by this working day.

Stock Part with Safety Stock Example

In this example, Part Alpha is now a stock part with a Safety Stock Quantity. This additional modifier means you do not want the On-Hand Quantity to ever be less than a specific quantity. In this case, you never want less than a 25 quantity in your inventory. Everything else is the same, as Part Omega's method of manufacturing requires Part Alpha and Part Beta to assemble the final part.

As before, you receive a sales order for a 50 quantity of Part Omega due on 7/25. To meet this deadline, you must have a 50 quantity for Part Alpha ready by 7/20. There is a 25 quantity available in stock. However, this reduces the On-Hand Quantity of Part Alpha to 0, and MRP now must consider the Safety Stock value of 25. MRP determines an additional demand for a 25 quantity is needed on that working day, which restores the Safety Stock value.



The MRP engine calculates demand for a 75 quantity for Part Alpha on 7/20. Stock can handle 25 of this quantity, but the remaining 50 quantity must be manufactured. The MRP engine generates a job suggestion that requires a 50 part quantity be manufactured by 7/20.

MRP Logic

This section of the guide covers the background Material Requirement Planning (MRP) logic and explains how the MRP operates.

Overview

The major objectives of the MRP process are to simultaneously:

1. Ensure the availability of materials, components, and products for planned production and for customer delivery.
2. Maintain optimal level of inventory.
3. Plan manufacturing activities, delivery schedules, and purchasing activities.

> You can run MRP using the Regenerative or Net Change modes.

Regenerative Logic

In the Regeneration method, MRP clears all the unfirm/suggested data of the previous plan and suggests/creates new ones. For manufactured parts, MRP explodes through bill of materials. New requirements and planned orders are completely recalculated or regenerated at that time and for all the parts marked as Process MRP in the database.

When the MRP process completes, it creates the following record types:

- **Unfirm Jobs** - When the MRP engine discovers a demand requirement for a manufactured part that has an approved method of manufacturing, it will generate an un-firm job to satisfy this demand requirement. Unfirm job records display within the Job Entry app.

- **Job Suggestions** - When the MRP engine discovers a demand requirement for a manufactured part that does not have an approved method of manufacture, it creates a job suggestion. These are job shell records that you can turn into a job, if required.
- **Purchase Suggestions** - When the MRP engine discovers a demand requirement for a purchased part, it generates a purchase suggestion. You can turn suggestions into a new purchase order or update an existing open purchase order. You can view suggestions within the New PO Suggestions app.
- **Transfer Order Suggestions** - When the MRP engine discovers a demand requirement for a transfer part, it generates a transfer order suggestion. You can turn suggestions into a new transfer order or update an existing open transfer order. You view, edit, delete and accept transfer order suggestions within the Transfer Order Workbench app.
- **Job Adjustment Suggestions** - A suggestion to increase/decrease quantity, expedite or delay a job or purchase order suggestion.

MRP Using Multiple Processes

Material Requirements Planning (MRP) is one of the many business processes that organizations must perform in a timely manner. Unfortunately, due to the complex nature of the MRP run and the amount of data most companies have this is not possible.

To improve the MRP performance, define the **Number of MRP Processes** and **Number of Schedulers** values.

- The Number of MRP Processes modifier defines how many separate threads your server runs to complete the MRP process. This way you can split one large MRP process into several threads. The process then takes less time to complete. Generally, the more MRP processes you can run, the faster un-firm jobs and suggestions can execute and complete. However, exercise caution when determining the number of MRP Processes.
- The Number of Schedulers modifier defines how many separate threads your server runs to schedule unfirm jobs. This feature improves performance, as you can schedule unfirm jobs on several threads (if your hardware can handle multiple threads). The more schedulers you can run, the faster the scheduling engine can schedule un-firm jobs and save workload. However, exercise caution when determining the number of Schedulers.

  To decide how many MRP processors and schedulers you can run at the same time, check your MRP logs to review the performance results.

  As you run your tests, start with a small value to get a base time. Then increase the Number of MRP Processes and/or Number of Schedulers values for each test. Be sure you always make these changes in small increments. As you increase the number of MRP processors and schedulers, the performance boost you receive will eventually decline. This occurs because the server will run out of capacity to handle all of the multiple threads you attempt to run concurrently. Your server has limited capacity, so there will be a point when using multiple MRP processors and schedulers can slow down MRP performance. In such case, reduce the

MRP process threads and scheduling threads back to the point where you achieved optimal performance.

Example Most servers can handle two MRP processes and two schedulers at the same time, so you could start by entering a **2** value in both fields. As you run MRP, continue to monitor the MRP and Scheduling logs. If the schedulers are consistently waiting for the next job, you have some options. You can remove one scheduling thread to free up more CPU resources for the rest of the company. If you have CPU resources available, you can also add one more thread to the **Number of MRP Processes** field and keep the **Number of Schedulers** value the same. Likewise, if you notice times in the log where the MRP process threads are idle, the processors can also be used as scheduling threads.

Epicor recommends that you do NOT run the MRP process with only one MRP process and one scheduler. If you run only one process and it fails to run in real time (for example, you run the process overnight), the whole process fails. The number of recommended processes depends on your operating system capacity, but you should normally run a 3:3 processes ratio.

For Kinetic Cloud the MRP processing is limited to three processors and two suggestions.

Logs

Based on the value you enter in the **Number of MRP Processes** and **Number of Schedulers** fields, Kinetic creates a number of log files used to track information about each MRP process run.

The types of generated logs depend on the option you select in the **Logging Level** drop-down list located in the Process MRP app. Select one of the three options to determine how much detail you wish to include in the log files. You must also define a log name for the log(s) to be generated.

The following are the log types that generate based on your Logging Level selection:

- **Control Log (Main Log)** - If you run the Process MRP regularly and error free and don't need additional scheduling logs or part processing details, select the **Basic** logging level option. The Basic option generates the Control log only, where you can see the overall information for the specific MRP process run and by task. For instance, the log displays the current MRP process activity, such as deleting jobs, transfer order suggestions, purchase order suggestions, and so on. It also displays the date/time, defines the processor identifier (PID), and assigns the session number. You would normally review this log if you had a problem with the MRP process not completing.

If you want to see how long it takes to run each MRP process thread by Load Level and part, select the MRP log option. The Load Levels go as deep as needed to evaluate each Bill of Material (BOM), so the levels that display on the log depend on how complex the BOMs are for each manufactured part.

- **MRP Processor** - The log informs you how MRP looks for demand and creates supplies for each part record in Kinetic. The log displays the un-firm jobs and suggestions MRP deletes before processing new un-firm jobs, stock transactions, purchase and transfer order suggestions, and other part processing details. You would use this log if there was a problem with part quantities or you would want to find out why the MRP generated transfer order suggestions.
- **MRP Processor and Scheduler** - If you need to review both the MRP process and scheduler threads through separate logs, select the **MRP and Scheduling** option. For instance, the logs generated through this option display un-firm jobs which took longer to generate, give you information about why certain un-firm jobs will be late, and locate any scheduling errors. You would use these logs to analyze un-firm jobs with potential problems such as why the MRP suggests that a job will not meet its required date.
- **Individual Scheduling** - The system also generates Individual Scheduling logs that you use to review scheduling details of the Bill of Operations on generated un-firm-jobs and, in some cases, also on the firm jobs. The log displays scheduling information for each operation on an un-firm job's method of manufacture.

To generate Individual Scheduling logs, enter a log name and select the **MRP and Scheduling** logging level option. Epicor recommends that you do NOT generate logs unless you need to track down issues.

MRP creates one log per an un-firm job.

For visual log examples, refer to the **MRP Logs** section in this guide.

An increased number of logs may affect the system performance. Therefore, it is recommended that you optimize the number of MRP processes, Schedulers, and Logging Level requirements.

For example, the Process MRP includes the following entry values:

Field	Data
Log	MRP

Field	Data
Logging Level	MRP and Scheduling
Number of MRP Processes	3
Number of Schedulers	3

Based on the data entries above, Kinetic generates the following logs once you execute the Process MRP:

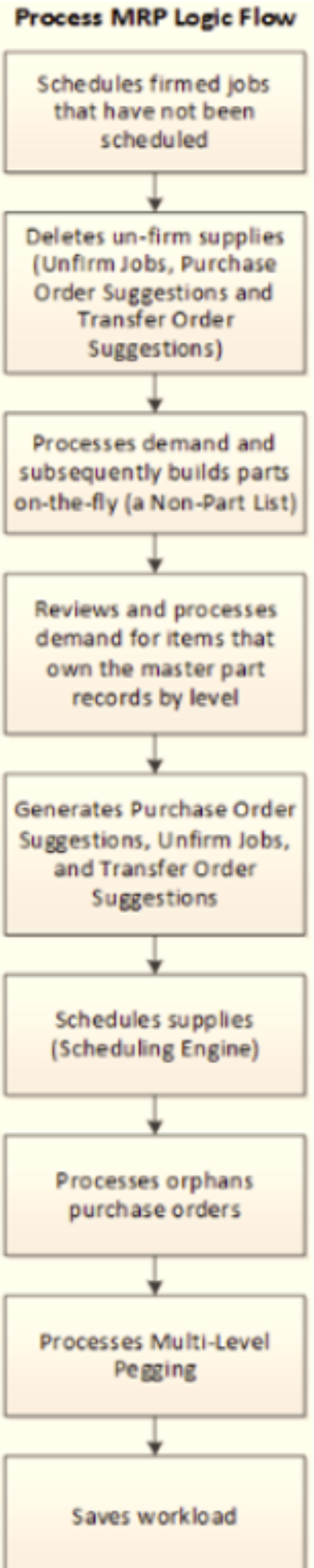
- **Control Logs** - Use the Control log, if you want to see how long it takes to run each MRP process thread by Load Level and part. The Load Levels go as deep as needed to evaluate each Bill of Material (BOM), so the levels that display on the log depend on how complex the BOMs are for each manufactured part.

  To generate a Control log, select the **MRP** logging level option.

  - MRP.log (Main Log) - Control Log
- **MRP Logs**
  - MRP0001.log - MRP Processor Log
  - MRP0002.log - MRP Processor Log
  - MRP0003.log - MRP Processor Log
- **Schedulers Logs**
  - MRPsched101.log - Scheduler Log
  - MRPsched102.log - Scheduler Log
  - MRPsched103.log - Scheduler Log
  - MRPsched104.log - Scheduler Log

MRP Running Sequence (Regenerative) and Troubleshooting

MRP runs in the following sequence mode:


Process MRP Logic Flow
Schedules firmed jobs that have not been scheduled
Deletes un-firm supplies (Unfirm Jobs, Purchase Order Suggestions and Transfer Order Suggestions)
Processes demand and subsequently builds parts on-the-fly (a Non-Part List)
Reviews and processes demand for items that own the master part records by level
Generates Purchase Order Suggestions, Unfirm Jobs, and Transfer Order Suggestions
Schedules supplies (Scheduling Engine)
Processes orphans purchase orders
Processes Multi-Level Pegging
Saves workload

MRP Stages

- **Stage One** - It schedules Firmed jobs that have not been scheduled. MRP will not consider Firmed scheduled jobs.
- **Stage Two** - It examines all the job tables and deletes un-firm supplies. It deletes un-firm jobs, purchase order and transfer order suggestions.

  Unfirm jobs will not delete if you select the Recyle MRP Jobs check box.

  This calculation feature improves MRP processing performance by saving unfirm jobs that use active part revisions. Instead of deleting all unfirm jobs each time the MRP process is run, this calculation determines which unfirm jobs can be saved. When the MRP process begins generating unfirm jobs during the current process run, it uses these recycled jobs first to satisfy current demand.

  A new job is only created when a valid recycled job cannot be found. Likewise, if any recycled jobs could not be linked to a new demand record, the recycled unfirm job is deleted.

- **Stage Three** - It processes demand and subsequently builds parts on-the-fly (a Non-Part list). A part on-the-fly does not own a master part record and is entered directly on a job as material or a sales order.

  As a result, demand for parts on-the-fly comes from job materials and sales order releases. When processing and building the Non-Part list, MRP considers the nature of the part.

  For instance, if a part on-the-fly is a job material (Purchased part), and you enter this material directly in Job Entry (Purchase Direct), MRP creates a purchase order suggestion, because you need to purchase this material to complete the assembly job.

  If you enter a part on-the-fly (Manufactured part) on a sales order (Make Direct), MRP creates a job suggestion that you can review in the Planning Workbench.

  For example, you enter a quote for 20 units of 'Part A' (part on-the-fly) and manually define a method of manufacture for this part. After you engineer the quote, you push it to a sales order (demand created). When you run the Process MRP, a job suggestion is created to manufacture 20 units of 'Part A'.

  If the MRP engine finds a part that has a method, it creates an un-firm job. If the engine finds a part that does not have a method, it creates a job suggestion.

  The MRP process reviews all the current types of demand in the database such as sales orders, job materials, transfer orders, transfer order suggestions, sales forecasts, master production schedules, or purchase order suggestions.

- **Stage Four** - It reviews and processes demand for items that own Part Maintenance records by level.

  The level of an item is the maximum number of phases of assembly required to get the item into an end product. Each MRP run explodes all manufactured items into component parts.

  For example, consider a system with two end parts, part 1 and part 2.

  - Part 1 requires two units of part A and one unit of part C.
  - Part 2 requires one unit of part B, one unit of part D and three units of part E.
  - Part A requires one unit of part B and two units of part F.
  - Part B requires two units of part C and one unit of part E.
  - Part C requires one unit of part F and three units of part G.
  - Part D requires two units of part B and one unit of part C.

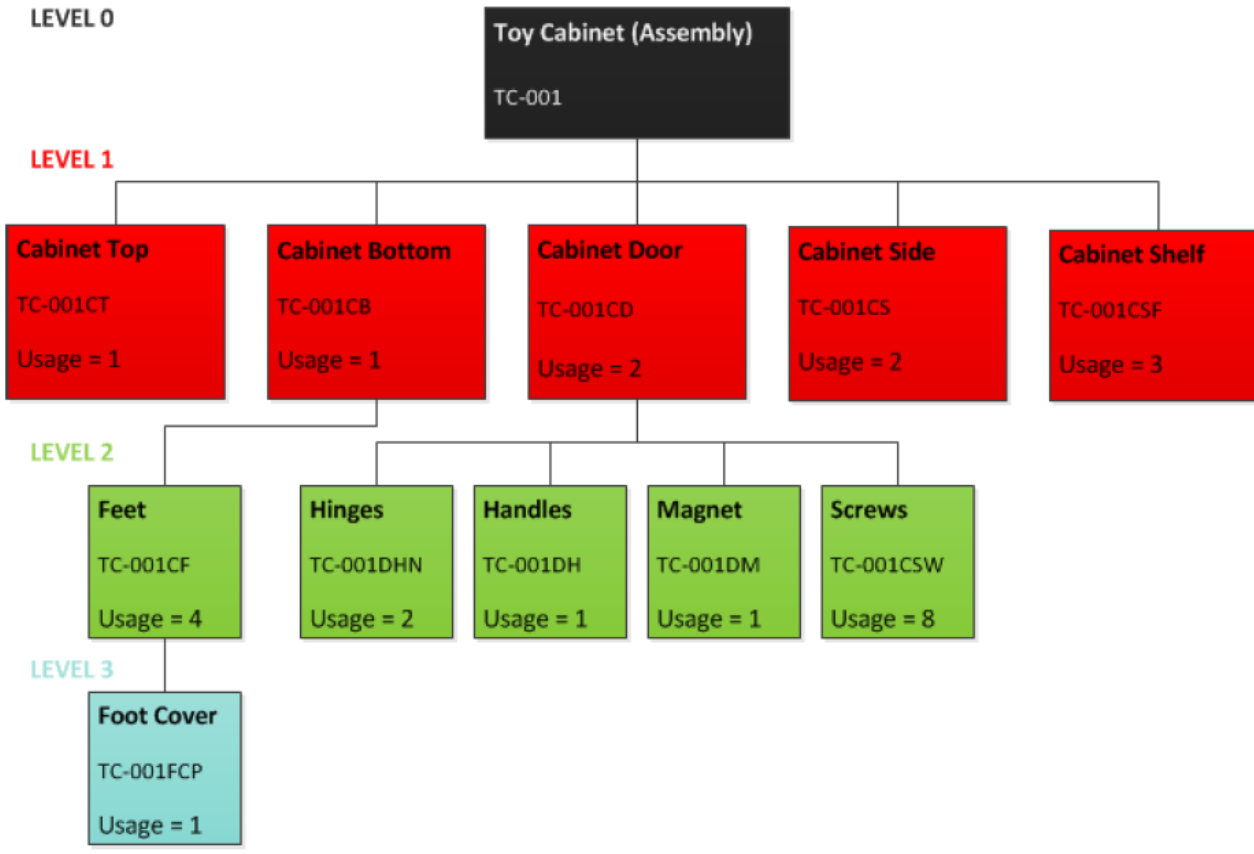
  The levels of the items are:

  - Level 0: Parts 1 and 2.
  - Level 1: Part A and D.
  - Level 2: Part B.
  - Level 3: Parts C and E.
  - Level 4: Parts F and G.

  For example. you build a toy cabinet that consists of the following components:

Part Number	Description	Quantity Required
TC-001	Toy Cabinet	1
TC-001CT	Cabinet Top	1
TC-001CB	Cabinet Bottom	1
TC-001CF	Cabinet Feet	4
TC-001CD	Cabinet Door	2
TC-001DH	Door Handle	1
TC-001DM	Door Magnet	1
TC-001DHN	Door Hinge	2

Part Number	Description	Quantity Required
TC-001CS	Cabinet Side	2
TC-001CSF	Cabinet Shelf	3
TC-001CSW	Cabinet Screw	8
TC-001FCP	Foot Cover Plastic	1



MRP processes the levels starting at the top and moves to the end. The number of levels that MRP processes depends on the complexity of a method of manufacture. Using the graphical example above, it first processes the items at 'Level 0'. In this case, there is only one item at 'Level 0', the **Toy Cabinet** assembly.

MRP always processes levels in alphabetical order.

Next, MRP processes all the subassemblies at 'Level 1', in this case the **Cabinet Bottom** and **Cabinet Door** items. If a purchased material is required by an

assembly part on a level (any level), MRP first determines the demand for the assembly that requires this purchased material, before it determines demand for the purchased material. The purchased material is always processed last.

The **Cabinet Bottom** and **Cabinet Door** parts are the Toy Cabinet's subassemblies, but they are also assembly parts, as they own a method of manufacture. In this example, the **Cabinet Top**, **Cabinet Side**, and **Cabinet Shelf** parts are purchased. Therefore, MRP processes demand for the Cabinet Bottom and Cabinet Door parts on 'Level 1'.

Next, it moves to 'Level 2' and processes the subassembly parts, again in alphabetical order. The only subassembly at 'Level 2' is the **Feet** part, as it requires the **Foot Cover** material, which is a purchased part. Once MRP completes processing all the subassemblies, level by level, it moves from the bottom up and determines materials (demand) required to manufacture the subassemblies.

The reason why MRP processes the purchased parts at the end is that if, for example, you also sold a purchased material separately that is required on an assembly, MRP needs to process demand coming from the assembly part as well, in addition to demand for the separately-sold purchased material.

- **Example #1** - You receive a sales order for 12 units of the Shelf part only, and 1 unit of the Toy Cabinet. As the shelf is also part of the method of manufacture for the Toy Cabinet, MRP will process demand coming from the assembly part first (Toy Cabinet), determining the requirement of three units. Finally, it will process demand coming from ordering 12 separate shelves and, therefore, the total required supply of 15 units.
- **Example #2 (MRP Level Processing Using Multiple MRP Processes)**

  The following example shows how MRP behaves when you run multi-MRP processes.

Level #	Part
Level 0	Part A
Level 0	Part B
Level 0	Part C
Level 1	Part D
Level 1	Part E
Level 1	Part F

Level #	Part
Level 2	Part G
Level 2	Part H
Level 2	Part I

In this example, you run **Process MRP - Regenerative** with two MRP processes. As MRP always processes levels in alphabetical order, 'MRP Process 1' would process Part A, and 'MRP Process 2' 'Part B'. Based on which MRP process completes first, it moves on to process the next part on the level and in alphabetical order. For instance, if 'MRP Process 2' completed first and processed 'Part B', it would then move to process 'Part C'. If 'Part C' was still being processes at the time 'MRP Process 1' completes 'Part A', 'MRP Process '1' would move on to process 'Part D'.

The MRP processes completion times may vary, depending on the complexity of a method of manufacture.

Demand Processing, Supply Creation, and Scheduling

The previous section explained how MRP runs through levels and in what order. This section covers the logic of how MRP processes demand and creates supply.

1. MRP reviews demand from the following sources:

    - Forecasts
    - Master Production Schedules
    - Sales Orders
    - Transfer Order Suggestions
    - Inventory Planning Parameters
    - Material Requirements on Jobs

When Process MRP deletes un-firm jobs, un-firm Transfer Order and PO suggestions, it regenerates them based on demand and planning inventory parameters defined in the Part app. If demand is still open at the time of the **Process MRP** run, the process will identify it and fulfill it. However, the MRP process does not look at the actual demand source (Sales Order, Sales Forecast, Job Material, Transfer Order) when running in the Regenerative mode, but always at the **Part Detail** table.

The **Part Detail (Erp.PartDtl)** table is a flat table that contains all the part needs defined within your company database.

For example, each time you enter a sales order for a part, a record is automatically created in the **Part Detail** table, recording the entered sales order (demand). When you run MRP, the process references the Part Detail table information and regenerate demand for the required part. MRP will not reference the actual Sales Order Entry record. In this case, the Part Detail table records information such as Order Number, Quantity, Part Description, Revision Number or a Source file.

2. Once MRP reviews all the Erp.PartDtl tables, it proceeds to create supplies to satisfy the existing demand. How the MRP provides supply depends on whether a part is purchased or manufactured. For instance, if the part is a purchased item, then the MRP process determines/suggests you to buy it, and creates a purchase order suggestion. If the part is manufactured, the MRP process creates an un-firm job. If the part is a transfer part, the MRP process creates a transfer order suggestion.

    - Firstly, MRP creates un-firm jobs to satisfy demand for the manufactured parts. As MRP processes the manufactured items, starting at the top level and moving to the end, it uses the following logic when processing an assembly part at any level:

        - It pulls in the part's revision. Each method of manufacture is associated with a specific revision.

            For Non-stock parts, the MRP engine calculates the suggestions using the current part revision, if the part has the **Use Part Rev** check box selected in Part Maintenance. If this check box is cleared, MRP uses the revision level defined on the sales order that created the requirement.

        - It explodes the operations and materials associated with the part revision.

            When MRP generates un-firm jobs and executes **Get Details**, it adds the operation times each job requires to the schedule and combines labor, burden, and materials costs. It assigns the time units to the available scheduling blocks, so the un-firm jobs are included in the schedule.

    - Secondly, it creates Transfer Order suggestions. If a part is a manufactured or purchased item and you are supplying it to another site, MRP creates a Transfer Order suggestion. You can then turn the suggestion into a new transfer order or update an existing open transfer order.

- Thirdly, it creates Purchase Order Suggestions. You can then turn the generated PO suggestion into a purchase order.

3. Once MRP processes demand and creates supplies to satisfy this demand, it proceeds to schedule supplies. The Scheduling engine incorporates information pulled in through **Get Details** into the overall schedule and determines the **Required By** date based on lead times of purchased materials, available material (current stock levels), and production times for subassemblies. The Process MRP runs **Backwards** scheduling.

   The Scheduling engine uses a bill of operations and bill of materials to determine how long it will take to produce a job. Process MRP does not generate jobs with dates, but calls the Scheduling engine to schedule them. The Scheduling engine calculates the **Start Date** and **End Date** on un-firm jobs and purchase suggestions, reviewing each level of the Bill of Operations and the amount of total time it requires to run from start to finish, material lead times for purchased parts or current stock levels (material availability - Purchased & Manufactured).

- **Stage Five** - It processes orphans purchase orders. The orphans purchase orders do not include links.

  If you have already executed Process MRP, a series of records already exist in the database. If the material requirements on MRP jobs subsequently change, some purchase orders may no longer be required, or the original purchase orders no longer have the correct quantities. As a result, Process MRP purges the orphaned purchase orders.

- **Stage Six** - It processes Multi-Level Pegging if you selected the **Run the Multi-Level Pegging Process** check box located in the Process MRP app.

  The Run the Multi-Level Pegging Process check box indicates that you want the MRP engine to use the Multi-Level Pegging calculation. This causes the MRP engine to calculate additional supply and demand details.

  Because of this calculation, each supply part quantity is directly linked, or pegged, to the specific demand record that created it. You can display this additional suggestion information on the Multi-Level Pegging Display dashboard. This information displays available inventory quantity, the jobs currently producing each part, the sales orders creating demand for the part, and so on.

- **Stage Seven** - It saves work load.

Troubleshooting

The troubleshooting section looks at some issues that may occur with the MRP process during different stages of an MRP run.

Because MRP is a complex process, there may be times when you run into issues of some kind. If you experience problems with the MRP process, review the troubleshooting topics below for a potential solution.

Timeout Settings

If there is an issue with MRP, the first thing you do is to verify the default timeout settings, as the incorrect settings may lock your system, especially when you try to process a large volume of data. If necessary, increase these timeout settings to prevent the Kinetic from prematurely stopping transactions before they complete.

You increase the Timeout related settings in web.config. The default values in the appSettings include 2000 for processing the rows and 3600 seconds (one hour) for the timeout. You can increase these values if necessary.

- **MRPRowCount** - The number of rows that sqlCommand is going to affect or read each time.
- **MRPCommandTimeout** - Sets the timeout before finishing the attempt to execute a command and generate an error.

You can read the preset values in the generated log file.

- **Example #1** - You can read the preset values in the generated log file.

```
14:30:55 _____________________________________
14:30:55 MRPRowCount (rows)           -> 2000
14:30:55 MRPCommandTimeout (seconds) -> 3600
14:30:55 _____________________________________
```

  If the timeout expires during the MRP run, an error generates cancelling the run. In such case you need to modify your raw and timeout settings. Process MRP must complete and deletion of unfirm jobs must finish within the defined timeout.

- **Example #2**

```
14:38:14 The wait operation timed out
14:38:14 Unexpected Error - Cancelling MRP - MrpExp
14:38:16 Cancelling from MrpExp stopProcesses
```

The timeout settings are organized in a parent-child hierarchy. Depending on your performance and testing needs, you adjust the timeout settings at different levels in this hierarchy. Current hierarchy levels are:

- **machine.config file** - This high level configuration file contains the overall settings used by all applications on the server.
- **web.config file** - This configuration settings file defines the settings used by the application server that runs Kinetic. This file contains the default timeout values.

If no override timeout values exist lower in the hierarchy, the values in this file determine when a transaction times out.

In addition to this hierarchy, you can also adjust timeout values in the **rsreportserver.config** file, the **.sysconfig** file, the **Task Agent Configuration** app, and on the **SSRS Site**. These settings define timeout durations for transactions not monitored by the **machine.config** and **web.config** files.

- **Stage One** - After the MRP run, some jobs may be missing **Start** and **Due** dates. This may happen if a user creates a job manually and does not engineer, schedule or release the job. If a Firmed job(s) is missing Start and Due dates, take the following action:

  1. In Job Entry, verify whether the selected job is engineered, firmed, and released. The job must be scheduled.
  2. If the job dates are not generated after you schedule a job, review the individual scheduling logs.

  For Kinetic to generate individual scheduling logs, select the **Enable Scheduling Debug Log** check box located in the Company Configuration app. It is recommended to keep this check box clear, to prevent generation of too many logs. The individual scheduling logs display step-by-step information on how jobs are scheduled.

- **Stage Two** - If MRP does not delete one of the supplies, first confirm how many purchase order suggestions, transfer order suggestions and un-firm jobs were not deleted.

  For example, you may have a case where MRP fails to delete un-firm jobs. To verify the number of undeleted un-firm jobs, open the BAQ Desginer and design a query for the table that holds these jobs.

  If you run MRP in Regenerative mode, MRP deletes jobs as a whole, in another words, all in one bucket. After you determine the number of un-deleted un-firm jobs, open the BAQ Designer and design an updatable query to delete a couple of job records in Job Entry, then run MRP Regenerative again. Note that usage of updatable BAQs is only allowed to users with Advanced BAQ privileges.

  If you run MRP in the Net Change mode, you must first identify the last part number that MRP was processing when it tried to delete an un-firm job, and then delete that job.

  If you need to know the number of un-deleted PO Suggestions, TO Suggestions, or PO Suggestion changes, again enter a query to retrieve the records to see how many are still remaining, then proceed to delete a couple of records manually before you run MRP Regenerative again.

- **Stage Three** - MRP may fail to process demand and build a non-part list if you use restrictive characters for your part IDs or due to the UOM conversion failure. Using Part Maintenance, verify that all the parts include correct part IDs.
- **Stage Four - Incorrect Quantity Results**

  When MRP processes demand it may generate incorrect results. For instance, you enter a sales order for 800 units, but MRP generates supply for only 500 units.

  Follow these steps to determine why the system generates incorrect results:

  1. **Review the Time Phase** - If you are not receiving the quantity you expect, it may be because you already had it supplied.
  2. **Review the MRP Logs** – Review the MRP Processor logs to determine why MRP suggested particular production quantities.

     For more information about the MRP Processor log, refer to the Logs topic in this guide.

  3. **Review the Planning values in Part Maintenance** – Review Min, Max, and Lot Sizing values to see whether the planning values correspond with the generated results.
  4. **Review the Part Detail (Erp.PartDtl) table** - The MRP engine references the information within this table to calculate its job, transfer order, and purchase suggestions. To reference the Part table, use the BAQ Designer to construct the following query:

     SELECT * FROM Erp.PartDtl WHERE Company = 'EPIC06' and PartNum = 'Part A'

     The Company and Part IDs would vary.

     Once you retrieve the results, review demand, quantities, and dates for this part.

Job Creation

MRP creates an un-firm job for a manufactured item in several stages:

1. It creates a job number.
2. It creates a job header.
3. It created a demand link.
4. It pulls in the most effective revision.
5. It executes Get Details (pulls in a method of manufacture).

If MRP fails to create a job to supply demand, take the following action:

1. Use the MRP log to verify that the process executed Get Details for the manufactured item in focus.

2. If you determine that there is an issue with Get Details, use Job Entry and create a job manually, including Get Details. Verify whether the revision in focus has been approved or whether a method of manufacture has been correctly created. For example, verify whether all the operations include resources or whether resource groups are valid for the current site.

   If MRP cannot execute Get Details for a particular manufactured item, it deletes the job number for the item for which it tried to create a job and moves on to create un-firm jobs for the rest of demand. Once MRP creates jobs, it moves them to a scheduling queue for scheduling.

3. MRP creates a job without dates, schedule the job manually. Also, review the individual scheduling logs, verify whether you have the correct Scheduling Factor setup or verify that a resource group is assigned against all the operations in the method of manufacture.

Net Change Logic

Net Change mode restricts the number of calculations run by the MRP engine, because it ignores any previously generated information. It processes supply only for parts that changed since the last MRP run. If a demand requirement was changed since the last time you ran the MRP engine, all supply such as the job, transfer order, and purchase suggestions originally generated for these requirements update.

If a value (especially a Date or Quantity value) is updated within any of the following demand sources, these updates cause a Net Change to occur within any suggestions linked to the demand source:

- Forecasts
- Master Production Schedules
- Sales Orders
- Transfer Orders
- Inventory Restock Quantities
- Material Requirements on Jobs
- Recurring Purchase Order Quantities
- Changes to the Part's Method of Manufacturing

The Epicor ERP application uses the **MRP Recalc Needed** functionality to identify which parts have changed their demand requirements since the last MRP run. The MRP Recalc Needed check box is located in the PartPlant table. When you run MRP Net Change, the process refers to the PartPlant table to see what supply has been changed and needs to be re-planned. It evaluates all the current

supplies (un-firm jobs, purchase order suggestions, transfer order suggestions), and if it detects the change in demand for a part, whether purchased or manufactured, it activates the MRP Recalc Needed check box in the PartPlant table of the required part. The MRP process then deletes the records it previously created and then generates new supply records to satisfy the changes in demand.

Example You enter a sales order for two manufactured items, Electric Water Pump and Mechanical Power Transmitter. Both items include a set of different purchased and manufactured (sub-assembly) components in their method of manufacture (MOM). You agreed with your customer to deliver both products on the last day of September. Next, you run the MRP process to plan the jobs.

However, the customer calls and informs you that they would like to change the delivery date for the Mechanical Power Transmitter part and receive the items at the end of November. As a result, you change the date on the original sales order release, to reflect the new delivery date requirement. The date change triggers the MRP Recalc Needed in the PartPlant table for the Mechanical Power Transmitter. When you next run the MRP process in the Net Change mode, it regenerates and re-plans all the previously created supplies, coming from the old sales order release date. It creates new un-firm jobs (the Mechanical Power Transmitter includes a sub-assembly in its MOM) and purchase order suggestions for parts (materials) needed to manufacture both the sub-assembly and assembly (Mechanical Power Transmitter) items.

Primary Components

The material requirement planning engine uses several components together as a base for generating job, transfer order, and purchase suggestions. The values defined on these components affect how the Epicor application handles MRP at your company.

When you set up these primary components to reflect how you want the Epicor application to handle potential demand, you fine-tune the MRP engine to fit your business practices. The MRP engine will then accurately estimate the demand for your company's products and generate the potential purchase orders and jobs to meet this demand.

The list of primary components include:

Buyer

Buyers are responsible for the company's purchasing activity, and buyers are specified on all purchase orders. These records, whether they define individuals or departments, contain Authorized Users that are allowed create purchase orders.

Each buyer record must have at least one authorized user.

Each buyer record is linked to a Part Class that defines the types of materials this individual or department is responsible for purchasing. Also, Each buyer record is assigned a set limit to the total amount of all purchases they can handle at any given time. Authorized Users can create purchase orders as long as the total amount does not exceed the amount authorized on the buyer record.

You must also have at least one active buyer record within the Epicor application before any purchasing activity can begin, because the Epicor application requires that there be a reference to the individual or the department that created the purchase order.

Additionally, the PO suggestions generated by the MRP engine can be filtered by Buyer. This feature lets the buyers or departments in your company display only the PO suggestions created by them, which lets users or departments more quickly accept or reject these suggestions.

Modifiers

The following section describes the Buyer values you can change.

These are the values you can modify for buyer records:

- **Authorized User**- Although at least one Authorized User must be defined on the buyer record, you can enter as many authorized users as needed. This lets you create buyer records for departments or for purchasing department managers and their employees. If a user needs to make purchases within the Epicor application, they must be defined as an Authorized User on a buyer record. If they are not defined as an Authorized User, they cannot create purchase orders.

- **Purchase Order Entry**- When creating a purchase order, the default buyer for your User ID will default into this field. You can change the buyer to another buyer, as long as your User ID is defined as an Authorized User within the other buyer record.
- **Change PO Suggestions**- Similar to New PO Suggestions, users can make changes only to PO's created for the buyer records for which they are defined as Authorized Users. The MRP engine verifies access by using the buyer record selected on the purchase order and checking for the Authorized Users. After this analysis, the PO suggestions linked to your current user record are displayed.
- **New PO Suggestions**- Users only have access to PO suggestions created for the buyer records for which they are defined as Authorized Users. The MRP engine verifies access by identifying the default buyer on the part class used by the purchased part. The engine then retrieves the Authorized Users on the buyer record. After this analysis, it displays PO suggestions linked to your current user record.
- **System Default**- One buyer can be designated as the system default. When a new purchase order is created, this default buyer record will be selected automatically.
- **Inactive**- When the Inactive check box is selected, the MRP engine no longer includes this buyer record when calculating PO suggestions. You should define a buyer as inactive when the individual leaves the company or the department is no longer associated with purchasing part quantities.
- **PO Limit**- An optional limit, each buyer can be assigned an amount. If the buyer record has currently purchased this amount or higher, individuals linked to this buyer must get approval from a purchasing manager.
- **Approval Person**- If a buyer (or Authorized User) creates a PO above their PO limit, it must be approved by the user defined as the Approval Person on the buyer record.
- **Consolidated Purchasing**- This field should be enabled if this buyer can perform consolidated buying for two or more companies within your organization. This functionality requires the Multi-Site module.

Where Located

You can access the Buyer functionality through the following locations.

- **Buyer Maintenance**-Use this maintenance program to define the buyers that exist for your company. Each buyer must have at least one Authorized User assigned to it. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Part Class Maintenance**- You can select a buyer on the Part Class so that only a specific buyer can purchase products from within this Part Class. You locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.

Logic/Algorithms

The Buyer functionality uses this logic to calculate its results.

How MRP Determines Buyer

The MRP engine uses a logical sequence to determine which buyer record will be used on a purchase suggestion. This is the sequence:

- The engine first checks for the material (part) to be purchased on an operation. Within the database, this record is found on the JobMTL/JobOper table within the method of manufacturing.
- It then reviews the part record to find out which supplier is defined on the site that receives the part. This record also indicates which warehouse will receive the purchased parts. Within the database, this record is found on the Part/site table within the part record.
- The MRP engine then reviews the part class linked to the part record. The buyer defined on the part class is used on the purchasing suggestion. Only Authorized Users linked to this buyer record will be able to turn this purchase suggestion into a purchase order.
- Note that to complete the purchase suggestion, the MRP engine also retrieves the values defined for your company within the Company Configuration program.

Example(s)

The following example(s) illustrate how you use the Buyer functionality.

A user typically has multiple purchasers or purchasing managers that buy products for either inventory replenishment or for manufacturing raw material. To set up these individuals as buyers, their user IDs must be defined on the buyer record. This setup is required if any purchasing is to take place from this user in the application.

Calendar

Production Calendars allow you to define the specific hours per day production will run, the days on which work is performed (Working Day), and the days on which work is not performed (Non-Working Day).

The MRP engine uses calendars to determine when a demand requirement can be placed on a specific date. If the date is a Working Day, demand can be placed on this date. Then MRP can calculate that supply will also be required on that date. If a date is a Non-Working Day, however, the MRP engine will ignore the date.It follows a hierarchy to determine which calendar has precedence over another calendar. The following is the production calendar hierarchy that the MRP engine uses:

1. **site Calendar**- If a calendar is selected on a site record, it is evaluated first by the MRP engine.
2. **Company Calendar**- The overall production calendar selected on the company record is evaluated last.

The MRP engine also uses production calendars on Supplier records to calculate the arrival dates for materials or part quantities being worked on through a subcontract operation.

Note that the MRP engine does not actually schedule the job suggestions and unfirm jobs it generates. Instead, the MRP engine calls the scheduling engine, which uses several calculations to determine the Start Date and End Date on each job suggestion or unfirm job. When the scheduling engine determines these date values, they are passed along to the MRP engine - which in turn places them on the job suggestions and unfirm jobs.

Modifiers

The following section describes the Calendar values you can change.

These are the values you can modify for this item:

- **Working Day**- A date on which production is performed at your manufacturing center.
- **Non-Working Day** - A date, like a holiday or a weekend day, on which production is not performed at your manufacturing center.

Where Located

You can access the Calendar functionality through the following locations.

- **Production Calendar Maintenance**-Use this maintenance program to define various production calendars. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.
- **site Maintenance**- You can select a production calendar for a specific site on the Detail sheet. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Company Configuration**- You can select a production calendar for the entire company on the Company Configuration - Detail sheet. You can locate this program from the Main Menu by opening the System Management folder and the Company Maintenance folder.
- **Supplier Maintenance**- You can select a production calendar for a specific supplier on the Supplier Maintenance - Detail sheet. You can locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Calendar functionality uses this logic to calculate its results.

Total Work Time Available = Working Days - (Non-Working Day 1 + Non-Working Day 2 + Non-Working Day 3 + and so on)

Example(s)

The following example(s) illustrate how you use the Calendar functionality.

Your company's Blue site is open from Monday to Friday. You create a production calendar that defines Monday - Friday as Working Days and Saturday-Sunday as Non-Working Days. Then on the Hours Per Day sheet, you indicate that production will run from 7 to 5 each Working Day. You then label this calendar as "5 days 10 hrs" and select this calendar on the Blue - site record.

Customer

A Customer record contains all the primary details about organizations that purchase parts from your company.

Key details about your customers, like contacts and shipping address locations, are all entered through these records. The information defined within a customer record is used in many programs throughout the application - including Quote Entry, Sales Order Entry, Customer Shipment Entry, and AR Invoice Entry.

The MRP engine can use Customer records to predict forecast quantities. This is optional functionality that can help you better predict upcoming demand. If you have a customer that places regular sales orders, MRP lets you create a forecast that calculates when jobs should be created to satisfy the customer's potential demand. The job suggestions calculated through this forecast are linked to sales orders for these same customers.

The sales orders consume the quantities calculated through the job suggestions first, followed by any general forecasts you have created for the same part record. As you can see, by selecting a customer on a forecast, you can more efficiently handle sales orders placed by your regular customers.

Modifiers

The following section describes the Customer values you can change.

These are the values are the values you can modify for this item:

- **Forecasts**- You can select a specific customer on a forecast record. This indicates that the forecast will only be for this customer. This setting is optional.
- **Forecast Entry**- Use this program to predict demand for part quantities. You select a specific customer for each forecast on the Detail sheet. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.

Where Located

You can access the Customer functionality through the following locations.

- **Customer Maintenance**- You create customer records through this program. You can locate this program from the Main Menu by opening the Sales Management folder, the Order Management folder, and the Setup folder.

Logic/Algorithms

The Customer functionality uses this logic to calculate its results.

If a customer is defined on a forecast record, consume the quantities generated through this forecast before quantities generated through general forecasts.

Example(s)

The following example(s) illustrate how you use the Customer functionality.

A customer, Dalton Manufacturing, typically orders a 500 quantity of Part 378-0R every month. You want the MRP engine to reflect this demand, so at the beginning of the year you create a three month forecast record for Part 378-0R. You add a forecast detail for Dalton Manufacturing. This forecast record contains a 1,500 Forecast Quantity and a Forecast Date of 3/31.

Now the MRP engine will create jobs against this forecast detail. As sales orders for Part 378-0R are created for Dalton Manufacturing, the Consumed Quantity value on the forecast will increase, letting you track the progress of the forecast. The following table illustrates how a forecast quantity is consumed:

Date	Forecast Quantity	Consumed Quantity	Sales Order Quantity	Part Detail
1/02	1,500	0	0	1,500
1/25		500	500	1,000
2/25		1,000	500	500
3/31		1,500	500	0

Forecast

In many companies, it is typical for the sales department to predict demand both by product and by customer. The company can then develop its yearly budget based on this sales prediction, or forecast.

Within the application, you enter these forecast records using the Forecast Entry program.

Each forecast predicts when a specific part quantity will be shipped. The primary values you define on each forecast are the part being forecasted, the quantity of parts predicted for the demand, the site that will produce the part quantity, and the date by which the part quantity needs to be shipped.

Note that forecast quantities are always entered in the base inventory unit of measure defined for the part in the Primary UOMs - Inventory field in the Part Maintenance - Part - Detail sheet.

Forecasts can be created for general demand predictions for a specific part; this lets you predict the overall demand for a part that will most likely occur during a specific time period. Forecasts can also be created for a specific customer, which let you predict the demand for a part that this customer will most likely order by a specific date. You can use this feature for regular customers who need parts shipped from your company on a frequent basis.

Additional features are available for your use of forecasts. You can export forecasts for editing in another application or for later reference. A forecast can also be imported from a CSV file which has been prepared in the proper format. Forecasts can be created for global parts, which are parts manufactured throughout your organization. You can then accept, reject, or update these forecasts through the Global Forecast functionality. You can also use export the activity for a part during a given time period using the External Forecast > Export Sales History option found under the Actions menu. You can then modify this output using the Smart Forecasting™ application. After you finish modifying the forecast record through Smart Forecasting, you import this data back into the application using the External Forecast > Import External Forecast option.

The forecast will be used by the MRP engine to create demand requirements for a selected part. As long as a quantity to be used remains on the forecast, a demand requirement will be generated through the forecast. The Consumed Quantity value monitors how much of a forecast has been used so far, or consumed, by demand requirements.

The MRP engine ignores a forecast if its Scheduled Start Date is greater than the Forecast Date plus the Days After value. In this situation, the MRP engine no longer considers the forecast as a value producing demand, because this record is no longer in the processing date range.

Please note the difference between a forecast and a master production schedule (MPS). A forecast is a sales prediction for when a specific part quantity will need to be shipped. A master production schedule is a manufacturing prediction for when a specific part quantity will need to be produced.

A forecast can be turned into a master production schedule, which in turn can be used to update material quantities to better distribute the load against your manufacturing center's capacity. Also note that if a forecast and a master production schedule are created for the same part, the MRP engine overrides the forecast record with the master production schedule record.

Modifiers

The following section describes the Forecast values you can change.

These are the values you can modify for this item:

- **Days Before**- The number of days before the actual forecast date that the forecast should include sales order demand. Along with the Days After field, this field establishes a window around the forecast date in which sales order demand should be included in the overall forecast. You define this value within the Company Configuration program on the MRP sheet.

- **Days After**- The number of days after the actual forecast date that the forecast should include sales order demand. Along with the Days Before field, this field establishes a window around the forecast date in which sales order demand should be included in the overall forecast. You define this value within the Company Configuration program on the MRP sheet.
- **Part**- The specific part that will be used for this forecast.
- **site**- To define the specific site that will be used to manufacture the part quantity, use the site drop-down list or its Navigation Toolbar.
- **Forecast Date**- The date by which this part quantity is predicted to be shipped.
- **Forecast Quantity**- The total quantity that is predicted to be in demand on or before the Forecast Date. Note that forecast quantities are entered in the base inventory unit of measure defined for the part in the Primary UOMs - Inventory field in the Part Maintenance - Part - Detail sheet.
- **Customer**- Each forecast can also be created for a specific customer. Sales orders created for this customer will consume the part quantity on the forecast.

Where Located

You can access the Forecast functionality through the following locations.

- **Forecast Entry**-Use this program to create the forecast records. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.
- **Process MRP**- The MRP engine uses forecast records to create job suggestions to satisfy future demand. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Forecast functionality uses this logic to calculate its results.

- If a sales forecast is in use and a sales order is placed in the same time frame as the forecast, the MRP engine will use the largest part quantity that is found on either the forecast or the sales order.
- As sales orders are created for a specific part, the MRP engine uses the quantities on these sales orders to determine the Consumed Quantity value on forecasts. The MRP engine first consumes this quantity against any customer specific forecasts created for the part. It then consumes this quantity against any general forecasts created for the part..
- Each time it is run, the MRP Engine (Process MRP) updates the Consumed Quantity value to reflect how much of the forecast is being used (consumed) by current demand.
- If a forecast is Forecast Date + Days After < the scheduled Start Date, the forecast is ignored by the MRP engine. All sales orders, however, will be calculated by the MRP engine.

- If a Sales Order (open, firm) has a Forecast Date <= orderrel.regdate + Days Before and a fore date > ordered.regdate- Days After, the sales order's quantity is counted against the forecast.

Example(s)

The following example(s) illustrate how you use the Forecast functionality.

Days Before/Days After Example

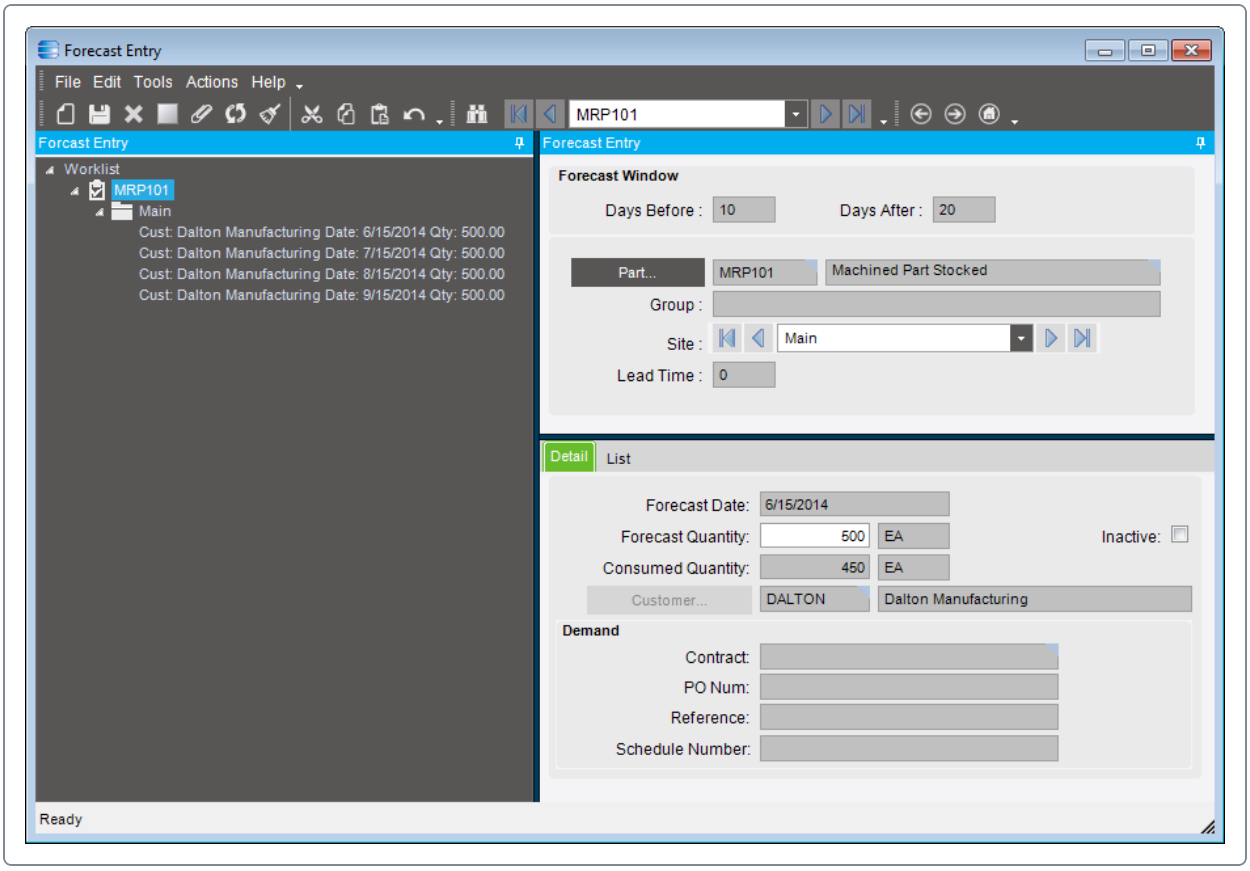
The Days Before and Days After values determine the range within which sales orders will be included in the forecast. For example, if the Days Before value is 15, then the forecast for November 20, 2014 includes all sales orders whose required due date is between November 5, 2014, and November 20, 2014. Likewise if the Days After value is 15, the forecast for November 20, 2014 includes all sales orders whose required due date is between November 20, 2014, and December 5, 2014. The total date range for this forecast will then be November 5, 2014 to December 5, 2014.

Forecasting In Action

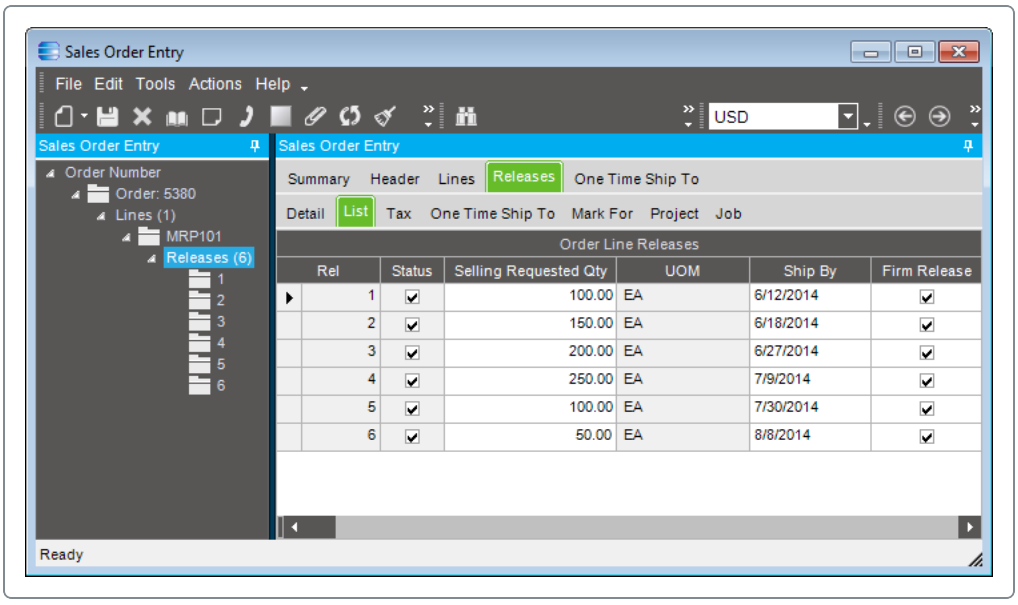
Your company manufactures part MRP101 in the Main site; this part-site detail has a Minimum On-Hand value of 200, which indicates that you always want at least a 200 quantity available in stock. It also has a Minimum Lot Size value of 100 and a Multiple value of 100, which means that each MRP unfirm job must have at least a 100 quantity and be a multiple of 100 (100, 200, 300, and so on). You produce this part using the "A" method of manufacturing, which is an approved part revision.

You have a customer, Dalton Manufacturing, who regularly orders this part. To help predict this demand, you create a forecast for part MRP101 to predict the potential demand you should receive from Dalton.

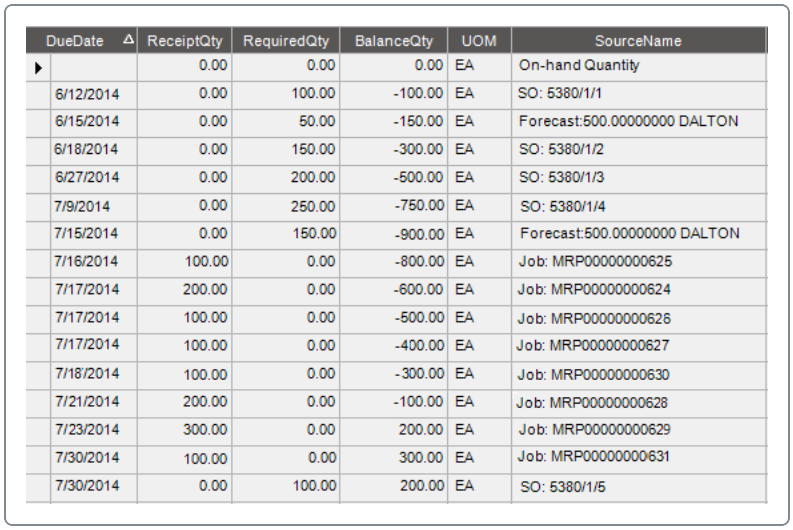
You launch Forecast Entry and create four details on this forecast record, each spaced one month apart on the 15th. You use a Days Before value of 10 and a Days After value of 20, so each forecast detail handles thirty days. To complete the forecast, each detail line has a 500 quantity.



Meanwhile, Dalton Manufacturing places an order with your sales team for the quantities they need over the next three months. Dalton wishes to receive the MRP101 part quantities through 6 releases for various quantities based on their own incoming sales orders. They need the first release on 6/12 and the last release on 8/08.



You now run MRP processing. When the process is finished, you launch Time Phase Inquiry and select part MRP101 to review the results. The first section of these results is displayed on the next page.

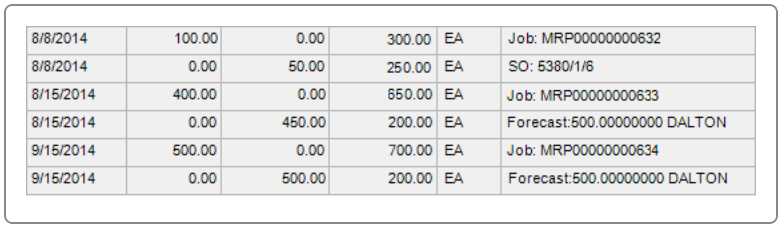


DueDate	ReceiptQty	RequiredQty	BalanceQty	UOM	SourceName
	0.00	0.00	0.00	EA	On-hand Quantity
6/12/2014	0.00	100.00	-100.00	EA	SO: 5380/1/1
6/15/2014	0.00	50.00	-150.00	EA	Forecast:500.00000000 DALTON
6/18/2014	0.00	150.00	-300.00	EA	SO: 5380/1/2
6/27/2014	0.00	200.00	-500.00	EA	SO: 5380/1/3
7/9/2014	0.00	250.00	-750.00	EA	SO: 5380/1/4
7/15/2014	0.00	150.00	-900.00	EA	Forecast:500.00000000 DALTON
7/16/2014	100.00	0.00	-800.00	EA	Job: MRP00000000625
7/17/2014	200.00	0.00	-600.00	EA	Job: MRP00000000624
7/17/2014	100.00	0.00	-500.00	EA	Job: MRP00000000626
7/17/2014	100.00	0.00	-400.00	EA	Job: MRP00000000627
7/18/2014	100.00	0.00	-300.00	EA	Job: MRP00000000630
7/21/2014	200.00	0.00	-100.00	EA	Job: MRP00000000628
7/23/2014	300.00	0.00	200.00	EA	Job: MRP00000000629
7/30/2014	100.00	0.00	300.00	EA	Job: MRP00000000631
7/30/2014	0.00	100.00	200.00	EA	SO: 5380/1/5

The MRP engine uses the forecast, the sales order, and the part-site record to determine the suggested amounts that should be within your warehouse over the next few months. The following describes how the MRP engine calculates these results:

- June Forecast Detail: This warehouse does not have a beginning On-Hand Quantity, so the first row displays that a 0.00 quantity is available. Three releases from the sales order are also due in June for a total demand quantity of 450. The first forecast detail for 500 appears on 6/15 and it handles a date range 06/05 - 07/05; notice that the 450 demand quantity consumes most of the forecast, leaving a 50 quantity. Because this part-site detail requires a Minimum On-Hand quantity of 200, the MRP process calculates that a -150 quantity is still required if jobs are generated to answer the demand from the forecast detail. Now the MRP engine moves through the June sales order releases for the 150 and 200 quantities, subtracting each demand quantity from the Balance. The MRP engine calculates that a -500 Balance is available in the warehouse for June.
- July Forecast Detail: The next sales order release, 5380/1/4, is due on 07/09. This adds another 250 demand quantity for the part, so now the total balance drops to a -750 quantity. The July forecast detail line is 7/15, so it handles a date range from 07/05 - 08/04. The total demand from Dalton in July is a 350 quantity, which leaves a 150 demand quantity on the forecast detail. Since this remaining forecast quantity is also calculated as demand, so now the Balance on 07/15 is a -900 quantity. The MRP engine next determines the supply that can answer this demand. Starting on 07/16, it generates a series of unfirm MRP jobs, MRP00000000625 to MRP00000000631, each for a 100 quantity or a multiple of 100. A quantity of the total demand is satisfied by each unfirm job. Notice that Job MRP00000000629 on 07/23 is for a 300 quantity. The MRP engine now calculates a 200 quantity Balance, which satisfies the Minimum On-Hand value defined on the part-site detail. One more sales order release, 5380/1/5, is due on 07/30 for a 100 quantity. The MRP engine generates an unfirm job in July for a 100 quantity, restoring the Balance to the 200 quantity minimum.

- August Forecast Detail: The final sales order release is due on 08/08 for a 50 quantity. Because all unfirm jobs must have at least a 100 quantity, the next job, MRP00000000632, is for a 100 quantity. This generates a Balance of 250. The August forecast detail is calculated next; Dalton consumes a 50 quantity, so a 450 quantity remains to be consumed. Unfirm job MRP00000000633 is generated, using a 400 quantity (500-100), to account for this forecast demand. The total demand quantity for August is 450, so the resulting balance is 650. MRP generates enough unfirm jobs that maintain the 200 Minimum On-Hand quantity (650 - 450 = 200).
- September Forecast Detail: The MRP engine now calculates that the only demand in September comes from the remaining forecast detail. A last job, MRP00000000634 is generated for a 500 quantity. Because MRP considers this a demand quantity, this amount is subtracted from the 700 balance, again leaving the 200 Minimum On-Hand quantity on the last row of the time phase results.

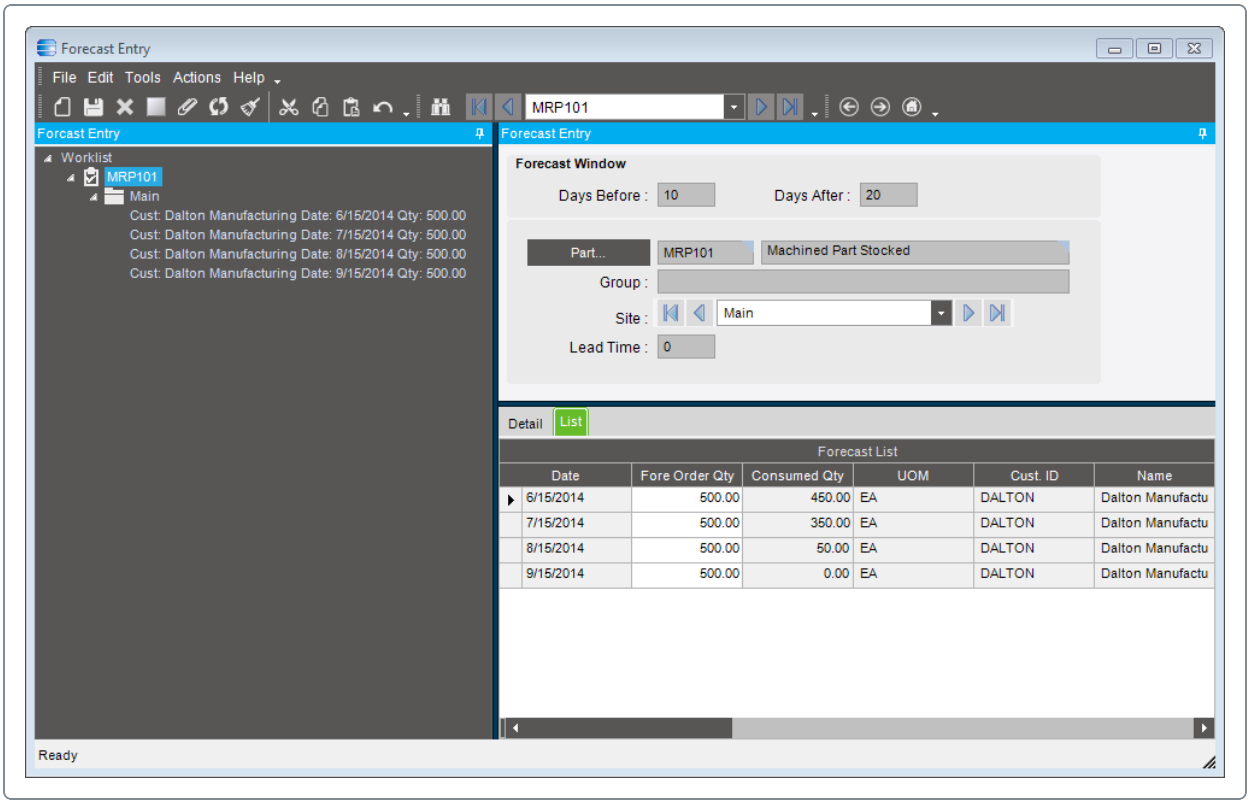


8/8/2014	100.00	0.00	300.00	EA	Job: MRP00000000632
8/8/2014	0.00	50.00	250.00	EA	SO: 5380/1/6
8/15/2014	400.00	0.00	650.00	EA	Job: MRP00000000633
8/15/2014	0.00	450.00	200.00	EA	Forecast:500.00000000 DALTON
9/15/2014	500.00	0.00	700.00	EA	Job: MRP00000000634
9/15/2014	0.00	500.00	200.00	EA	Forecast:500.00000000 DALTON

Notice that throughout the results, the MRP engine uses the forecast to help even out the demand. The remaining quantities not actually consumed by Dalton Manufacturing are still considered demand quantities, so jobs are generated to account for this additional demand. When the MRP engine calculates the entire forecast, it plans that a 700 quantity of part MRP101 should be available within inventory on 09/15 for distribution as you need.

You can also review how the MRP engine consumes the forecast details within Forecast Entry. The next page displays the results of the forecast after it was included in the MRP calculation.

To display the MRP forecast results, you open the forecast for part MRP101 and click on the List sheet. Each forecast detail is displayed along with the actual quantity consumed each month by the sales order releases from Dalton Manufacturing.



You can now use these MRP results as a guide for creating the production schedule for part MRP101. You could start by changing the dates on the unfirm jobs and running the MRP process again. Eventually you will receive results that display available balance amounts that can be delivered on time as requested by Dalton Manufacturing. You will also create jobs for additional quantities that will hopefully be consumed by future sales orders you predict will come from Dalton Manufacturing.

Master Production Schedule

A Master Production Schedule (MPS) is a record you can use to predict quantities that your manufacturing center will produce. This program is valuable when you want to schedule production quantities that you plan to manufacture in advance of receiving the actual order.

Like forecast records, the MRP engine uses these records to generate demand for the selected part.

Please note the difference between a forecast and a master production schedule (MPS). A forecast is a sales prediction for when a specific part quantity will need to be shipped. A master production schedule is a manufacturing prediction for when a specific part quantity will need to be produced.

A forecast can be turned into a master production schedule, which can in turn be used to update material quantities to better distribute the load against your manufacturing center's capacity. Also note that if a forecast and a master production schedule are created for the same part, the MRP engine overrides the forecast record with the master production schedule record.

While determining job suggestions and unfirm jobs, the MRP engine will account for existing sales orders and jobs that occur at the same point in the schedule. For example, if a 10 quantity is indicated on a master production schedule and a job exists for a 5 quantity (for the same part), then the MRP engine will generate a 5 quantity job suggestion to account for the remaining quantity on the master production schedule. Likewise, if a sales order is created for a 13 quantity at the same point, it will generate an 8 quantity job suggestion.

Other demand sources never reduce the quantity on the master production schedule, they can only add to this quantity. For example, if the master production schedule has a quantity of 10 and a sales order has a quantity of 8, the job suggestion will use the 10 quantity. If this sales order had a quantity of 13, however, then the job suggestion also has a 13 quantity.

Modifiers

The following section describes the Master Production Schedule values you can change.

These are the values you can modify for this item:

- **Part**-The part that will be used for this master production schedule.
- **site**- The site that will manufacture the part quantity defined on each master production schedule.
- **Due Date**-The date on which production should be completed to satisfy the master production schedule.
- **Production Quantity**- The quantity that needs to be produced by the Due Date.
- **Copy from Forecast**- This is an Actions menu command that you can use to pull a forecast record into a master production schedule. The forecast values are incorporated into the master production schedule.

Where Located

You can access the Forecast functionality through the following locations.

- **Forecast Entry**-Use this program to create the forecast records. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.
- **Process MRP**- The MRP engine uses forecast records to create job suggestions to satisfy future demand. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Master Production Schedule functionality uses this logic to calculate its results.

To account for forecasts that might be included within a master production schedule, there are two sets of bucket logic. One set of logic calculates the demand created by any forecasts (sales orders) that are added to the MPS. The other set of logic calculates jobs generated because of the values defined within the MPS. The MRP engine uses the following calculations for this bucket logic:

- Prior MPS Detail + 1 to Current MPS Detail = Jobs that satisfy MPS Demand
- Current MPS Detail to Next MPS Detail- 1 = Sales orders that will be supplied by MPS Production if the Order Required Quantity is > the increase in MPS Quantity
- If a master production schedule is in use and a sales order is placed, MRP uses either the quantity found within the MPS or the quantity found within the sales order, whichever is greater.

Example(s)

The following example(s) illustrate how you use the Master Production Schedule functionality.

Constant Stock Example

Because you want to maintain a constant stock quantity for Part 8734-A throughout the year, you decide to create a master production schedule for this part at your Vancouver site. You select Part 8734-A, and add twelve details to this schedule. Each MPS detail has Due Date set to the 20th of each month and a Production Quantity of 500.

As the MRP engine calculates demand for Part 8734-A, it will discover that a 500 quantity for part 8734-A is required each month. Twelve job suggestions are generated. Each job suggestion will use the Due Date as the Required By Date, and each will be set to produce the 500 quantity.

Sales Order 1 Example

A sales order is created for Part 234-902A that requires a 25 quantity. You also have a 50 quantity required on a master production schedule. Both demand requirements are due on the same date.

The MRP engine generates a job suggestion for the 50 quantity.

If the sales order and/or job material demand is less than a 50 quantity at this point, the master production schedule will still produce the 50 quantity. The MRP engine always uses the greater demand quantity on its job suggestions.

Sales Order 2 Example

A sales order is created for Part 234-902A that requires a 75 quantity. You also have a 50 quantity required on a master production schedule. Both demand requirements are due on the same date.

The MRP engine generates a job suggestion for the 75 quantity. This logic is identical to the previous example, as the MRP engine always uses the greater demand quantity on its job suggestions.

Method of Manufacturing

A Method of Manufacturing is the process through which a part is produced. Each method is made up of two components: a bill of operations, or routing, and a bill of materials.

The bill of operations defines the various tasks that need to be run in order to manufacture the part. The bill of materials specifies the materials required to complete the part.

The scheduling engine uses these items to determine how long it will take to produce a job. The MRP engine calls the scheduling engine to get this information for the Start Date and End Date on unfirm jobs and purchase suggestions. It does this by reviewing each level on the bill of operations. It checks the first assembly (0) to evaluate the demand requirements for the operations contained on this level. Then it moves to the next assembly, evaluate the demand requirements, then move again, and so on, until all the demand requirements in the bill of operations are evaluated. Each operation has an amount of total time it requires in order to run from start to finish; this value is used by the scheduling engine to determine the Start Date for each operation.

You can create methods of manufacturing on part, job, and quote records. A part record is created by using the Engineering Workbench. A job method is created through Job Entry. A quote method is designed within Opportunity/Quote Entry. Each method can be defined as a template for a part. Note however, that the MRP engine will use only the method defined on a part record to generate purchase suggestions and unfirm jobs.

Also note that methods determine whether the MRP engine generates an unfirm job or a job suggestion. If the engine finds a part that has a method, it creates an unfirm job. If the engine finds a part that does not have a method, it creates a job suggestion.

It is crucial that you have a solid method of manufacturing designed for each part that will be processed through the MRP engine. Doing so will ensure that your job, transfer order, and purchase suggestions achieve accurate results.

Modifiers

The following section describes the Method of Manufacturing values you can change.

These are the values you can modify for this item:

- **Assembly**- Each of these items defines a specific step, or component, on a job or quote method that will produce each material quantity required to make the final part quantity. A method can have one assembly or multiple assemblies. An assembly can contain one or more subassemblies and a subassembly can become a parent assembly by containing one or more subassemblies.

  This hierarchy lets you engineer part methods of manufacturing that are as simple or as complex as you need. You can create a method that details the entire production flow of a part by creating assemblies and sub-assemblies. Also, you can create a method that references component parts as materials. In this case, the MRP engine will view these materials as

separate demand requirements and create job suggestions to handle the separate material requirements. Each assembly has its own number and material requirements.

A parent assembly is any assembly that is made up of one or more child subassemblies. Parent assemblies are used by the engine to determine the correct manufacturing hierarchy of the operations defined for the job. The hierarchy lets the scheduling engine calculate when each operation should begin and end - which then results in the engine calculating the final Start Date and End Date on a job. The dates are, in turn, passed along to the MRP engine.

- **Operation**- These items define the various processes your company uses to manufacture products. Operations are manufacturing actions like Welding, Painting, Engineering, and so on. There are two types of operations - those you perform through your company and those that you subcontract out to an outside supplier. You set up the primary values for an operation within the Operation Maintenance program.

  Use this program to define the default resources, resource groups, and capabilities that are needed to run the operation. One or more resources are required for each operation. To create a accurate schedule for completing jobs, you will need to measure how long it takes to complete each operation. There are four types of time that make up the complete time for each operation. These time types are not, however, used by the MRP engine. They are values used by the scheduling engine to calculate the total it will take to complete the job. These are the time types:

  - **Queue Time**- The amount of time a part quantity must wait before work begins on it at the resource.
  - **Setup Time**- The amount it takes to prepare for production on the part quantity.
  - **Production (Run) Time**- The amount it takes to manufacture a part quantity.
  - **Move Time**- The amount it takes to transport a part quantity to its next stage of manufacturing. When these times are defined, the scheduling engine can then calculate the Start Date for each operation.
- **Materials**- These are the items needed to produce the production quantity defined on the job. The required items are defined in the job's Bill of Materials that is included as part of the job method. Materials can be stock or non-stock items.

  Materials can be constrained, which means that the materials must be available before the engine will schedule an operation. If the engine discovers that the constrained material cannot be issued to the operation at a specific time, it will locate another time when the material can be issued. You indicate whether material is constrained on its part record. If the material is a Make Direct or a Purchase Direct part, it is automatically considered constrained by the scheduling engine. If a material's part record is defined as Purchase Direct, these materials are also automatically constrained by the PO Date on the purchase order.

  If the material is defined as a **Plan As Assembly**, this material node within the method of manufacturing can be split off as a subassembly and turned into a separate job. When not enough inventory quantity is available, this causes the MRP engine to automatically split the material into its own unfirm job. The material node is also turned into a subassembly within the job method. The split job now must satisfy the material requirements on the subassembly.

Where Located

You can access the Method of Manufacturing functionality through the following locations.

- **Opportunity/Quote Entry**- You can define a method of manufacturing for a part through this program. The part's method of manufacturing is useful for designing the quote. and the methods can be defined as templates. They can be used later by the jobs that will produce the parts defined on the original quotes. You can locate this program from the Main Menu by opening the Sales Management folder, the Quote Management folder, and the General Operations folder.
- **Engineering Workbench**- This tool lets you create methods of manufacturing for part revisions. The methods can be defined as templates. They can be used later by the jobs that will produce the parts engineered through this tool. You can locate this program from the Main Menu by opening the Production Management folder, the Engineering folder, and the General Operations folder.\
- **Job Entry**- The method defined on each job record will be used to produce the parts. The MRP engine will use the method to calculate Start Date and End Date values for each operation and ultimately the entire job. The materials needed to produce the parts are determined by the method defined for the part. Note that you can create methods here that can then be defined as templates. The methods can be used later by the jobs that will produce the same parts. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the General Operations folder.
- **Get Details**- Use this program to pull a method of manufacturing template into a job, quote, or part record. Then you can use the method on these records or make further modifications as you need. You launch this program from the Actions menus within Opportunity/Quote Entry, Job Entry, and the Engineering Workbench.

Logic/Algorithms

The Method of Manufacturing functionality uses this logic to calculate its results.

The MRP engine does not evaluate part methods directly. Instead, it calls the scheduling engine to calculate how long it will take to produce each job. The MRP engine then pulls the Start Date and End Date calculated by the scheduling engine for the unfirm jobs that it generates.

To determine how long it will take to produce each job, the scheduling engine considers a number of items. Some of these items include the length of time it will take to produce the part quantity on each operation, whether some assemblies can run at the same time, the availability of constrained materials for specific operations, and so on.

Example(s)

The following example(s) illustrate how you use the Method of Manufacturing functionality.

Part Omega has a method of manufacturing that contains three assemblies: two for manufactured parts Alpha and Beta and one for the final assembly (Assembly 0) that combines the Alpha and Beta parts to create the Omega part.

The assembly for Part Alpha contains three operations: Mold, Cool, and Grind. The Mold operation requires a Plastic material component; this is a constrained (required) material on this operation. Because of this contraint, the Part Alpha assembly cannot begin until these materials, or purchased parts, are available at the site.

The assembly for Part Beta contains three operations: Mold, Cool, Grind, and Paint. Like Part Alpha, the Mold operation requires a Plastic material component; this is a constrained (required) material on this operation. Because of this contraint, the Part Beta assembly also cannot begin until these materials, or purchased parts, are available at the site.

The assemblies for Part Alpha and Part Beta can run at the same time (concurrently), so once the Mold operation on both assemblies receives the Plastic material, work on a job for Part Omega can begin.

You have a master production schedule for Part Omega that has a production quantity of 100 and a Due Date of 4/15. To make the finished quantity, you need to manufacture a 100 quantity for both Part Alpha and Part Beta. The scheduling engine calculates that it will take two days to complete each operation for Part Alpha, and three days to complete each operation for Part Beta. It will also take three days to assemble these parts to produce a 100 quantity of Part Omega.

The MRP engine uses the method of manufacturing to calculate how this demand requirement will be handled. You run the Process MRP program, using a Scheduled Start Date of 3/12. The MRP engine calculates the following suggestions:

- A purchase suggestion for the Plastic material for Part Alpha. This suggestion has a Due Date of 4/1.
- A purchase suggestion for the Plastic material for Part Beta. This suggestion has a Due Date of 4/1.
- A job suggestion for Part Omega. This suggestion has a quantity of 100 and a Due Date of 4/15.

MRP Code Customization

You can customize the MRP process to generate results that best match your production flow and also improve MRP performance.

If you are a C# programmer, leverage this functionality to create dlls you can then insert through the available Process Maintenance programs. When the MRP process runs, these dlls interrupt the MRP logic and run using their customized logic. When the MRP process completes, the results reflect your custom code.

The base item used during MRP processing is a queue. Each queue defines the sequence order in which it is run, whether you run it in full regeneration mode only, if its scheduling should use the finite calculation, the number of outbound queues available, and other parameters. Queues in the system are gathered into groups and all the queues in the group are processed at the same time. A group may contain one or multiple queue records. Before moving to the next group, all queues must

complete processing. Only the last queue record in a block should indicate what queues to listen for before moving on to the next queue.

Each MRP process run requires at least two process control files - a controller file and a listener file. The control file runs the main MRP process driver. You use this file to first build the initial MRP processing queues you define for the process, and then determine when the MRP process can move on to the next available queue. The listener file is the MRP driver that processes each queue record and then moves the record to the next queue within the MRP process. You determine the sequence of the MRP queues by creating a process queue record.

If your MRP code customization generates an error and you are unable to fix it, you can always restore the original MRP process. To do this, launch the System Administrator Console and run the MRP conversion program to reset the process back to the installed default settings.

Where Located

You can access the Queue functionality through the following locations.

- **Process Queue Maintenance** - Use this program to create the various queues you wish to run during your customized MRP process. Process queues are the primary building blocks you manipulate during the MRP process that determine what demand records are evaluated by the MRP process.

  Main Menu Path: **Production Management > Material Requirements Planning > Setup > Process Queue**

- **Process Control Queue Maintenance** - You launch this program to link your custom .p code files to specific queue records. You also define the group you wish to use with your custom queue records. You can also define the order in which the queues are launched. You can select multiple queues for each .p code file.

  Main Menu Path:**Production Management > Material Requirements Planning > Setup > Process Control Queue**

- **Process Control Maintenance** - Use this program to define the overall parameters you wish to run with each custom .p program. You can define whether the process is a controller or a listener file, the number of processors you can run with the custom file, and the specific queue records that the process must check before the custom process is complete. Main Menu Path:

  Main Menu Path:**Production Management > Material Requirements Planning > Setup > Process Control**

Part

Part records contain the base information that the MRP engine requires to generate suggestions. The MRP engine can calculate the quantity requirements for both Manufactured and Purchased part types.

- For purchased part quantities, the MRP engine uses the Production Calendar linked to the supplier to determine when the purchased part quantities will arrive at your manufacturing center.
- For each manufactured part, the MRP engine first determines whether or not the part has a method. If the MRP engine discovers a part record that does not have a method, it generates a job suggestion that will appear in the Job Manager. A planner can then turn this job suggestion into an unfirm job by creating or assigning a method to it.

If the MRP engine discovers a part record that has a method of manufacturing, it generates an unfirm job that will appear in Job Entry. At the same time, the MRP engine calls the scheduling engine, which in turn evaluates all the materials required to manufacture the final part quantity and the length of time it takes to run the operations. This information is passed back to the MRP engine to generate the Start Date and End Date on the unfirm jobs.

Part records also contain modifiers that define how the MRP engine will calculate demand for each part record. The modifies define how the MRP engine will generate items like inventory quantities, which revision level to use, and the planning time required to purchase or manufacture quantities for this part. You can define, for example, the Minimum Lot Size, Maximum Lot Size, and other quantity values to calculate the part quantities displayed on each suggestion.

You define the MRP values within Part Maintenance on both the Part - Detail sheet and the Part - sites - Detail sheet. The majority of the MRP modifiers are found on the Part - sites - Detail sheet, which lets you reflect how each site handles manufacturing and purchasing for the current part. Thus, the MRP engine calculates suggestions and unfirm jobs that accurately reflect production differences you might have between each site.

When a part is selected in a forecast, a master production schedule record, or some other demand source, the MRP engine pulls the manufacturing needs defined on the part method (if one exists) to determine where to place this demand and generate suggestions or unfirm jobs.

Modifiers

The following section describes the Part values you can change.

These are the values you can modify for this item. Notes that all quantity values that are defined in the part master file (for example, Min On Hand, Max On Hand, Min Lot Size are specified in the base unit of measure for the part:

- **Auto-Consume Stock -** When you select this check box, you indicate that when MRP creates a job, it should verify the on hand quantities when a part being used as material is marked as Pull As Assembly on the job's parent part. When the MRP engine evaluates an auto-consumed part, it uses the Available to Promise calculation to determine whether stock is available for materials marked as Pull As Assembly, when required by the job. The expected stock on hand quantity for the material is then set as a Pull Quantity on the subassembly, and the production quantity for the subassembly is reduced by the pull quantity.

  The Available to Promise calculation determines when some of this material quantity will be available in the future. This quantity amount is then considered when the MRP engine

calculates whether an unfirm job (or jobs) should be created for the subassembly through the Plan As Assembly functionality.

- **Generate PO Suggestions**- If this check box is selected, purchase suggestions will be automatically created for this part. Note that this check box is selected on manufactured parts by default, to account for any subcontract operations that might need to be purchased for the job method.
- **Inventory: Minimum On-Hand** - This is the smallest quantity of this part that should be stocked for inventory. When this part's current On-Hand value falls below this value, a purchasing or job suggestion will be generated.
- **Inventory: Maximum On-Hand** - This is the largest quantity of this part that should be stocked for inventory. When this part's current On-Hand value exceeds this value, no purchasing or job suggestions will be generated.
- **Inventory: Safety Stock** - This value defines an additional inventory quantity that will be stocked in case of emergency.
- **Lead Time** - A modifier which defines the number of days that pass between the day the purchased parts are ordered from a supplier and the day the parts arrive at the site. This value is used by the MRP engine to both calculate the lead time window (MRP Scheduled Start Date + Lead Time) and the Order By Date on a purchase order suggestion. If you use the Consume Minimum Quantity calculation, you can define two Lead Time values for each part-site detail record. The Lead Time you enter within the Purchasing section indicates the number of days used on typical PO suggestions, while the Lead Time you enter within the Urgent Planning section indicates the number of days used on PO suggestions that must be resolved more quickly.
- **Maximum On-Hand** - This value defines the largest quantity of this part that can be stocked in inventory. When a part's current On-Hand Quantity is equal to or higher than this value, the MRP engine will not generate job or purchase suggestions against this part.
- **Minimum On-Hand** - This value defines the smallest quantity of this part that will be stocked in inventory. This value is used as a trigger by the MRP engine. When a part's current On-Hand Quantity is lower than this value, the MRP engine will generate job or purchase suggestions against this part-site detail.
    - **MRP Planning: Days of Supply**- This value defines how many days into the future MRP will look in order to calculate the quantity needed on a job or purchasing suggestion. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.
- **Minimum Order Quantity** - This value defines the smallest quantity that must be placed on each PO suggestion. When a PO suggestion generates, it uses this value or higher for its quantity. If you use the Consume Minimum Quantity calculation, you can define two Minimum Order Quantity values on part-site records. You can define the Minimum Order Quantity (Min

Order Qty) value in the Purchasing section for typical purchases, while the value you define in the Urgent Planning section is used for more immediate purchases.

- **MRP Planning: Minimum Lot Size**- This value defines the smallest quantity that can be manufactured or purchased for this part. If the total demand quantity is less than this quantity, the MRP engine creates a single job or purchase suggestion that uses this value for the quantity. If this is a job suggestion, the extra quantity will be automatically recorded to inventory. For example, if four parts are required and the Min Lot Size is set to 10, MRP will create a job for 10 parts, six of which are added to stock.
- **MRP Planning: Maximum Lot Size**- This value defines the highest quantity that can be manufactured or purchased for this part. If the total demand quantity is greater than this quantity, the MRP engine creates two or more job/purchase suggestions that use this value for the quantity on each suggestion. For job suggestions, the extra quantity will be automatically recorded to stock. For example, if MRP creates an unfirm job for 100 parts and the Max Lot Size is set to 40, three jobs are created: two jobs for 40 parts and a third job for 20 parts.
- **MRP Planning: Multiple**- This value defines the quantity increments that will be placed on each job or purchase suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. For example, if a demand quantity is 379 and the Multiple value is defined as 100, the MRP engine will create a job suggestion that has a 400 part quantity. The extra quantity will be recorded to inventory automatically. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.
- **Multiple Order Quantity** - This value defines the multiple quantity value used on urgent PO suggestions to calculate the purchase quantity. For example, if you enter a 100 in this field, the PO suggestions will always generate quantities rounded up in hundreds like 200, 400, 600, and so on. This value is only calculated if you activate the Consume Minimum Quantities calculation.
- **Non-Stock Item** - When selected, this check box indicates that this part is not normally stocked as part of inventory. How the MRP engine handles this part changes depending on the part type:
    - **Manufactured**- When a manufactured part is a non-stock part, all demand for this part will be satisfied by jobs. If the demand comes from a sales order or transfer order, the sales order/transfer order is linked to a job that will satisfy its demand. If the demand comes from another record that uses this part on a sub-assembly, the demand is satisfied by creating a sub-assembly level on the original job. When the manufactured part is a stock part, it indicates that all demand for this part will be satisfied from inventory; allocations will be created to pull this part quantity on the sales order's Needed By Date.
    - **Purchased**- When a purchased part is a non-stock part, the demand for part will be satisfied by purchase orders. The purchase orders are linked to the job or transfer order that created the demand. The MRP engine will create a purchase suggestion for the part. When a purchased part is a stock part, the demand for this part will be satisfied from inventory; allocations will be created to pull this part quantity on its Required By Date.

    - **Sales Kit**- A sales kit part is not calculated by the MRP engine. The component parts that make up a sales kit, however, will generate job, purchase, and transfer order suggestions. When all the component part quantities are manufactured, the sales kit is ready to be assembled. This process, however, is handled outside of the MRP engine.
- **Part Class**- These records contain values that you can assign as a default to each part. The default values include the Buyer and Supplier, as well as MRP modifiers like Receive Time, Planning Time Fence, and so on. These values will be the default for each part record. However, you can override these values on a specific part record. You create part classes using the Part Class Maintenance program. You select part classes on part records within Part Maintenance on the Part sheet.
- **Part Type**- There are three part types available. Depending on the part type, different fields become active that define how MRP will calculate suggestions against this part record:
- **Manufactured**- This value indicates that the part is produced by your company. The MRP engine will create job suggestions against the part record and any purchase suggestions for materials that need to be ordered from suppliers.
- **Purchased**- This value indicates that you need to purchase the part from a supplier. The MRP engine will create purchase suggestions against the part record.
- **Sales Kit**- A sales kit part is not calculated by the MRP engine. The component parts that make up a sales kit, however, will generate both job, transfer order, and purchase suggestions. When all the component part quantities are manufactured, the sales kit is ready to be assembled. This process, however, is handled outside of the MRP engine.
- **Planning: Production Prep Buffer**- This value defines how many days are required to prepare for a job before it can be released to your manufacturing center for production. The MRP engine uses this value when calculating the Planned Action Date on this part's job suggestions. This buffer can be used with the Kit Time to calculate the total amount of time it takes to plan the job. If you use the Multi-Site module, you can leave this field blank. The Production Prep Buffer defined on the site record (Production Prep Time) will be used instead.
- **Planning: Kit Time**- This value defines how long it takes to assemble the final part quantity. The Kit Time is used only on manufactured parts; the MRP engine uses it to calculate the End Date for any materials in the parent part's assembly. If an assembly does not have any sub-assemblies, the Kit Time is subtracted from the Start Date. This value can be used with the Production Prep Buffer to calculate the total amount of time it takes to plan the job. Note that this value is not related to the sales kit functionality. Iif you use the Multi-Site module, you can leave this value blank. The Kite Time defined on the site record will be used instead as the default value.
- **Planning: Planning Time Fence**- This value defines a date range for the part. If a Due Date on a job, transfer order, or purchase order is on a date that falls between the Scheduled Start Date plus this value, the MRP engine will not change (quantity and date) these records. This Planning Time Fence affects all records contained within the current site. You can leave this field blank; if you do, the Planning Time Fence value defined within the Part Class is used instead.
- **Planning: Reschedule In Time Delta**- This value defines a date range during which the MRP engine will be prevented from rescheduling supply suggestions that occur in the future. Any future supply with a Due Date that is less than or equal to this value will not generate a new

suggestion. This value prevents the application from generating suggestions upon which you cannot act.

- **Planning: Reschedule Out Time Delta**- This value defines a date range during which the MRP engine will be prevented from rescheduling demand suggestions that occur in the future. Any future demand with a Due Date that is less than or equal to this value will not generate a new suggestion. This value prevents the application from generating suggestions upon which you cannot act.
- **Planning: Receive Time**- This value defines the number of days that are required to move the part quantity either to stock or the next job.
    - If this is a manufactured part, the MRP engine adds this value to the Due Date of the job suggestion. For example, you are a commercial airplane manufacturer. It will take your company several days to transport the plane to another facility to stock it or to continue work on it. You enter a Receive Time to account for this transport, or receive, time.
    - If this is a purchased part, the MRP engine subtracts this value from the End Date to calculate the correct Supply Date for purchase suggestions. This value accounts for the time required to both unpack and inspect a part quantity. For example, you receive some plastic parts at your dock. It will take two days to unpack these parts and inspect them for defects.
    - If a Receive Time is not required, you can set this value to 0. You can also leave this field blank; in this case, the Receive Time defined within the Part Class record is used instead. Part Class records let you create blanket values that you can then assign to parts.
- **Primary UOMs- Inventory** - This specifies the primary or base inventory UOM (Unit of Measure) code for a part (for example, Each, Feet, Inches). It designates the unit of measure in which inventory balances are stored in the Epicor application. The Epicor application always performs MRP calculations using the base UOM code assigned to the part in this field. The base UOM usually the smallest UOM in which the a part is normally stocked, and is the default UOM code for most inventory related transactions in the Epicor application.This is always the case, regardless of the setting of the Track Multiple UOMs check box for the part in the Part Maintenance - Part - Detail sheet. If the Track Multiple UOMs check box has been selected for a part, it first converts quantities and units of measure entered into transactional programs to the base unit of measure for the part before performing MRP calculations and generating suggested jobs, transfers or purchase orders.
- **Primary Warehouse**- If the part record is for a stock part, this value defines the main warehouse that will contain the manufactured or purchased parts. The MRP engine does not directly use this value. Part quantities that are manufactured/purchased through a suggestion or unfirm job, however, are placed in this warehouse through an inventory transaction.
- **Process MRP**- You must select this check box indicate that this part will be included during the MRP processing calculation. If this check box is clear, the MRP engine will ignore this part.
- **Quantity Bearing**- Select this check box to indicate that the part record has complete inventory functionality. Transactions to and from stock will be used to calculate the inventory quantity for this part. The MRP engine will use the inventory values to calculate job or purchase suggestions.

- **Re-Order to Max** - Select this check box to indicate that the MRP engine will create inventory demand requirements using the Maximum On-Hand quantity. When the On-Hand Stock quantity is less than the Minimum On-Hand quantity, an inventory demand suggestion (or suggestions) is created that uses the Maximum On-Hand value plus any quantity below the Minimum On-Hand quantity. The actual size of this quantity on each suggestion depends on the Maximum Lot Size defined within either the MRP Planning or the Short Horizon Planning group boxes. If the total quantity from this inventory demand source is greater than the Maximum Lot Size, then two or more suggestions are generated.
- **Rough Cut Code** -- Defines the rough cut parameters you want calculated against a part revision. Rough cut parameters add additional time to setup, fixed, variable, and/or subcontract times calculated during rough cut scheduling. Select the rough cut code you need from the drop-down list; you create these codes within Rough Cut Parameter Maintenance.
- **Run Out**- When selected, this check box indicates that the part is being discontinued by your company, but an On-Hand Quantity for this part remains within inventory. If another part or parts will be used to satisfy demand against this part record, these parts are defined on Substitutions sheet. The MRP engine will not, however, mix quantities of these parts on the same suggestion. Depending on how the run out part is used, the MRP engine will generate suggestions differently:
    - **Co-Part**- If this run out part is one being produced on the job, it will only create a suggestion for the run out part. The substitute part is not included during this calculation.
    - **Material Part**- If this run out part is used as a material on a method of manufacturing, the MRP engine will only generate suggestions against the substitute part. It ignores the run out part during this calculation.
- **Short Horizon Planning: Horizon Days**- If the demand Due Date falls between the Scheduled Start Date plus the Horizon Days, the MRP engine will use the Short Horizon Minimum and Maximum lot sizes and Days of Supply to generate the job or purchase suggestions. These values override the normal lot sizes defined within the MRP Planning section. Note that the MRP engine will use the Multiple value from the MRP Planning section to determine the multiplier that creates part quantity values on the MRP suggestions. If there is not a value within the Horizon Days field, the Short Horizon functionality is not active on this part-site detail.
- **Short Horizon Planning: Minimum Lot Size**- This value indicates the smallest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range. If a demand's Due Date is less than or equal to the current date plus the Horizon Days range, this alternate Minimum Lot Size value will be used instead of the MRP Planning value.
- **Short Horizon Planning: Maximum Lot Size**- This value indicates the highest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range. If a demand's Due Date is less than or equal to the current date plus the Horizon Days range, this alternate Minimum Lot Size value will be used instead of the MRP Planning value.
- **Short Horizon Planning: Days of Supply** - This alternate value defines how many days into the future MRP will look to calculate the quantity needed on a job or purchasing suggestion - if the demand falls within the Short Horizon. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is

the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.

- **Supplier** - You can select the default supplier and purchase point used on generated PO suggestions on purchased part records. Each part-site detail can have two default suppliers -- one supplier for normal purchases and other supplier for urgent planning. if you activate the Consume Minimum Quantities calculation, the default supplier for urgent planning is used in some situations.
- **Track Multiple UOMs** - This check box specifies if inventory balances for a particular part should be stored in a single base inventory unit of measure (for example, Each), or if inventory balances for the partthey should be stored and tracked in multiple units of measure (for example, Each, Feet, Inches). However, the Epicor application always uses the base UOM code assigned to the part in the Primary UOMs - Inventory field, regardless of the setting of the Track Multiple UOMs check box when tracking WIP inventory, calculating purchase order suggestions, or performing MRP calculations.
- **Use Part Rev** - The MRP engine uses this check box to determine the revision level that will be used on non-stocked parts. This check box is found on the Part sheet. When this check box is selected, it indicates that the MRP engine calculates suggestions using the current revision of the part. The part number on the suggestions automatically displays the most current revision; the application calculates this by using the most recent Effective Date on an approved revision. Also note that if an unfirm job exists and a new revision is approved, the MRP engine creates the suggestions using the new revision. If this check box is clear, the MRP engine uses the revision level defined on the sales order that created the requirement. Use this feature to have the MRP engine create job suggestions based on the revision required for each customer. If you do not use MRP, this check box is not available. This functionality is also not available for make to stock part quantities; it only runs if the Make Direct check box is selected on the order release.

Where Located

You can access the Part functionality through the following locations.

- **Part Maintenance**- You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Part functionality uses this logic to calculate its results.

Part Detail Table

The PartDtl table is a flat table that contains all the part needs defined within your company database. The MRP engine references the information within this table to calculate its job, transfer order, and purchase suggestions.

Inventory Quantity

- If a part's On-Hand Quantity is < the Minimum On-Hand Quantity, create a job or purchase suggestion using the following calculations:
- If the Re-Order to Max check box is selected, then the suggestion's Quantity = Maximum On-Hand Quantity - (Safety Quantity + On-Hand Quantity)
- If the Re-Order to Max check box is clear, then the suggestion's Quantity = Safety Quantity + Minimum On-Hand Quantity - On-Hand Quantity

Safety Stock Quantity

If a part's On-Hand Quantity is < the Safety Stock Quantity, create a job or purchase suggestion. The MRP engine uses the following equation to calculate the quantity for the suggestion: Suggestion Quantity = Safety Stock Quantity - On-Hand Quantity

MRP Planning - Lot Sizes

This is how the MRP engine calculates lot sizes for each suggestion:

- If the required quantity is < the Minimum Lot Size quantity, then create a suggestion that = the Minimum Lot Size quantity.
- If the required quantity is > the Maximum Lot Size quantity, then divide the quantity into two or more suggestions.
- If a Multiple value is defined, then round the suggestion quantity up to the nearest multiple.

Days of Supply Date Range

- Days of Supply Start Date = Date on which On-Hand Quantity < Minimum On-Hand Quantity
- Days of Supply Date Range = Days of Supply Start Date + Days of Supply

Short Horizon Planning - Lot Sizes

- Short Horizon Date Range = Scheduled Start Date + Short Horizon
- If a suggestion's Due Date occurs within the Short Horizon Date Range, the Short Horizon is used instead. This is how the MRP engine calculates lot sizes for suggestions that use the Short Horizon:
    - If the required quantity is < the Minimum Lot Size quantity, then create a suggestion that = the Minimum Lot Size quantity.
    - If the required quantity is > the Maximum Lot Size quantity, then divide the quantity into two or more suggestions.
    - If a Multiple value is defined, then round the suggestion quantity up to the nearest multiple.

Supply Logic

This is the logic that the MRP engine uses to satisfy demand:

- Manufactured, non-stock part - This supply is handled by jobs.
- Manufactured, stock part- This supply is handled by inventory allocations.

- Purchased, non-stock part - This supply is handled by purchase orders.
- Purchased, stock part- This supply is handled by inventory allocations.

Planning Time for Specific Part

- Planning Time = Production Prep Time Buffer + Kit Time

Planning Time Fence

- If a record's Due Date is the Scheduled Start Date + Planning Time Fence, then the record cannot be changed.

Reschedule Time Delta

You define both the Reschedule Time In Delta and the Reschedule Time Out Delta to 5 days.

- For the Reschedule Time In Delta, this means that additional suggestions will not be created if a supply source is available five days or less in the future. If the demand source's date is 7/15 and the supply source date is 7/18, the MRP engine will not create an additional suggestion for 7/15. Instead , it will calculate that the original suggestion will come on 7/15.
- For the Reschedule Time Out Delta, this means that additional suggestions will not be created if a demand source is five days or less in the future. If the supply source's date is 7/15 and the demand source date is 7/18, the MRP engine will not create a suggestion.

Receive Time

The Receive Time is used differently depending on whether the part is manufactured or purchased:

- Manufactured: Due Date = Final Assembly Completion Date + Receive Time
- Purchased: Supply Date = Due Date- Receive Time

Example(s)

The following example(s) illustrate how you use the Part functionality.

Example One

If a part assembly on a job has a Scheduled Start Date of August 15th and the part's Production Prep Buffer is set to 4, then the Planned Action Date will be August 11th. If a part assembly on a job had a Scheduled Start Date of August 15th and the part's Kit Time is defined as 2, then the Planned Kit Date is August 13th.

Example Two

If a part assembly has a start date of August 1st and a Required By Date of August 22nd, and the Receive Time is set to 4, then the End Date is set to August 18th to allow 4 days for the part to be received before the part is required.

Example Three

If a part has a Kit Time of 5, a Production Prep Buffer of 10, and a job Start Date of August 15th, the Planned Kit Date is August 10th and the Planned Action Date is August 1st. Combining the Kit Time with the Production Prep Buffer creates a Planned Action Date that is 15 days before the actual Start Date of the part assembly.

A commercial airplane manufacturer provides an example of how this works. The manufacturer might need several days to transport the plane to another facility either to stock it or to continue working on the plane. The company will want the days in transit to affect the job's Due Date.

Example Four

If a part has a Receive Time set to 3 and the Production Prep Buffer set to 2, then when the job is rescheduled, 5 days are added to the overall job schedule to achieve the Due Date.

Example Four

A part is stored and tracked in multiple units of measure.The base UOM for the part is set to Each in the Primary UOMs - Inventory field, and the part comes packed 10 each per box. If we receive two cases and five individual units of the part, the manner in which the resulting inventory quantities are displayed and reported is dependent on the setting of this check box.

- If the Track Multiple UOMs check box check box has been cleared (inventory quantities tracked in the base UOM only), an inventory report run after receipt would show that we have 25 Each in stock.
- If the Track Multiple UOMs check box has been selected (inventory quantities tracked in multiple UOMs), the inventory for the part is simultaneously stored in multiple units of measure. An inventory report run after receipt would show that we have two boxes and five Each in stock.

However, the Epicor application always uses the base UOM code assigned to the part in the Primary UOMs - Inventory field, regardless of the setting of the Track Multiple UOMs check box. In this case, it uses the in-stock quantity of 25 Each in MRP calculations for the item, even if the Track Multiple UOMs check box has been selected and inventory balances are being tracked in multiple units of measure.

Part Class

A Part Class lets you define several values that you can use as defaults on your part records. Part Class records ensure that you are using uniform default values for any parts that are linked to a part class.

To link a part to a part class, select the class within Part Maintenance on the Part sheet.

Part classes primarily let you define values that are used for purchasing materials. Like parts, however, you can also create multiple site records that define how MRP values will be calculated for each site that manufactures or processes the parts linked to this class. The site records save you

time, as you do not need to select the values individually on each part record. When you define a part class on a part, the default values will be used during MRP processing.

Modifiers

The following section describes the Part Class values you can change.

These are the values you can modify for this item:

- **Approved Suppliers**- When you click this button, you can define which suppliers can be used for purchasing parts linked to this part class. When you link suppliers to a part class, they are available for all parts that use this part class during the purchasing requisition process.
- **Buyer**- This value determines the default buyer that will be used for parts that belong in this class. All Authorized Users that are linked to this buyer record will be able to make purchases for parts that belong to this class.
- **Consolidated Purchasing**- When selected, this check box indicates that the purchase suggestions from this part class can be combined across multiple companies within your organization. You can select this check box if your company uses the Multi-Site module.
- **Planning Time Fence**- This value defines a date range for the part class. If a Due Date on a job, transfer order, or purchase order is on a date that falls between the Scheduled Start Date plus this value, the MRP engine will not change (quantity and date) these records. The Planning Time Fence affects all records for the current site.
- **Receive Time**- This value defines the number of days that are required to move a part quantity either to stock or to the next job.
    - If this is a manufactured part, the MRP engine adds this value to the Due Date of the job suggestion. For example, you are a commercial airplane manufacturer. It will take your company several days to transport the plane to another facility to stock it or continue work on it. You enter a Receive Time to account for this additional time.
    - If this is a purchased part, the MRP engine subtracts this value from the End Date to calculate the correct Supply Date for purchase suggestions. This value accounts for the time required to both receive and inspect a part quantity.
- **Reschedule In Time Delta**- This value defines a date range during which the MRP engine will be prevented from rescheduling supply suggestions that occur in the future. Any future supply with a Due Date that is less than or equal to this value will not generate a new suggestion. This value prevents the application from generating suggestions upon which you cannot act.If a Receive Time value is not required, you can set this value to 0.
- **Reschedule Out Time Delta**- This value defines a date range during which the MRP engine will be prevented from rescheduling demand suggestions that occur in the future. Any future demand with a Due Date that is less than or equal to this value will not generate a new suggestion. This value prevents the application from generating suggestions upon which you cannot act.
- **Split PO Line**- When selected, this check box indicates that different purchase orders can be created from a single purchase suggestion based on comments. For an example of these comments, review the Examples section below. This feature is located in the New PO

Suggestions Entry program. If this field is clear, a purchase suggestion will always create one PO. Note that this functionality is used after the MRP engine generates suggestions. The engine creates only one suggestion that can be split later.

Where Located

You can access the Part Class functionality through the following locations.

- **Part Class Maintenance**-- You locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.

Logic/Algorithms

The Part Class functionality uses this logic to calculate its results.

- If the Planning Time Fence value is not defined on the part record, then use the Planning Time Fence value defined on the Part Class.
- If the Receive Time value is not defined on the part record, then use the Receive Time value on the Part Class.
- If the Reschedule Time In Delta value is not defined on the part record, then use the Reschedule Time In Delta value on the Part Class.
- If the Reschedule Time Out Delta value is not defined on the part record, then use the Reschedule Time Out Delta value on the Part Class.

Example(s)

The following example(s) illustrate how you use the Part Class functionality.

Split PO Example One

Part DSS-1000 is requested by two different operation lines on a job. The MRP engine creates one purchase suggestion for this part quantity. If the Split PO Line check box is selected and the Purchasing comments are different for each operation line, two purchase orders are created when the suggestion is turned into a PO. If the check box is clear, the parts will be combined onto a single purchase order.

Split PO Example Two

A steel bar has a unit of measure of 12 inches. The MRP engine generates a single purchase suggestion for a 20 quantity. The Split Operation check box is selected on the class. If the comments on one job operation indicate the requirement needs to be cut to 8 inches and another comment indicates it needs to be cut to 6 inches, the New PO Suggestion Entry program will create two purchase order records, one for each length that is required to be purchased.

site

A site is a physical facility used to producing parts within your manufacturing center. The facility might have one or more locations that contain the machines and skill sets used to manufacture parts. These locations and skills sets are the resources and resource groups linked to the site.

Each site must have at least one warehouse used to stock and distribute parts. A warehouse does not need to be unique to each site; warehouses can be shared with several sites.

Also, each part can be linked to multiple sites. Either the part is produced within the site (a manufactured part) or it is used at that site (a purchased part). The MRP engine considers the On-Hand Quantity available for each part as the total sum of the quantities in all warehouses linked to the site. If a warehouse is shared by two or more sites, the material in the warehouse is considered available in all sites that share the warehouse.

You define the MRP modifiers used for each site within both site Configuration Control and site Maintenance. site Configuration Control contains the Unfirm Job Prefix, the Firm Job Prefix, and the Production Yield Default options. You use the site Maintenance - Detail sheet to define the Production Calendar used by the site, its Finite Horizon, Production Prep Time and other values. It also contains values you use to indicate how this site handles transfer orders.

Modifiers

The following section describes the site values you can change.

These are the values you can modify for this item:

- **Allow Consumption of Minimum Quantity** -- Select this check box to activate the Consume Minimum Quantity calculation. When you activate this calculation, you cause both the MRP and PO Suggestion processes to use an another level of lead time calculations. When certain supply conditions are met within the purchase lead time, an additional set of Urgent Planning parameters activate. These parameters use the Minimum Quantity available within inventory to satisfy demand while at the same time generate purchase orders suggestions that require more immediate resolution. You can then reduce the gaps that can occur when standard lead times spread out demand though lengthy time intervals.
- **Auto Firm Horizon** - Use this field to define a date range the MRP process uses for generating firm jobs. Any demand records with Need By dates that fall within this date range automatically generate jobs that have the Firm status. If any previously generated unfirm jobs fall within this horizon, the MRP process automatically turns these unfirm jobs into firm jobs as well. These jobs are then ready to both engineer and release to your manufacturing center. Any demand records with Need By dates outside this horizon, however, automatically generate jobs that use the Unfirm job status.
- **Calendar**- Use this field to define the Production Calendar that will be used for the site. Each production calendar defines the Working Days and Non-Working Days during which the site will be available during the year. The number of hours that the site is available each Working Day is defined in these records.

- **Finite Horizon**- This value defines the limit at which the MRP engine will stop using the Finite Capacity calculation against a resource at the site, and switch to the Infinite Capacity calculation. The Finite Horizon is added to the Scheduled Start Date (defined on the Process MRP program) to determine the last date on which the Finite Capacity calculation is used. When a job suggestion is finitely scheduled, the demand its operations place against the resources at the site cannot be greater than their available capacity. When a job is infinitely scheduled, however, this limit is ignored, allowing the job suggestion to be scheduled based on when its required completion date. When the MRP engine creates a job suggestion that has an End Date past this date range, the job suggestion is infinitely scheduled.
- **Firm Job Prefix**- This value defines the job number prefix that will be applied to all job suggestions and ultimately job records generated by the MRP engine that are ready for production. When a job record is firm, it can no longer by updated by the MRP engine. You update this modifier in the site Configuration Control program.
- **Include in Manufacturing Lead Time** - Use this series of check boxes to indicate what additional times to include with the manufacturing lead times for the current site. Each option you select adds more time to manufacturing lead times for parts produced and/or consumed in this site. Available options:
    - **Kit Time** - Select this check box to indicate the time it takes in days to assemble manufactured parts will be included during the manufacturing lead time calculation. Only used on manufactured parts, the MRP engine uses it to calculate the End Date for any materials within the parent part's assembly. This value is defined on site records and part records.
    - **Lead Time** - Select this check box to indicate you want to include the purchasing Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes purchased part quantities to arrive at your site.
    - **Receive Time** - Select this check box to indicate you want to include the Receive Time values in this calculation. This value is defined on part records, and it indicates how long it takes, in days, to move purchased part quantities from the shipping dock to the resources that need them.
    - **Rough Cut Parameters** - Select this check box to indicate any rough cut parameters defined on product groups or part revisions will be included in the manufacturing lead time calculation. These parameters add extra time for the setup, fixed, variable, and subcontract values used for generating the rough cut schedule. Each set of parameters is defined on a rough cut parameter code; you set up each code within Rough Cut Parameter Maintenance and then select these codes within Part Maintenance and/or Product Group Maintenance.
    - **Transfer Lead Time** - Select this check box to indicate you want to include the Transfer Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes part quantities to arrive at your site from other locations within your organization.
- **Kit Time**- This value defines how long it takes to assemble the final part quantity. The Kit Time value is used only on manufactured parts; the MRP engine uses it to calculate the End Date for any materials in the parent part's assembly. If an assembly does not have any sub-assemblies, the Kit Time is subtracted from the Start Date. This value can be used with the

Production Prep Buffer to calculate the total amount of time it takes to plan the job. Note that this value is not related to the sales kit functionality.

- **Overload Horizon** -- Defines the number of days from the current date the scheduling engine uses to create job records within the Shop Load table. These overloaded resource records then display in the Shop Load Graph and the Overload Informer.
- **Production Preparation Time**- This value defines how many days are required to prepare and create a job before it can be released to your manufacturing center for production. The MRP engine uses this value when calculating the Start Date on this part's job suggestions. The preparation time can be used with the Kit Time to calculate the total amount of time it takes to plan a job at the site.
- **Production Yield Default**- Select this check box to indicate that some automatic functions will occur when a quantity changes on a job or a job suggestion. These changes are caused by a Production Yield Calculation that may result when MRP processing is run. You update this modifier in the site Configuration Control program. Selecting the check box activates these options:
    - **Adjust Job Quantities**- Select this check box to indicate that the application will automatically change the quantities on the suggestions generated through this site.
    - **Send Adjustment Alert**- Select this check box when you want the application to create an email message each time a quantity is changed on a suggestion.
- **Rough Cut Horizon** -- This value indicates the number of days from the Scheduled Start Date used for Rough Cut Scheduling. The Rough Cut Scheduling calculation gathers the Need By Dates and Lead Time values on each material and operation in a part method. It then uses these values to calculate how much time is required for each job to finish its operations and gather its materials. Note however that the generated data, or load, is not recorded against your resources.
- **Unfirm Job Prefix** -- This value defines the job number prefix that will be applied to all job suggestions and ultimately job records generated by the MRP engine that are not yet ready to commit for production. When a job record is unfirm, it can be adjusted by the MRP engine each time the Process MRP program is run. You update this modifier in the site Configuration Control program.
- **Unfirm Series Horizon**-- This value defines a date threshold for when the MRP engine switches from using the Firm Job Prefix to the Unfirm Job Prefix to generate job numbers.
- **Use Dynamic Days of Supply in Lead Time** -- You select this check box to activate the Use Dynamic Days calculation. When this calculation is active, the MRP engine checks for points when the Net On-Hand Quantity is either below or above the Reorder Quantity (Minimum Quantity + Safety Stock Quantity). If the MRP engine discovers one of these points, it first determines the End Date using the Days of Supply value. It then checks for the next available supply quantity after this End Date value. The date on this next supply quantity is now used instead as the new End Date, and the Days of Supply calendar range increases. All of the demand included in the new End Date is added to the On-Hand Quantity to determine the amount to increase or reduce on the purchase suggestion, job suggestion, or unfirm job.

Where Located

You can access the site functionality through the following locations.

- **site Maintenance**- You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **site Configuration Control**- You can locate this program from the Main Menu by opening the System Management folder and the Company Maintenance folder.

Logic/Algorithms

The site functionality uses this logic to calculate its results.

- Total Quantity Available = Warehouse A Total Quantity + Warehouse B Total Quantity + Warehouse C Total Quantity + and so on

Example(s)

The following example(s) illustrate how you use the site functionality.

You manufacture parts 897-342 and 734-128 at the Blue site. You create a site record that defines the main production values for the site. It uses Warehouse 7 to store its part quantities. It also generally takes two days to prepare for production, so you enter 2 within the Blue site's Production Prep Time field.

You now create part records for 897-342 and 734-128; you create Part-site details for both parts that use the Blue site.

When the MRP engine generates suggestions for these manufactured parts, it will use the values defined on both the part and site records.

Product Group

Product groups let you classify the different types of parts that you sell. These groups are used mainly for financial and sales analysis purposes.

The MRP engine, however, does pull one value from each product group - the Planner.

A planner is the person responsible for turning job suggestions into unfirm jobs, evaluating the job method, and ultimately approving these jobs for production. They approve the jobs by clearing the Unfirm check box for each record within Job Entry.

You can define an overall planner for each product group. You can also link sites to each product group; each site detail can specify a planner. Thus, you can define multiple planners for each product group.

Product groups are selected on part records within the Part Maintenance program. As the MRP engine generates job suggestions, either the default planner for each product group or the default planner for a specific site will be used on the suggestion.

Modifiers

The following section describes the Product Group values you can change.

These are the values you can modify for this item:

- **Planner**- When a job suggestion is generated, the Planner defined on the part record's product group or product group site detail appears in the Job Entry program. If you need, however, you can change this value on each job record.
- **Rough Cut Code** -- Defines the rough cut parameters you want calculated against all parts linked to this product group. Rough cut parameters add additional time to setup, fixed, variable, and/or subcontract times calculated for rough cut scheduling. Select the rough cut code you need from the drop-down list; you create these codes within Rough Cut Parameter Maintenance.

Where Located

You can access the Product Group functionality through the following locations.

- **Person Maintenance**- Use this maintenance program to enter the individuals who will be the planners for your manufacturing center. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Product Group Maintenance**- Product groups classify the different kinds of parts that your company produces. Use this maintenance program to identify an individual who will be the overall planner for the product group. If you need, you can link sites to each product group, which lets you select a specific planner on each site detail. Thus, you can define multiple planners for each product group. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Part Maintenance**- You define the product group that will be used for each part record on the Part sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Job Entry**- Each job is assigned to a planner. The planner defined on the part's product group appears by default. If you need, however, you can change this value. You locate this program from Main Menu by opening the Production Management folder, the Job Management folder, and the General Operations folder.

Logic/Algorithms

The Product Group functionality uses this logic to calculate its results.

The MRP engine checks for planners using the following logic:

- If a Planner value is defined on a product group's site- Detail sheet, use the Planner on a job suggestion.
- If a Planner value is not selected on a site-Detail record, but a Planner is defined on a part's Product Group - Detail sheet, use this Planner on a job suggestion.
- If a Planner is selected on a job record, override the Planner generated by the job suggestion.

Example(s)

The following example(s) illustrate how you use the Product Group functionality.

Bruce McCoy is your main job planner for your Pipe Fittings product group. Your company manufactures many parts that use this classification, however, so you also define the main sites that produce these parts. You indicate that Malena Jones is the planner for the Red site, and Peter Smith is the planner for the Blue site.

When the MRP engine runs, it reviews the sites that will manufacture the parts. Any job suggestions for parts manufactured at the Red site will use Malena Jones as the planner. Any job suggestions for parts manufactured at the Blue site will use Peter Smith as the planner. If any Pipe Fittings parts are manufactured in other sites not defined on the product group, Bruce McCoy will appear as the planner.

Rough Cut Parameters

You use rough cut parameters to define any additional time you need to include during the Rough Cut Scheduling calculation. Use these parameters to more accurately reflect your typical production schedule.

Four rough cut parameter types are available - Setup, Fixed, Variable, and Subcontract. You can define a percentage value for each type. When the rough cut scheduling calculation determines the amount of time needed for each time type, the final time amount is increased by these percentage values. You can also define minimum and maximum values for each time type to limit the additional time added by the scheduling calculation. If the final value calculated by this percentage falls above or below these values, the minimum or maximum values are used instead during the rough cut scheduling calculation.

Each set of parameters is grouped together under a specific code. You then select these rough cut parameter codes on product groups and part revisions. The product group defines the default rough cut parameter set used on all the parts assigned to that group. If you select a different rough cut parameter code on a part revision however, this parameter set overrides the values defined on the product group.

The values calculated through Rough Cut Scheduling are used by the Manufacturing Lead Time Calculation to determine the estimated completion time for materials and final assembly parts. The MRP engine then use these lead time values to determine if a job can be split using a Start Minimum Quantity. The split job will then produce this minimum quantity value before the remaining quantity can be manufactured.

Modifiers

The following section describes the Rough Cut Parameter values you can change.

Available rough cut parameter modifiers:

- **Fixed** -- Defines an additional percentage to calculate against all fixed time values indicated on methods of manufacturing. The total time is increased by this percentage amount. You can

also define a Minimum Change and a Maximum Change value; the fixed time values cannot be less than or greater than these parameters.

- **Setup** -- Defines an additional percentage to calculate against all setup time values indicated on methods of manufacturing. The total time is increased by this percentage amount. You can also define a Minimum Change and a Maximum Change value; the setup time values cannot be less than or greater than these parameters.
- **Subcontract** -- Defines an additional percentage to calculate against all subcontract time values indicated on methods of manufacturing. The total time is increased by this percentage amount. You can also define a Minimum Change and a Maximum Change value; the subcontract time values cannot be less than or greater than these parameters.
- **Variable** -- Defines an additional percentage to calculate against all variable time values indicated on methods of manufacturing. The total time is increased by this percentage amount. You can also define a Minimum Change and a Maximum Change value; the variable time values cannot be less than or greater than these parameters.

Where Located

You access the Rough Cut Parameters functionality through the following locations.

- **Part Maintenance** -- You can define the rough cut parameters used by a specific part revision. To do this, you select a Rough Cut Code on the Part - Revisions - Detail sheet. These parameters override any parameters defined on the product group linked to the part (if any). You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Site Maintenance** -- You indicate whether a specific site uses rough cut parameters on the Detail > Planning sheet. To do this, select the Rough Cut Parameters check box. The Manufacturing Lead Time Calculation then includes all rough cut parameters selected on product groups and part revisions in its calculated results. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Product Group Maintenance** -- Product groups classify the different kinds of parts that your company produces. You can select a Rough Cut Code on each product group; any parts linked to the product group then use these rough cut parameters to determine manufacturing lead times. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Rough Cut Parameter Maintenance** -- Use this maintenance program to define the rough cut parameters you want to include in the Rough Cut Scheduling calculation. You can create as many rough cut codes as needed; you select these codes on various product groups and part revisions. You locate this program from the Main Menu by opening the Production Management folder, the Scheduling folder, and the Setup folder.

Logic/Algorithms

The Rough Cut Parameter functionality uses this logic to calculate its results.

Rough Cut Parameter Hierarchy

1. **Product Group** -- If a Rough Cut Code is defined on the product group, use these parameters for all parts linked to this group.
2. **Part Revision** -- If a Rough Cut Code is assigned to a part revision, use these parameters for the part revision. These parameters override the rough cut parameters defined on the product group.

Parameter Logic

- **Fixed Time Value** = Fixed Time x Fixed Modifier Percentage

  If Fixed Time Valve > Max Change Value, then use Max Change Value

  If Fixed Time Valve < Min Change Value, then use Min Change Value

- **Setup Time Value** = Setup Time x Setup Modifier Percentage

  If Setup Time Valve > Max Change Value, then use Max Change Value

  If Setup Time Valve < Min Change Value, then use Min Change Value

- **Subcontract Time Value** = Subcontract Time x Subcontract Modifier Percentage

  If Subcontract Time Valve > Max Change Value, then use Max Change Value

  If Subcontract Time Valve < Min Change Value, then use Min Change Value

- **Variable Time Value**= Variable Time x Variable Modifier Percentage

  If Variable Time Valve > Max Change Value, then use Max Change Value

  If Variable Time Valve < Min Change Value, then use Min Change Value

Example(s)

The following example(s) illustrate how you use the Rough Cut Parameter functionality.

When production workers set up operations to build Part 84546-T, your machines frequently need to be recalibrated to process the size of the requested quantity. You create a rough cut parameter code that multiplies setup times by 25%. You then select this Rough Cut Code on the revisions for Part 84546-T. When the rough cut scheduling calculation is run, all setup times on each operation for this part are automatically increased by 25%.

Supplier

Suppliers define the organizations from whom you will purchase materials needed during the manufacturing process. These records contain information required for buying materials from each supplier, including the purchasing terms, purchase point locations, contacts, and so on.

The MRP engine uses supplier records to generate purchase suggestions. Each purchasing suggestion is linked to a specific supplier. If you decide that you want to use a purchasing suggestion, it is turned into a purchase order that will be sent to the supplier. The Required By Date and the Quantity on the purchase order will be calculated by the MRP engine.

The MRP engine uses the Calendar defined on a supplier record to determine when the parts will arrive at your manufacturing center. You can select a different production calendar for each supplier record.

Modifiers

The following section describes the Supplier values you can change.

These are the values you can modify for this item:

- **Calendar**- This modifier defines the Production Calendar that you will use with this supplier. The Working Days and Non-Working Days are used by the MRP engine to determine how long it will take materials to arrive at your manufacturing center.
- **Minimum Order Value**- Use this modifier to define the lowest total amount that can be allowed for purchase orders placed with this supplier. Use this value to avoid ordering small purchase quantities that are below your company's normal order quantity from a supplier. When a purchase order is created that is less than this value, a warning message appears and you can correct the order. Note however, that the message does not prevent you from completing the purchase order.
- **Inactive**- Select this check box to indicate that you are no longer making purchases from this supplier. The MRP engine will no longer generate purchase suggestions using this supplier record.

Where Located

You can access the Supplier functionality through the following locations.

Supplier Maintenance

Menu Path

Navigate to this program from the Main Menu:

- Financial Management > Accounts Payable > Setup > Supplier
- Financial Management > Multi-Site > Setup > Supplier
- Material Management > Inventory Management > Setup > Supplier
- Material Management > Purchase Contracts Management > Setup > Supplier
- Material Management > Purchase Management > Setup > Supplier

- Material Management > Supplier Relationship Management > Setup > Supplier
- Production Management > Job Management > Setup > Supplier
- Production Management > Quality Assurance > Setup > Supplier
- Service Management > Expense Management > Setup > Supplier
- Service Management > Time Management > Setup > Supplier

Logic/Algorithms

The Supplier functionality uses this logic to calculate its results.

Assigning a Supplier to a Suggestion

The MRP engine goes through a logical progression to determine which supplier to assign to a purchasing suggestion. This is the logic sequence that is used:

1. First, the engine checks for the material (part) that is required on an operation. Within the database, this record is found on the JobMTL/JobOper table within the method of manufacturing.
2. When the material is determined, the engine identifies which site will receive this purchased material. It does this by reviewing the part record for the purchased material. Within the database, this record is found on the Partsite table within the part record.
3. Then the engine searches for the most recent purchase order created for this part. It uses the supplier on the purchase order for the purchase suggestion.
4. Lastly, the engine uses the most recent price list to determine the unit price for the purchase suggestion.

Minimum Order Value Calculation

- If the Purchase Order Total of is less than the Minimum Order Value, then display an alert.

Example(s)

The following example(s) illustrate how you use the Supplier functionality.

As part of your production workflow, you need to purchase sheet metal material for use in your Blue site. The supplier who usually has the best prices is ABC Metals. Within the Part Maintenance program, you add a site (Part-site) detail to your Sheet Metal part record. You select ABC Metals as the default supplier for this site.

When the MRP engine calculates purchase suggestions for the Sheet Metal part, the generated PO's will use ABC Metals as the supplier.

Transfer Orders

Transfer Orders are internal requests for parts that occur between sites within your organization. You indicate that a part can be transferred to another site within Part Maintenance.

To do this, the part record must be a manufactured or a purchased part. You then create two part-site details that use the transfer type value. One site detail is defined as the source for the transfer part quantity; the other site detail is set up to receive this transfer part quantity.

Transfer orders are handled through the Inventory functionality. If you need to transfer parts within the same site, you instead use the Inventory Transfer program.

The MRP engine automatically creates transfer order suggestions during its calculations. It does this by monitoring the On-Hand Quantity available within the receiving part-site detail. When it encounters that this part-site detail's On-Hand Quantity is below its Minimum On-Hand Quantity, a transfer order suggestion is created for both sites. One suggestion is the demand record, while the other suggestion is the supply record.

The supply record suggestion uses the Transfer Order Need By Date. This record is applied against the receiving site. Any resulting MRP calculations use this date to determine when the transfer part quantity must arrive at the receiving site. The demand record suggestion, however, calculates the Transfer Order Request Date. This record is applied against the source site. Any resulting MRP calculations use this date to determine when production or purchasing must begin at the source site.

Transfer order suggestions are handled in the same way as purchase and job suggestions. Users can accept or reject them. If the transfer order suggestion is accepted, it becomes a transfer order that will be included as a demand source during the MRP process.

When the MRP engine is next run, it will create different types of records depending on whether the transfer part is manufactured or purchased:

- If the transfer part is manufactured, it will create either an unfirm job or a job suggestion (if it cannot find an approved method of manufacturing) as a supply record for the source part-site detail.
- If the transfer part is purchased, it will create a purchase suggestion as a supply record for the source part-site detail.

Non-Stock Versus Stock

The transfer order suggestions are calculated differently for non-stock and stock parts. These are the differences:

- **Non-stock parts** - Either an unfirm job/job suggestion or a purchase suggestion is created on the source site for the specific transfer part quantity.
- **Stock parts**- The MRP engine will first determine the On-Hand Quantity available at the source site. If there is enough quantity available, no suggestions are generated. If some of the

quantity is available, however, the quantity on the unfirm job/job suggestion or purchase suggestion will be reduced by the On-Hand Quantity amount.

Modifiers

The following section describes the Transfer Orders values you can change.

These are the values you can modify for this item. These values are all defined within Part Maintenance on its Part - sites - Detail (part-site) sheet:

- **Type**- This drop-down list activates the transfer order functionality. If this part-site detail will be used to handle transfer orders, select the Transfer option. This causes both the site and the Transfer Lead Time fields to be available.
- **site**- The source site from which the part quantity will be transferred. All the sites available within your application are displayed on this list; select the site that will manufacture this part quantity for the receiving site.
- **Transfer Lead Time**- This modifier indicates how many days it will take for the part quantity to arrive from the source site to the receiving site. This value is the default lead time value for the transfer order suggestion. The scheduling engine uses this value to calculate the Transfer Order Request Date for unfirm jobs that will be manufactured at the source site. This value is applied to the TFOrdDtl record.

Where Located

You can access the Transfer Orders functionality through the following locations.

- **Part Maintenance**- You indicate that a part will be used for transfer order transactions within its part record. You do this by creating two part-site details. One detail is the manufacturing source site for the part, while the other site is the receiving site for the part. You locate this program from the Main Menu by opening the Material Management folder, the Inventory Management folder, and the Setup folder.
- **site Maintenance**- You create site records within this maintenance program. You can then select this records for part-site details. You locate this program from the Main Menu by opening the Material Management folder, the Inventory Management folder, and the Setup folder.
- **site Configuration Control**- Use this program to set up how sites interact with functions such as Inventory Management, Production Management, and Shipping/Receiving. You first create site records through site Maintanence. You can then open each record within site Configuration Control to define various parameters for several application functions. You locate this program from the Main Menu by opening the System Management folder and the Compamy Maintenance folder.
- **Transfer Order Workbench**- Transfer order suggestions are displayed within the Transfer Order Workbench. Use this program to edit, reject, and approve transfer order suggestions. When you finish accepting/rejecting the transfer order suggestions, return to the Transfer Order Entry program to complete entry of these orders. You access this program within

Transfer Order Entry. To do this, click on this program's Actions menu and select the Transfer Order Workbench command.

- **Transfer Order Entry**- Use this program to create and edit transfer orders. If you approve a transfer order suggestion on the Transfer Order Workbench, it will then appear within this program. You can edit this transfer order as you need. As long as its status is Open, the MRP engine can generate additional transfer order suggestions against it, which you can then use to update the open transfer order. When the transfer order is closed, however, it will no longer be included within the MRP demand calculations. You locate this program from the Main Menu by opening the Material Management folder, the Inventory Management folder, and the General Operations folder.

Logic/Algorithms

The Transfer Orders functionality uses this logic to calculate its results.

- **Manufactured Part**- If the Receiving site On-Hand Quantity > Minimum On-Hand Quantity, then create transfer order suggestions for both the Receiving site and Source site and an unfirm job/job suggestion or the Source site.
- **Purchased Part**- If the Receiving site On-Hand Quantity > Minimum On-Hand Quantity, then create transfer order suggestions for both the Receiving site and Source site and a purchase suggestion for the Source site.
- **Existing Transfer Order**- If a transfer order exists for a transfer part, generate a suggestion and a job suggestion/unfirm job or purchase suggestion for the part-site detail.
- Transfer Order Request Date = Transfer Order Need By Date- Transfer Lead Time

Example(s)

The following example(s) illustrate how you use the Transfer Orders functionality.

site Alpha needs to stock Part 567-89K, as it is a material needed for another part it manufactures. You manufacture Part 567-89K internally within site Beta. You launch the Part Maintenance program and create a part-site detail for site Beta, entering the MRP details you need for this part.

You then create another part-site detail for site Alpha. In the Type section, you indicate that this is a Transfer part. You then indicate that site Beta will be the source for Part 567-89K. Within the Transfer Lead Time field, you also define that it usually takes 3 days to receive part quantities from site Beta. You then enter a Minimum On-Hand Quantity value of 100.

When the On-Hand Quantity at site Alpha becomes 99 or less, the MRP engine will generate both a transfer order suggestion and an unfirm job for Part 567-89K.

Primary Calculations and Values

There are a number of values and calculations used by the MRP engine. Most of these values are either defined by you or are automatically generated by the engine.

In turn, these values are factored into the main calculations that the MRP uses to generate the unfirm jobs, job suggestions, and purchase suggestions.

Available to Promise

The Available to Promise calculation places the total demand for a part on a specific date against the supply available on that same date. Depending on the demand required and supply available on that date, the ATP total quantity is either a positive or a negative value; a positive or zero value indicates enough supply is available on that date, while a negative value indicates that more supply is needed.

The results of this calculation are displayed within the Available to Promise program; each date has its own column (or bucket) on a grid; an ATP total value for that date displays on the bottom row.

To add together demand on a specific date column, the calculation totals the quantities of all sales order releases whose Need By dates either fall on or before the date. For example, sales order 237 has three releases - release 1 has a 5/14 Need By date, release 2 has a 5/15 Need By date, and release 3 has a 5/16 Need By date. Each release is for a 50 quantity. If no supply is available for the part quantities by 5/16, the Available to Promise calculation displays a -150 ATP quantity on the 5/16 date column.

Now in order to add together supply on a specific date, the Available to Promise calculation reviews all the forecast, master production schedule, transfer order, job receipt, and PO receipt quantities scheduled to be available on a specific date. The calculation does this by reviewing the Forecast Date value on the forecast detail, the Due Date value on the master production schedule detail, the Need By date on a transfer order release, the Due Date value on a PO release, and the Due Date value on a job. The detail lines that fall on a specific date are added as supply quantities available on that specific date column.

If this total supply quantity is less than the demand quantity on this date, the entire quantity is consumed and a negative value displays for the ATP total on this date column. If this total supply quantity is greater than the demand quantity, a positive ATP value displays for the total on this date column. The remaining supply quantity is then included in the next date column, as the Available to Promise calculation assumes that this remaining supply quantity exists in stock.

Planning Contracts

If a job material is Constrained and is linked to a planning contract, the Scheduling engine considers only planning Warehouse/Bin when searching for material availability. A material that is NOT linked to a planning contract cannot use inventory in a contract location (warehouse/bin).

You link planning warehouse/bin to a contract in Planning Contract Maintenance. For more information, refer to the **Planning Contract Maintenance** topic in the Application Help.

On the supply side, the Scheduling engine only considers supply linked to a planning contract. You link a planning contract to a purchase order in Purchase Order Entry.

Supplies in a planning contract location (warehouse/bin) are not considered when running scheduling for Constrained job materials that are NOT linked to a planning contract.

Future Demand

The Available to Promise calculation also considers future demand as it generates the ATP totals. If a future demand quantity exceeds supply on a certain date, this quantity is subtracted from the supply quantities available on previous dates until it consumes all of the available supply and encounters a negative ATP total on a preceding date column. So even though enough supply may be available on a specific date, the Available to Promise calculation provides an accurate picture of the actual supply by including upcoming demand quantities.

Lead Time

To prevent too much future demand from being placed against supply quantities, the Available to Promise calculation uses the Lead Time value on part-site records to limit how much demand is placed against preceding date columns. When you enter a Start At date within the Available to Promise window, all sales order releases due on or before the Start At date plus the Lead Time are included as demand in the ATP totals. Any demand that falls on a date beyond the Lead Time window is ignored, as the calculation assumes that you have enough time to fulfill this future demand.

Purchase Order Threshold Rule

One key feature of the Available to Promise calculation is that it ignores amounts from any purchase order release that is more than two days late (overdue) from the Start At date. The calculation considers any PO release that is over two days late to be invalid, as these quantities should have arrived by the Start At date. If you expected a quantity on a specific date and it has not arrived, you most likely need to open the purchase order and adjust the dates to reflect the future date on which the quantity will actually arrive.

Modifiers

The following section describes the Available to Promise values you can change.

- **Sales Order Releases**-The calculation uses the quantity requested on each sales order release and its Need By date value to determine the demand quantity required on a specific date. The total sales order release quantity on a specific date displays within the Order row on the Available to Promise window.

- **Forecast Details**- The calculation uses the quantity on each forecast detail and its Forecast Date to determine the forecast quantity predicted to be available on each date. The total forecast detail quantity available on a specific date displays within the Forecast row on the Available to Promise window.
- **Master Production Schedule (MPS) Details**- The calculation uses the quantity on each master production schedule detail and its Due Date to determine the MPS quantity predicted to be available on each date. The total MPS detail quantity available on a specific date displays within the MPS row on the Available to Promise window.
- **Transfer Order Lines**-The calculation uses the quantity requested on each transfer order detail line and its Need By date value to determine the demand quantity expected to be available on each date. The total transfer order detail line quantity available on a specific date displays within the Transfer Order row on the Available to Promise window.
- **PO Release**- The calculation uses the quantity on each PO release and its Due Date to determine the PO release quantity predicted to be available on each date. Note that if the PO release is more than two days in the past, however, the release is not included in the Available to Promise calculation. The total PO release quantity available on a specific date displays within the Receipt row on the Available to Promise window.
- **Job Receipt**- The calculation uses the quantity on each job and its Due Date to determine the job receipt quantity predicted to be available on each date. The total job receipt quantity available on a specific date displays within the Receipt row on the Available to Promise window.

Where Located

You can access the Available to Promise functionality through the following locations.

- **Available to Promise**- Run this program to review what quantities for a specific part are available to ship on a specific date. You locate this program by opening the Material Management folder, the Inventory folder, and the General Operations folder. You can also launch this program by right-clicking a Part ID field; from the content menu, highlight the Open With... sub-menu and select Available to Promise.

Logic/Algorithms

The Available to Promise functionality uses this logic to calculate its results.

- Total Demand Quantity (Specific Date) = Total of All Order Releases that have Need By dates on a specific date + Any Previous Unresolved Demand Quantity
- Total Supply Quantity (Specific Date) = Total of All Forecast Detail Quantities, MPS Quantities, Transfer Order Quantities, PO Release Quantities, and Job Receipt Quantities available on a specific date + Any Previous Stock Quantities Not Consumed
- Available to Promise Quantity (Specific Date) = Total Supply Quantity- Total Demand Quantity

Example(s)

The following example(s) illustrate how you use the Available to Promise functionality.

You want to see the Available to Promise calculation in action through a simple test run. To do this, you create ATPTest01, a purchase part record. This part record has a part-site Lead Time value of 15 days.

You now create a sales order that contains a series of order releases requesting this part. You enter the following order release values, where Today is the current date plus or minus the listed days:

Order Release	Need By Date	Quantity
1	Today - 10 Days	10
2	Today - 8 Days	5
3	Today - 3 Days	6
4	Today - 2 Days	3
5	Today - 1 Day	12
6	Today	8
7	Today + 5 Days	1
8	Today + 10 Days	32
9	Today + 20 Days	45

The sales order defines the total demand for this purchased part.

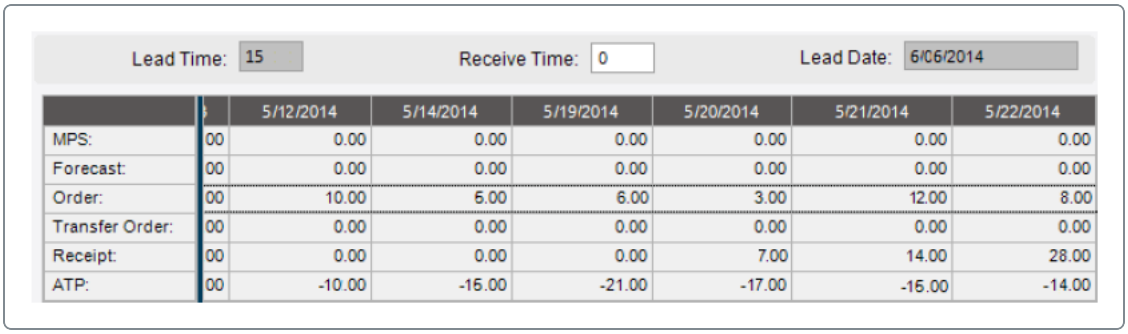
You now enter the total supply available for this part. For this example, you decide to limit the supply records to purchase order releases. To do this, you create a single PO that contains the following PO release schedule and incoming quantity values, where Today is the current date plus or minus the listed days:

PO Release	Due Date	Quantity
1	Today - 10 Days	1
2	Today - 7 Days	2
3	Today - 3 Days	3
4	Today - 2 Days	7
5	Today - 1 Day	14

PO Release	Due Date	Quantity
6	Today	28
7	Today + 4 Days	6
8	Today + 9 Days	8
9	Today + 19 Days	11

You now launch Available to Promise and enter ATPTest01 in the Part field; the current date displays in the Start At field. Notice that for this example a date of 05/22 is used.

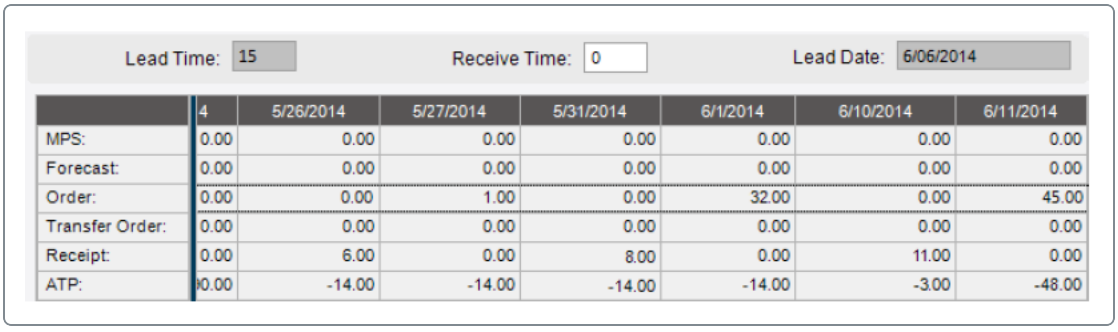
The Available to Promise grid displays the following results for the first half of the Lead Time date range:


Lead Time: 15 Receive Time: 0 Lead Date: 6/06/2014

	5/12/2014	5/14/2014	5/19/2014	5/20/2014	5/21/2014	5/22/2014
MPS:	0.00	0.00	0.00	0.00	0.00	0.00
Forecast:	0.00	0.00	0.00	0.00	0.00	0.00
Order:	10.00	6.00	6.00	3.00	12.00	8.00
Transfer Order:	0.00	0.00	0.00	0.00	0.00	0.00
Receipt:	0.00	0.00	0.00	7.00	14.00	28.00
ATP:	-10.00	-16.00	-21.00	-17.00	-16.00	-14.00

Notice that the PO thresehold rule automatically ignores the PO releases scheduled on 5/19 or earlier. The first supply quantity the Available to Promise calculation includes is the 7 quantity on 5/20. The demand placed against this part continues to accumulate, however, so the total demand on 5/20 is -24, but the 7 supply quantity reduces the ATP total to a -17 quantity.

As you continue to review the results, you see that the the Available To Promise calculation generates a -14 quantity on 5/22. A future demand quantity is included in this total, so you need to scroll to the right to see where this future demand value hits in the schedule:


Lead Time: 15 Receive Time: 0 Lead Date: 6/06/2014

	5/26/2014	5/27/2014	5/31/2014	6/1/2014	6/10/2014	6/11/2014
MPS:	0.00	0.00	0.00	0.00	0.00	0.00
Forecast:	0.00	0.00	0.00	0.00	0.00	0.00
Order:	0.00	1.00	0.00	32.00	0.00	45.00
Transfer Order:	0.00	0.00	0.00	0.00	0.00	0.00
Receipt:	6.00	0.00	8.00	0.00	11.00	0.00
ATP:	-14.00	-14.00	-14.00	-14.00	-3.00	-48.00

You discover that on 5/27, you have a future demand for a 1 quantity and on 6/1, you have a future demand for a 32 quantity. Notice that the complete Lead Time range considered by the Available To Promise calculation is 6/06, which is the the Start At date of 5/22 plus the 15 day Lead Time. Because of this, the 33 quantity is included by the calculation as future demand; it consumes all the supply quantities in the preceding date buckets until it reaches 5/21. A negative -15 quantity exists on this date, so the future demand is not added to the ATP total amount in this column, as no additional supply is available on this date. The total future supply you will receive is 34 and this only reduces the total demand by a 1 quantity, so a -14 quantity is displayed for all dates that fall either on or before the Lead Date back to 5/22.

However, the Available To Promise grid does display demand past the Lead Date. On 6/10, you receive a supply quantity of 11 and a demand quantity of 45. Because both quantities fall outside the Lead Time date range, however, these values are not calculated in the future demand displayed on 6/1 or earlier. The Available To Promise calculation assumes that you will satisfy this demand later.

The next page breaks out the Available To Promise calculation even further to illustrate how the calculation arrived at these numbers.

This table displays all the dates affected by either a demand quantity, a supply quantity, or both a demand and a supply quantity for part ATPTest01. The Net/Day row displays whether a negative or positive quantity is calculated on the specific day. These net values reflect the demand quantity and the supply quantity received/needed on each specific day.

The rest of the table displays the ATP total values that are generated as a result of these net values.

	5/12	5/14	5/19	5/20	5/21	5/22	5/26	5/27	5/31	6/1	6/10	6/11
Net/Day	-10	-5	-6	4	2	20	6	-1	8	-32	11	-45
5/12	-10											
5/14	-10	-15										
5/19	-10	-15	-21									
5/20	-10	-15	-21	-17								
5/21	-10	-15	-21	-17	-15							
5/22	-10	-15	-21	-17	-15	5						
5/26	-10	-15	-21	-17	-15	5	11					
5/27	-10	-15	-21	-17	-15	5	10	10				
5/31	-10	-15	-21	-17	-15	5	10	10	18			

6/1	-10	-15	-21	-17	-15	-14	-14	-14	-14	-14		
6/10	-10	-15	-21	-17	-15	-14	-14	-14	-14	-14	-3	
6/11	-10	-15	-21	-17	-15	-14	-14	-14	-14	-14	-3	-48

The first supply quantity is recorded on 5/20, reducing the demand quantity from the preceding day by 4. On 5/21 another net gain for a 2 quantity is recorded, which reduces the total demand to a -15 quantity.

Then on 5/22, the current date, the Available To Promise calculation records a 20 quantity net gain, which initially causes an ATP total of 5 to appear. As the Available to Promise calculation moves through the incoming PO releases, it discovers that a total 18 supply quantity is available through 5/31.

However the calculation discovers that a future demand quantity of 33 falls within the Lead Time date range as well. The total supply from the 5/22 date on is 34. Because of this, you really only gain a 1 quantity during this time frame, so the calculation must regenerate these values. For the final results, the Available To Promise calculation returns -14 quantity throughout the Lead Time date range (The Lead Date value is 6/6) to account for this future demand.

Lastly, the supply quantity on 6/10 and the demand quantity on 6/11 fall outside the Lead Time date range. This demand is not evaluated for the ATP future demand total from 5/22 to 6/1. Because you are carrying a -14 quantity however, this negative quantity value is included ATP totals generated beyond the Lead Date, resulting in a -48 quantity on 6/11.

Auto Firm Process

Run this process to automatically change any unfirm jobs that fall within process parameters to firm jobs.

You first define the date range you will use for the process; any unfirm jobs or subassemblies that can be turned into jobs (Plan As Assembly) are automatically assigned the firm status. Their job numbers are also regenerated using the Firm Job Prefix.

If you need, you can further limit the records included in the process by filtering on sites and/or parts. Any unfirm jobs that match the filters you define are processed using the firm status. The Auto Firm Process program can also be added to a schedule and automatically run on a recurring basis.

Any jobs defined as firm can be engineered and then released to your manufacturing center.

Modifiers

The following section describes the Auto Firm Process values you can change:

- **Start Date** - Use this field to define the first date to include in the process. Any unfirm jobs with Need By dates on or after this date are included in auto firm processing.

- **End Date** - Use this field to define the last date to include in the process. Any unfirm jobs with Need By dates on or before this date are included in auto firm processing.
- **Parts** - You can select a range of parts to include on this filter sheet. Any unfirm jobs created for these selected parts are included in auto firm processing.
- **sites** - You can select a range of sites to include on this filter sheet. Any unfirm jobs created for manufacturing within these selected sites are included in auto firm processing.

Where Located

You can access the Auto Firm Process functionality through the following locations.

- **Auto Firm Process** - You run this process to automatic assign unfirm jobs the firm status.

  Main Menu Path: Production Management >Job Management > General Operations > Auto Job Firm Process

Logic/Algorithms

The Auto Firm Process functionality uses this logic to calculate its results.

- Auto Firm Date Range = Start Date -> End Date
- If an unfirm job or subassembly's Need By date falls within this date range, change the unfirm job's status to firm. Regenerate the job number to use the Firm Job Prefix.

Example(s)

The following example(s) illustrate how you use the Auto Firm Process functionality.

You need to firm all of the unfirm MRP jobs with Need By dates between 1/15 and 1/31. You launch the Auto Firm Process and enter these dates in the From and To date fields. You also only want to firm the MRP jobs generated for the Blue site. You click the Filters tab and the site sheet, selecting the Blue site record.

All unfirm jobs at the Blue site that have Need By dates between 1/15 and 1/31 are automatically assigned the firm status.

Consume Minimum Quantity

Long lead times can cause some purchase order change requests to either never execute or generate excessive purchase order suggestions. You can correct these situations by using the Consume Minimum Quantity calculation.

When you activate this calculation, you cause both the MRP and PO Suggestion processes to use another level of lead time calculations. When certain supply conditions are met within the purchase lead time, an additional set of **Urgent Planning** parameters activate. These parameters use the Minimum Quantity available within inventory to satisfy demand while at the same time generate

purchase orders suggestions that require more immediate resolution. You can then reduce the gaps that can occur when standard lead times spread out demand though lengthy time intervals.

After the MRP engine finishes calculating supply and demand requirements during the lead time window (MRP Scheduled Start Date + Standard Lead Time), it then calculates supply and demand requirements using standard MRP logic.

The Consume Minimum Quantity calculation uses two quantity thresholds to determine its lead time results. When the available On-Hand Quantity falls below the Minimum On-Hand Quantity, the purchase order suggestions use the regular inventory parameters to arrive at the purchase quantities required on each PO suggestion. If the projected On-Hand Quantity falls below the Safety Stock or a zero (0) quantity, the Urgent Planning parameters are used to calculate the purchase suggestion quantities. Through these additional parameters, you can define specific quantities, lead times, and suppliers to use for these immediate supply needs.

Each PO suggestion also displays the reason why the MRP or PO Suggestion engines arrived at this quantity. The **Below Reorder**, **Below Safety**, and **Below Zero** reasons display on the respective purchasing change or suggestion.

You set up the Consume Minimum Quantity calculation on site and part-site records.

Modifiers

The following section describes the Consume Minimum Quantity values you can change.

site Maintenance

You modify this value in **site Maintenance**:

- **Allow Consumption of Minimum Qty** -- Select this check box to activate the Consume Minimum Quantity calculation for a specific site. When the projected On-Hand Quantity for a purchased part falls below the Safety Stock quantity or a 0 quantity, the Urgent Planning parameters are used to determine quantities on the PO suggestions that fall within the lead time window (MRP Scheduled Start Date + Standard Lead Time).

Part Maintenance

You modify these values in **Part Maintenance** on the Part > sites > Detail sheet. These values all display within the **Urgent Planning** section, and they define the values you use when the purchase quantity needs to arrive quickly to satisfy demand:

- **Lead Time** -- Defines the length of time it takes to receive the purchase quantity from the supplier after you place the purchase order. If you leave this value at 0 and the application finds a Supplier value on a Supplier Price List, the suggestion then uses the Lead Time value from the supplier list.
- **Minimum Order Quantity** -- Defines the smallest quantity that must be placed on each PO suggestion.

- **Multiple Order Quantity** -- Indicates the nearest multiple PO suggestions use to calculate the purchase quantity. For example, if you enter a 100 in this field, the PO suggestions will always use values in hundreds like 200, 400, 600, and so on each PO suggestion generated for the part-site record.
- **Supplier** -- Indicates the specific supplier from whom you purchase these parts when you need to receive them quickly. If you leave this field blank, the MRP and Purchase Suggestion calculations use the standard Supplier value on the part-site record or the Supplier defined on the supplier price list.

Where Located

You can access the Consume Minimum Quantity functionality through the following locations.

Site Maintenance

You activate the Consume Minimum Quantity calculation on the Detail > Detail sheet.

Menu Path

Navigate to this program from the Main Menu:

- Financial Management > Multi-Site > Setup > Site Maintenance
- Material Management > Inventory Management > Setup > Site Maintenance
- Production Management > Job Management > Setup > Site Maintenance
- Service Management > Field Service Integration > Setup > Site Maintenance
- System Setup > Company/Site Maintenance > Site Maintenance

Part Maintenance

You enter the Urgent Planning parameters for each part on the Part > sites > Detail sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part

- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Consume Minimum Quantity functionality uses this logic to calculate its results.

Lead Time

Lead Time = MRP Scheduled Start Date + Standard Lead Time

Reorder Point Quantity

Reorder Point Quantity = Minimum Quantity + Safety Stock Quantity

PO Suggestion Calculations

To activate various calculations:

- If PO Quantity + Net On-Hand Quantity is >= Reorder Point Quantity, then do not generate suggestions.
- If PO Quantity + Net On-Hand Quantity is < Reorder Point Quantity, then create a PO Suggestion where its Quantity = Reorder Point Quantity - (PO Quantity + Net On-Hand Quantity).
- If PO Quantity + Net On-Hand Quantity is < Safety Stock Quantity or < 0 Quantity, then create a PO Suggestion using the Urgent Planning parameters. This PO Suggestion Quantity = Reorder Point Quantity - (PO Quantity + Net On-Hand Quantity).

Urgent Planning Default Values

The Urgent Planning fields use the following hierarchies to determine various PO Suggestion values:

- **Supplier**
    1. If the supplier is defined on the part-site record and the On-Hand Quantity < Reorder Point Quantity and is > the Safety Stock Quantity, use the default supplier and purchase point in the Purchasing section.

2. If the supplier is defined on the part-site record and the On-Hand Quantity < Safety Stock Quantity and the Consume Minimum Quantity calculation is active, use the default supplier and purchase point in the Urgent Planning section.
3. If the Urgent Planning Supplier field is blank, use the Supplier on the part-site record defined in the Purchasing section instead.
4. If the Purchasing Supplier field is blank, instead use either the Supplier value on the last purchase order or the Supplier value on the supplier price list.
5. Override: if this is a Buy Direct PO suggestion, the Supplier value defined on the demand record is used; the Urgent Planning Supplier and Purchasing Supplier values are ignored.

- **Lead Time**
  1. If the Lead Time is defined on the part-site record in the Urgent Planning section, this lead time value is used on the purchase suggestion.
  2. If the Urgent Supplier Lead Time value is blank and the supplier is defined on the supplier price list, the PO suggestion uses the Lead Time value from the supplier price list.

PO Suggestion Reason Codes

The PO Suggestion Reason field populates with the following values based on specific conditions:

- **Direct (D)** -- Used when the PO suggestion is for a Buy Direct purchase order.
- **Below Reorder (M)**-- Used when the On-Hand Quantity < Reorder Quantity (Minimum Quantity + Safety Stock Quantity).
- **Below Safety (S)** -- Used when the On-Hand Quantity < Safety Stock Quantity.
- **Below Zero (Z)** -- Used when the On-Hand Quantity < 0 Quantity.

Example(s)

The following example(s) illustrate how you use the Consume Minimum Quantity functionality.

You are generating purchasing suggestions for Part 010-0112. The part-site record uses a Purchasing (Standard) Lead Time value of 10 days. You typically purchase this part from Global Supply, as they give you the best price breaks. This part-site record also has a 20 Safety Stock quantity.

However, Global Supply's turnaround time, 10 days lead time, can sometimes be problematic. In order to satisfy demand, you set up Urgent Planning values on this part-site record. When the MRP calculation detects that the On-Hand Quantity falls below the Safety Stock value, these Urgent Planning values are used instead to calculate the purchase changes. Another supplier Speed-E Supply, can turn around a part quantity in 5 days lead time, so you use this supplier for emergency points in your schedule.

You set up the part-site record as the following:

Safety Stock: 20	Supplier	Lead Time	Min Order Qty	Mul Order Qty
Purchasing	Global Supply	10	100	N/A
Urgent Planning	Speed-E Supply	5	50	10

You generate MRP using a Scheduled Start Date of 8/12. The engine discovers that on 8/17, the available On-Hand Quantity will be 18, a two quantity below the Safety Stock quantity. Because this low quantity falls within the Standard Lead time window (in this case 8/12 - 8/22), this causes MRP to activate the Consume Minimum Quantity calculation. MRP generates a purchase change to create a PO for Speed-E Supply for part 0101-0112. The Purchase Quantity on this purchase order with be 50 and the Lead Time value will be 5 days. This purchase suggestion should then answer the increased demand needed for part 010-0112 at this point in the schedule.

Consumed Quantity

The Consumed Quantity tracks the quantity supplied so far against a demand quantity that has been defined on a sales forecast or a master production schedule (MPS).

If the demand quantity is defined on a sales forecast, the MRP engine subtracts the total amount listed on sales orders created for the part. If the demand quantity is defined on a master production schedule, the MRP engine subtracts the total amount listed on jobs created for the part.

Modifiers

The following section describes the Consumed Quantity values you can change.

These are the values you can modify for this item:

- **Sales Orders**- If a sales order lists a part defined on a sales forecast, the Consumed Quantity value increases.
- **Jobs**- If a job lists a part defined on a master production schedule, the Consumed Quantity value increases.

Where Located

You can access the Consumed Quantity functionality through the following locations.

- **Forecast Entry**- The Consumed Quantity value is displayed on each detail record within the sales forecast. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.
- **Master Production Schedule Entry**- The Consumed Quantity value is not displayed on this program. Instead, it is an internal value that the MRP engine uses to measure how much quantity remains to be produced on a master production schedule. You can locate this

program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Consumed Quantity functionality uses this logic to calculate its results.

Forecast Consumed Quantity

- As sales orders are created that use the part defined on a Forecast detail, the Consumed Quantity value increases.

MPS Consumed Quantity

- As jobs are created that use the part defined on a MPS detail, the Consumed Quantity value increases.

Example(s)

The following example(s) illustrate how you use the Consumed Quantity functionality.

Example One

A customer, Dalton Manufacturing, typically orders a 500 quantity of Part 378-0R every month. You want the MRP engine reflect this demand, so at the beginning of the year you create a three month forecast record for Part 378-0R. You add a forecast detail for Dalton Manufacturing. The forecast record contains a 1,500 Forecast Quantity and a Forecast Date of 3/31.

The MRP engine will create jobs against the forecast detail. As sales orders for Part 378-0R are created for Dalton Manufacturing, the Consumed Quantity value on the forecast increases, letting you track the progress of the forecast. The following table illustrates how a forecast quantity is consumed:

Date	Forecast Quantity	Consumed Quantity	Sales Order Quantity	Part Detail
1/02	1,500	0	0	1,500
1/25		500	500	1,000
2/25		1,000	500	500
3/31		1,500	500	0

This table displays how the MRP engine calculation works. This does not illustrate that information that will appear on the Time Phase Material report. The report will not

display the forecast, because the Consumed Quantity starting value is zero.

Example Two

This example shows you how customers consume forecast quantities. You create two forecasts for the same part, Part 10X. One of the forecasts is for Dalton Manufacturing, while the other is a general part forecast. The following table shows you the main details about each forecast.

Forecast	Part Number	Customer	Forecast Quantity
A	Part 10X	Dalton	250
B	Part 10X	No Customer	500

As orders are placed, the quantity on both forecasts is consumed by the MRP engine. You have five sales orders for Part 10X, one from Ace Manufacturing, the other four from Dalton Manufacturing. These are the sales orders and the specific forecast quantities they consume:

Order	Customer	Date	Quantity	Forecast = Consumed Quantity
1	Ace	1/10	100	B = 400
2	Dalton	1/20	100	A = 150
3	Dalton	1/30	100	A = 50
4	Dalton	2/10	100	A = 0 B = 350
5	Dalton	2/20	100	B = 250
Notice that the orders placed by Dalton Manufacturing first consumes the forecast quantity assigned directly to them and later consumes the quantity on the general forecast.				

Constrained Materials

A constrained material is a scheduling modifier that can be used to limit where the MRP engine calculates the Start Date and End Date for suggestions. Note however, that the MRP engine does not actually review which materials are constrained.

The MRP engine instead calls the scheduling engine, which uses constrained materials to calculate Start Dates and End Dates on jobs and operations. The MRP engine uses the results to generate suggestions.

Materials can be defined as required, or constrained, for an operation. If an operation is linked to a constrained material, both the material and the resources must be available at the same time before the scheduling engine will schedule the operation. Material is defined as constrained through these methods:

1. The Constrained Materials check box is selected on the part record.
2. The Make Direct check box is selected within the manufactured material record defined on the part method.
3. A PO Date is defined on the PO for a purchased material.

When the scheduling engine encounters a constrained material linked to an operation, it determines when the material will be available for this operation. The date on which the material is available is used as the beginning date for the operation. If the Required By Date for the material is greater than the Lead Time on the material, the engine considers this material as available. The scheduling engine does this by reviewing the Available to Promise calculation. For example, if 20 materials are required for an operation and only 10 are available, the engine will wait until all 20 are available before it generates scheduling blocks for the operation.

Note also that when the Constrained Material calculation discovers a constrained material that it cannot resolve, it automatically switches to Forward Scheduling using the current date as the Start Date for the job. Then it will locates a point in the schedule when the constrained material will be available. The engine will again, however, calculate the entire schedule a third time to make sure that it has calculated the closest amount of time possible to the Start Date to begin operations with constrained materials.

In some situations, a constrained material can cause a negative quantity balance to appear on the Time Phase Material Requirements report. If you run this report and see these results, you should first review the constrained materials to see when these materials are scheduled to be available. Then you can increase the supply of these constrained materials at an earlier date to resolve the negative quantity.

Modifiers

The following section describes the Constrained Materials values you can change.

These are the values you can modify for this item:

- **Constrained Materials**- You indicate that a material is constrained on its part record. You define this value within the Part Maintenance program on the Part sheet. Select the Constrained Material check box on this sheet.
- **Ignore Constrained Materials**- This modifier causes the scheduling engine to ignore arrival dates for constrained materials. The operation is scheduled at a point where there is capacity available to run it. The MRP engine assigns Start Date and End Date values by totaling only when these operations will start and finish.

Where Located

You can access the Constrained Materials functionality through the following locations.

- **Part Maintenance**- You use the Part Maintenance program to indicate when a material is constrained. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Process MRP**- Select the Ignore Material Constraints check box to indicate that the MRP engine should not account for constrained materials during its calculations. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **Time Phase Material Requirements Report**- This report projects future inventory balances by analyzing planned receipts and requirements for each part. You can locate this report from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Reports folder.

Logic/Algorithms

The Constrained Materials functionality uses this logic to calculate its results.

- If Material Lead Time < Required By Date on the operation, then schedule the operation.

Example(s)

You have a sales order for Part 10X that is due on 12/01/09. Part 10X has a constrained material, Part 10Y, on Operation 10, and this constrained material will not arrive at your manufacturing center until 12/5/09. This operation takes one working day to complete.

Because of the constrained material, this job's End Date will be 12/5/09, because Operation 10 cannot start until the constrained materials arrive.

You run the Time Phase Material report during this time period 12/01/09 - 12/05/09. This report shows a negative On-Hand Quantity for Part 10Y during this time. The negative demand appears because there is a demand for this part on 12/01/09 which cannot be fulfilled until 12/05/09.

Demand Sources

There are several records within the application that are used as demand sources by the MRP engine. These records define the quantity of parts that are needed for both sales order and production activity.

The engine handles demand requirements that originate from these sources:

- Forecasts
- Master Production Schedules
- Sales Orders

- Transfer Order Suggestions
- Inventory Restock Quantities
- Material Requirements on Jobs
- Recurring Purchase Order Quantities (Purchase Contracts)

The MRP engine calculates the total demand required, during a date range you define, for each manufactured and purchased part handled by your company. It then goes through a series of calculations to determine how much supply is available to satisfy the demand.

Modifiers

The following section describes the Demand Sources values you can change.

You must define the date range for use by the MRP engine. These are the dates you must define within the Process MRP program:

- **Cut Off Date**- The date on which the MRP engine will stop looking for demand.
- **Scheduled Start Date**- The date that will be used to start both the MRP and scheduling processes. This date is the first date from which the MRP engine runs. For example, if this date is two days in the future but the MRP engine is run now, then today and tomorrow are both considered to be in the past by the MRP engine.

Where Located

You can access the Demand Sources functionality through the following locations.

- Process MRP Program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Demand Sources functionality uses this logic to calculate its results.

- The MRP engine evaluates all the open demand sources against each part. When it discovers that a part quantity is needed for a part, it creates a demand requirement.
- Then it generates unfirm jobs, job suggestions, and purchase suggestions that can potentially satisfy the demand requirements.

Example(s)

The following example(s) illustrate how you use the Demand Sources functionality.

Dalton Manufacturing places a sales order for a 100 quantity of Part 459-KI4. When the MRP engine runs, it finds this sales order, generating a demand requirement for this 100 quantity.

Dynamic Days of Supply

Use the Dynamic Days of Supply calculation to more accurately generate material requirements when a new purchase suggestion may not satisfy demand at the correct point in the lead time window (MRP Scheduled Start Date + Standard Lead Time).

The **Days of Supply** modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job. Since this window of days is a fluid calculation that depends on when MRP generates based on its Start Date and on when demand quantities move based on record changes, MRP can calculate a reduce purchase suggestion in the lead time window (MRP Scheduled Start Date + Standard Lead Time), followed by a new purchase suggestion generated outside this window using standard MRP logic. If this new purchase suggestion itself has a long lead time, you may not be able to act on this suggestion in time to satisfy demand at the correct point in the schedule.

To account for this situation, use the Dynamic Days of Supply calculation. When this calculation is active, the MRP engine checks for points when the Net On-Hand Quantity is either below or above the Reorder Quantity (Minimum Quantity + Safety Stock Quantity). If the MRP engine discovers one of these points, it first determines the End Date using the Days of Supply value. It then checks for the next available supply quantity after this End Date value. The date on this next supply quantity is now used instead as the new End Date, and the Days of Supply calendar range increases. All of the demand included in the new End Date is added to the On-Hand Quantity to determine the quantity to increase or decrease on the purchase suggestion, job suggestion, or unfirm job.

This calculation continues to check for records that may cause the Net On-Hand Quantity to be either reduced by a material requirement or increased by a material supply later in the schedule. If a demand requirement increases or reduces the supply quantity again, a new End Date is recalculated and the additional increase or reduce demand and supply records are added to the expanded Days of Supply calendar range.

Modifiers

The following section describes the Dynamic Days of Supply value you can change.

You modify this value in **site Maintenance**:

- **Use Dynamic Days of Supply in Lead Time** -- Select this check box to activate the Dynamic Days of Supply calculation. When MRP generates for records assigned to this specific site, the Dynamic Days of Supply calculation can expand the End Date for the Days of Supply calendar range.

Where Located

You can access the Dynamic Days of Supply functionality in the following location.

Site Maintenance

You activate the Dynamic Days of Supply calculation on the Detail > Detail sheet.

Menu Path

Navigate to this program from the Main Menu:

- Financial Management > Multi-Site > Setup > Site Maintenance
- Material Management > Inventory Management > Setup > Site Maintenance
- Production Management > Job Management > Setup > Site Maintenance
- Service Management > Field Service Integration > Setup > Site Maintenance
- System Setup > Company/Site Maintenance > Site Maintenance

Logic/Algorithms

The Dynamic Days of Supply functionality uses this logic to calculate its results.

When the Net On-Hand Quantity does not equal the Reorder Point Quantity (Minimum Quantity + Safety Stock Quantity) for a specific date, do the following:

1. Use the Days of Supply value to determine the End Date.
2. Find the first supply record available after the End Date.
3. Pull the date from the supply record and use it as the new End Date.
4. Total all demand quantities required up to the new End Date.
5. Delete all PO suggestions that result in 0 quantities.
6. Evaluate the Net On Hand Quantities available during the expanded Days of Supply. When the Net On-Hand Quantity does not equal the Reorder Quantity for a specific date, repeat this logic.

Example(s)

The following example(s) illustrate how you use the Dynamic Days of Supply functionality.

Single Recalculation Example

The part-site record for Part A, a purchased part, has the following values:

- Days of Supply = 10
- Lead Time = 20

The MRP engine discovers the following supply and demand records during the month of May:

Purchase Order	Quantity = 100	PO Date = 5/1	Supply
Sales Order 1	Quantity = 80	Need By Date = 5/2	Demand
Sales Order 2	Quantity = 20	Need By Date = 5/15	Demand

The Days of Supply calendar range goes from May 1st to May 10th. Because of this, the second sales order falls outside this range. If you do not turn on the Dynamic Days of Supply calculation, MRP creates a PO suggestion to reduce the purchase order quantity to 80 instead. Then a new PO suggestion is created for the second sales order, but because of the lead time, this quantity is calculated to arrive on 5/21, six days after the Need By date on the sales order.

However, if you activate the Dynamic Days of Supply calculation, the Days of Supply date range is extended to 20 to match the lead time required on the original purchase order suggestion. Because the next PO suggestion in this expanded Days of Supply would have a 0 quantity, no additional PO suggestion is created.

Multiple Recalculation Example

The part-site record for Part B, a purchased part, has the following values:

- Days of Supply = 10
- Lead Time = 60

The MRP engine discovers the following supply and demand records during the month of May (May 1st to June 1st):

Sales Order 1	Quantity = 50	Need By Date = 5/1	Demand
Sales Order 2	Quantity = 25	Need By Date = 5/5	Demand
Purchase Order 1	Quantity = 100	PO Date = 5/15	Supply
Sales Order 3	Quantity = 25	Need By Date = 5/20	Demand
Purchase Order 2	Quantity = 30	PO Date = 6/1	Supply

This site uses the Dynamic Days of Supply calculation.

The Days of Supply calendar range goes from May 1st to May 11th. Because the next supply records falls outside this range, the Days of Supply range is extended 4 days to May 15th. However, because the first purchase order will have part of its supply used on 5/1, it technically no longer arrives on 5/15. Because of this, the Dynamic Days of Supply calculation extends the calender range 31 days to 6/1. Sales Order 3 and Purchase Order 2 will then be included in the calculated results as well.

Finite Horizon (Calculation)

The Finite Horizon calculation defines the point at which the MRP engine stops using the Finite Capacity calculation against the unfirm jobs and job suggestions it is creating and switch to the Infinite Capacity calculation.

The Finite Horizon is added to the Scheduled Start Date defined on the Process MRP program to determine the last date on which the Finite Capacity calculation is used.

When a job suggestion is finitely scheduled, the demand its operations places against the resources at a site cannot be greater than their available capacity for work. When a job is infinitely scheduled, this limit is ignored, allowing the job suggestion to be scheduled based on when the quantity is needed to be complete.

The MRP engine does not schedule the job suggestions and unfirm jobs. Instead, it calls the scheduling engine, which in turn runs these scheduling calculations. When the scheduling engine starts scheduling past the latest Finite Horizon date, it uses the Infinite Capacity calculation.

Modifiers

The following section describes the Finite Horizon (Calculation) values you can change.

These are the values you can modify for this item:

- **Finite Horizon**- This value defines the limit, in days, when the MRP engine will stop using the Finite Capacity calculation against a resource at this site and switch to the Infinite Capacity calculation. If you enter zero (0) in this field, the MRP engine will not use the Finite Horizon calculation.

Where Located

You can access the Finite Horizon (Calculation) functionality through the following locations.

- **site Maintenance**- You define the Finite Horizon range for each site on the Detail sheet. Use this feature to set up different finite horizons for the various sites that manufacture each part. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Finite Horizon (Calculation) functionality uses this logic to calculate its results.

- If the unfirm job or job suggestion's Required By Date > Scheduled Start Date + the Finite Horizon, then schedule the item using the Infinite Capacity calculation.

Example(s)

The following example(s) illustrate how you use the Finite Horizon (Calculation) functionality.

The Finite Horizon on the Red site is 5 days, while the Finite Horizon on the Blue site is 0 days. When the MRP engine calculates suggestions and unfirm jobs, it calls the scheduling engine to determine whether or not these records will be infinitely scheduled.

The MRP engine is run using a Scheduled Start Date on May 10th. For the Red site, the scheduling engine calculates that any suggestions or unfirm jobs with Required By Dates on May 15th or later will be infinitely scheduled. Because the Blue site has a Finite Horizon value of 0, the scheduling engine always finitely schedule suggestions or unfirm jobs at this site.

Lot

The Lot values define a number of key quantities used by the MRP engine. They determine the size of the quantities for inventory demands generated by the MRP engine.

They also can determine the highest quantity that can be calculated for each job or purchase suggestion.

Lot size values are entered on the Part - sites - Detail sheet within the Part Maintenance program. These fields let you define the lot quantity sizes that will be generated for each site that produces each part.

You can define two different sets of lot sizes for each sites - Detail. The primary values are displayed in the MRP Planning group box within this detail sheet; they indicate the typical minimum and maximum quantities you will use. You can also define an alternate set of lot size values in the Short Horizon Planning group box; these values are used if a demand requirement occurs during the Short Horizon date range. You enter the Short Horizon date range in the Short Horizon field. Any suggestion that occurs between the Scheduled Start Date and the last date of this range will use the alternate lot size values. You use these Short Horizon lot size values for emergency orders or rush orders.

Modifiers

The following section describes the Lot values you can change.

These are the values you can modify for this item:

- **MRP Planning: Minimum Lot Size**- This value defines the smallest quantity that can be manufactured or purchased for this part. If the total demand quantity is less than this quantity, the MRP engine creates a single job or purchasing suggestion that uses this minimum value for the quantity. If this is a job suggestion, the extra quantity is recorded as On-Hand Quantity.
- **MRP Planning: Maximum Lot Size**- This value defines the highest quantity that can be manufactured or purchased for this part. If the total demand quantity is greater than this quantity, the MRP engine creates two or more jobs or purchase suggestions that use the maximum value for the quantity. Suggestions will continue to use this quantity on each suggestion until the remaining quantity can all be placed on one suggestion.
- **MRP Planning: Multiple**- This value defines the quantity increments that will be placed on each job or purchasing suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.
- **MRP Planning: Days of Supply**- This value defines how many days into the future MRP will look to calculate the quantity needed on a job or purchasing suggestion. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the

quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range. All the demand records that fall within this range are combined to generate one or multiple (if over the Maximum Lot Size value) suggestions. Typically only one suggestion is created through this calculation.

- **Short Horizon Planning: Horizon Days**- If the demand Due Date falls between the Scheduled Start Date plus the Horizon Days value, the MRP engine will use the Short Horizon Minimum Lot Size, Maximum Lot Size, and Days of Supply to generate the job, transfer order, and purchase suggestions. These values override the normal lot sizes defined within the MRP Planning section. Note that the MRP engine still uses the Multiple value from the MRP Planning section to calculate part quantity values on the suggestions. If you enter 0 in the Horizon Days field, the Short Horizon functionality is not active on this part-site detail.
- **Short Horizon Planning: Minimum Lot Size**- This value indicates the smallest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range.
- **Short Horizon Planning: Maximum Lot Size**- This value indicates the highest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range. Suggestions will continue to use this quantity on each suggestion until the remaining quantity can all be placed on one suggestion.
- **Short Horizon Planning: Days of Supply**- This alternate value defines how many days into the future MRP will look to calculate the quantity needed on a job or purchasing suggestion, if the demand falls within the Short Horizon. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range. All the demand records that fall within this range are combined to generate one or multiple (if over the Maximum Lot Size value) suggestions. Typically only one suggestion is created through this calculation.

Where Located

You can access the Lot functionality through the following locations.

- **Part Maintenance**- You define the lot size values on the Part - sites - Detail sheet within the Part Maintenance program. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Lot functionality uses this logic to calculate its results.

Stock Quantity Supply

If a part is a stock part, all demand is fulfilled from stock.

Minimum Lot Size

If a part has a demand requirement that is below the Minimum Lot Size quantity, it will be rounded up.

Example(s)

The following example(s) illustrate how you use the Lot functionality.

Minimum Lot Size Example

If four parts are required and the Min Lot Size is set to 10, MRP will create a job for 10 parts. The 6 quantity will be added to the On-Hand Quantity for the part.

Maximum Lot Size Example

If MRP creates an unfirm job for 100 parts and the Max Lot Size is set to 40, three jobs are created: two jobs for 40 parts and a third job for 20 parts.

Multiple Example

If a demand quantity is 379 and the Multiple value is defined as 100, the MRP engine will create a job suggestion that has a 400 part quantity. The extra quantity will be added to the current On-Hand Quantity for the part.

Manufacturing Lead Time Calculation

The Manufacturing Lead Time calculation determines how long it takes, in days, to receive materials and manufacture part quantities at each subassembly level and then uses these values to total how long it takes, in days, to complete the final assembly.

This calculation generates these values for each part and/or site you decide to include for the calculation process. The lead time amounts then display on each part record (Part Maintenance) on the Part - sites - Planning sheet. The calculation does this by using the values generated through the Rough Cut Scheduling calculation to determine how long it takes material quantities to arrive and production quantities to be produced. Additional factors can also be included in this calculation such as purchasing Lead Time, Receive Time, Kit Time, and so on; you indicate the values you want to include on each site record.

When complete, this calculation defines two values on each part-site record - Cumulative Time and This Level Time. Cumulative Time indicates the total number of days it takes to produce the part within the current site. This Level Time defines how much time is needed to manufacture part quantities for the subassembly in the method that requires this material part. After you run this process, the calculated amounts appear on each Part-site-Planning sheet. You can accept these calculated values, but you can also manually override these values as you need.

The calculation considers a number of values when it determines manufacturing lead time. For each purchased part, the calculation determines how long it takes for the part quantity to be ordered from the supplier and then arrive at the receiving site. For each manufactured part, the calculation determines lead time by totaling the time required at each subassembly. It first considers the number of days it will take for purchased materials to arrive at the site. It then factors in the time it times to run setup and production on each operation. The calculation then arrives at a total time for each subassembly. It then adds together each subassembly time to arrive at a cumulative value for the entire part quantity.

The MRP engine does not directly use the manufacturing lead time values. The Cumulative Time and This Level Time values, however, are the main factors the MRP engine uses to determine if a demand record quantity can be split into two jobs using the Start Minimum Quantity functionality. Through this functionality, if the calculated manufacturing lead time falls within Start Minimum Quantity lead time, the demand quantity is divided into two or more jobs. The quantity defined within the Start Minimum Quantity field is used as the quantity on the original job, while the remaining quantity is placed on the subsequent job. If a Minimum Lot Quantity value is defined on the part record, however, and this value is less than the Start Minimum Quantity, multiple jobs are created using the Minimum Lot Quantity value until they equal the quantity amount defined for the Start Minimum Quantity.

Be sure to run this calculation each time you make a change to a part revision within the Engineering Workbench. This ensures that the current calculated lead times accurately reflect the length of time it takes for parts to become available within your manufacturing center.

Modifiers

The following section describes the Manufacturing Lead Time values you can change.

- **As Of Date** - Defines the date from which the calculation will generate. Any part methods that changed on or after this date are included within the calculation.
- **Include Subassemblies** - Select this check box to indicate all subassemblies within each part method will be included during the manufacturing lead time calculation. If you clear this check box, only the lead times on each parent assembly are calculated.
- **Kit Time** - Select this check box to indicate the time it takes in days to assemble manufactured parts will be included during the manufacturing lead time calculation. Only used on manufactured parts, the MRP engine uses it to calculate the End Date for any materials within the parent part's assembly. This value is defined on part records.
- **Lead Time** - Select this check box to indicate you want to include the purchasing Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes purchased part quantities to arrive at your site.
- **Product Code** - You can limit this calculation to only generate lead times for specific product groups. To do this, click this drop-down list and select the product group you wish to use. You create product groups within Product Group Maintenance and then select these product groups within Part Maintenance.
- **Rough Cut Parameters** - Select this check box to indicate any rough cut parameters defined on product groups or part revisions will be included in the manufacturing lead time calculation.

These parameters add extra time for the setup, fixed, variable, and subcontract values used for generating the rough cut schedule. Each set of parameters is defined on a rough cut parameter code; you set up each code within Rough Cut Parameter Maintenance and then select these codes within Part Maintenance and/or Product Group Maintenance.

- **Receive Time** - Select this check box to indicate you want to include the Receive Time values in this calculation. This value is defined on part records, and it indicates how long it takes, in days, to move purchased part quantities from the shipping dock to the resources that need them.
- **Transfer Lead Time** - Select this check box to indicate you want to include the Transfer Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes part quantities to arrive at your site from other locations within your organization.

Where Located

You can access the Manufacturing Lead Time functionality through the following locations.

- **Manufacturing Lead Time Calculation** - Use this process program to generate manufacturing lead times for a specific part, part group, and/or site. You can run this process whenever you need. You can also set up this process to run during an automatic recurring schedule you define. Main Menu Path: Production Management>Engineering>General Operations>Manufacturing Lead Time
- **Part Maintenance** - You can review and manually update the various lead time values (Receive Time, Kit Time, Lead Time, Transfer Lead Time) included in the manufacturing lead time calculation. You can also select the rough cut parameters code on each part revision; this overrides the rough cut parameters defined on the product group selected for the part. After the manufacturing lead time calculation is run, it displays both the Cumulative Time and the This Level Time values within the Part - sites - Planning sheet. If you select the Manual check box, you can update the Cumulative Time and the This Level Time values as you need. Main Menu Path: Production Management>Engineering>Setup>Part
- **site Maintenance** - You use this maintenance program to define what lead times will be included for the manufacturing lead times generated for the current site. You can also indicate whether the rough cut parameters defined on part revisions and product groups will be included in the calculation. Main Menu Path: Production Management>Job Management>Setup>site
- **Product Group Maintenance** - Product groups classify the different part types you sell. You can define a rough cut parameter code on each product group. By default, parts assigned to this product group automatically use these parameters. However, each part revision can also have its own rough cut parameters; during MRP processing, these parameters override the rough cut parameters selected on the product group. Main Menu Path: Main Menu Path: Production Management>Job Management>Setup>Product Group

Logic/Algorithms

The Manufacturing Lead Time functionality uses this logic to calculate its results:

- Purchase Part Lead Time = Number of Days to Receive Quantity
- Manufacture Part Lead Time = Setup Time + Production Time
- This Level Time = Total Purchase Material Time + Total Manufacturing Part Quantity Time
- Cumulative Time = Subassembly 1 Time + Subassembly 2 Time + Subassembly 3 Time and so on…

Example(s)

The following example(s) illustrate how you use the Manufacturing Lead Time functionality.

The MRP engine is creating a job for Part A that contains assemblies AB and AC. The Manufacturing Lead Time Calculation is run, and it generates the following times for each level within the part method:

- Part A:
  - Cumulative Lead Time -- 51 Days
  - This Level Lead Time -- 2 Days
- Part AB (contains purchased parts P1 and P2):
  - Cumulative Lead Time -- 28 Days
  - This Level Lead Time -- 7 Days
  - P1 Lead Time -- 14 Days
  - P2 Lead Time -- 21 Days
- Part AC:
  - Cumulative Lead Time -- 49 Days
  - This Level Lead Time -- 14 Days

The Cumulative Lead Time values include the manufacturing time for the cost lot quantity of each level plus the critical path for any dependant assemblies. The This Level Lead Time values include the total manufacturing time in days to produce the costing lot size quantity of the parts.

Notice how the lead times are calculated using the three assembly levels in the method hierarchy:

- The Cumulative Lead Time for Part A (51 days) is the sum of the Cumulative Lead Time for Part AC (49 days) plus the This Level Lead Time for Part A (2 days).
- The Cumulative Lead Time for Part AC (49 days) is the sum of Part AB Cumulative Lead Time (28 days) and This Level Lead Time (7 days) and Part AC's This Level Lead Time (14 days).
- The Cumulative Lead Time for Part AB (28 days) and the This Level Lead Time (7 days) divides the total time it takes to receive purchase parts P1 and P2. P1 has a purchasing Lead Time of 14 days and P2 has a purchasing Lead Time of 21 days for a total of 35 days.

Manufactured Part Type

The Manufactured part type value indicates that this part is produced by your company. The MRP engine will create unfirm jobs and job suggestions against this part record.

It will also generate purchase suggestions for any part materials within the job method that must be bought from suppliers.

This value is also used as selection criteria on various reports and searches. It does not, however, limit how you can use this part record. You can purchase any part that is defined as manufactured, and you can manufacture any part that is defined as purchased.

Modifiers

The following section describes the Manufactured Part Type values you can change.

These are the values you can modify for this item:

- **Non-Stock Item**- When a manufactured part is a non-stock part, all demand for this part will be satisfied by jobs. If the demand comes from a sales order, the sales order is linked to a job that will satisfy the demand. If this demand comes from another record that uses this part on a sub-assembly or as a material, the demand is satisfied by creating a job linked to the sub-assembly on the original job.
- **Stock Item**- When the manufactured part is a stock part, it indicates that all demand for this part will be satisfied from inventory. The job suggestions and unfirm jobs assume that the demand will be satisfied through inventory allocations.

Where Located

You can access the Manufactured Part Type functionality through the following locations.

- **Part Maintenance**- You can indicate a part is a Manufactured part type in two locations within this program:
- **Part- Detail sheet** - You select this value from the Type drop-down list.
- **Part- sites - Detail sheet** - You also select this value from the Type drop-down list. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Manufactured Part Type functionality uses this logic to calculate its results.

- If the manufactured part is a non-stock item, satisfy the demand for this part by creating job suggestions (if a valid part method is not found) or unfirm jobs (if a valid part method is available).

- If the manufactured part is a stock item, satisfy the demand for this part from within inventory. Demand requirements that need this part will be satisfied through inventory allocations.

Example(s)

The following example(s) illustrate how you use the Manufactured Part Type functionality.

Non-Stock Part

Dalton Manufacturing orders a 50 quantity for Part 324J, a non-stock part. The MRP engine finds a valid method for this part, so it generates unfirm job U982. The quantity you manufacture on this job is applied directly against the sales order that generated the demand.

Stock Part

You have a sales forecast for a 50 quantity of Part 784T, a stock part. The MRP engine finds a valid method for this part, so it generates unfirm job U873. When you firm this job and produce it, the 50 quantity is received to inventory at the Primary Warehouse defined on the part-site detail.

When a demand requirement is placed against this part, the MRP engine evaluates the On-Hand Quantity available for Part 784T. If enough quantity is available to satisfy the demand, this quantity is pulled from inventory and shipped to the customer.

To make sure that there is enough On-Hand Quantity available for Part 784T, however, you indicate that there should always be a Minimum On-Hand Quantity of 100 available. If the MRP engine discovers that the On-Hand Quantity will fall below this value on a certain date, it creates an inventory demand requirement to restore the On-Hand Quantity to the Minimum On-Hand Quantity.

The MRP engine will generate an unfirm job to satisfy this inventory demand.

MRP Processing

You run the MRP engine through the Process MRP program.

After the demand requirements are defined, the MRP engine generates the job, transfer order, and purchase suggestions to satisfy the requirements. The MRP engine uses several calculations to generate job, transfer order, and purchase suggestions. These calculations take into account all the demand requirements currently placed within your database. The demands included in the calculations are defined by a beginning date (Scheduled Start Date) and a final date (Cut Off Date). Any demand requirements that occur on or between these two dates are evaluated by the MRP engine.

For **Epicor Cloud ERP - Multi Tenant** and **Epicor Cloud ERP - Dedicated Tenant** environments, processing MRP is limited to three processors and two suggestions.

The MRP engine always uses the base inventory unit of measure assigned to the part in the Primary UOMs - Inventory field when performing these calculations. If the Track Multiple UOMs check box has been selected for a part, it first converts quantities and units of measure entered into transactional programs to the base unit of measure for the part before performing MRP calculations and generating suggested jobs, transfers or purchase orders. All quantity values it uses that are defined in the part master file (for example, Min On Hand, Max On Hand, Min Lot Size are specified in the base unit of measure.

Before you run the MRP calculations, make sure that the application reflects the production workflow within your manufacturing center. Each part needs an accurate method of manufacturing and a complete set of site details; demand is generated against all levels within a method. You should also verify that the stock quantities currently recorded within inventory are correct. Your sites must also be linked to production calendars that accurately define the days and hours per day during which work will be performed.

When all of the required information is entered, you are ready to run the MRP engine. The engine handles demand requirements that originate from these sources:

- Forecasts
- Master Production Schedules
- Sales Orders
- Transfer Order Suggestions
- Inventory Restock Quantities
- Material Requirements on Jobs
- Recurring Purchase Order Quantities

The MRP engine calculates the total demand required during the defined date range for each manufactured and purchased part handled by your company. It then performs a series of calculations to determine how much supply is available to satisfy the demand. The MRP supply logic asks these questions:

- **What quantities of a part are coming in from different locations?** The MRP engine calculates supply quantities from the following sources:
    - Purchase Orders
    - Other Jobs
    - Transfer Orders
    - Receipts from Inspection
- **If this is a stock part, what quantities can be used from inventory?** The MRP engine calculates these supply quantities using the following considerations:
    - The Total On-Hand Quantity available in all warehouses that stock the part.
    - The Minimum On-Hand Quantity required to be kept within stock.
    - The Safety Stock Quantity required to be kept in stock for emergency situations.

- **What quantities are being manufactured?** The MRP engine calculates these supply quantities from the jobs that are currently manufacturing part quantities.
- **What quantities are needed each day?** When the available supply quantities do not equal the required demand quantities on a specific date, the MRP engine creates job, transfer order, and purchase suggestions. The MRP engine calculates the quantities required on these suggestions using the following methods:
    - If this is a non-stock part, create a job or purchase suggestion for the demand.
    - If this is a stock part, calculate the amount of supply available on a specific day and then create the job or purchase suggestion.
    - If this is a stock part, is the On-Hand Quantity under the Minimum On-Hand Quantity? If so, create a suggestion for the demand.
    - If the Re-Stock to Max check box is selected, the job or purchase suggestion will use the quantity defined within the Part-site detail's Maximum On-Hand Quantity.
    - If this is a stock part, is the On-Hand Quantity under the Safety Stock Quantity? If so, create a suggestion for the demand.
    - If the Re-Stock to Max check box is selected, this job or purchase suggestion will use the quantity defined within the Part-site detail's Maximum On-Hand Quantity.

By default, the MRP engine will create an unfirm job if it can find a valid method of manufacturing linked to the part. However, if the MRP engine cannot locate a valid part method, it instead generates a job suggestion. You can convert the job suggestions to firm jobs within the Job Manager program.

- Even though you can convert an unfirm job or job suggestion into a firm job, these jobs will continue to be modified each time the MRP engine is run. This is also true for open purchase orders that were originally generated by MRP. The MRP engine will generate suggested changes to open jobs and purchase orders, which you can choose to act on.
- Note that the MRP engine will use the Unfirm Job Prefix value to indicate which jobs were generated by the MRP calculations, and that these job numbers are generated in sequence. You can review the jobs within the Job Entry program. As long as the job has an Unfirm status, it can be deleted by the MRP engine and regenerated as a new unfirm job.

If the MRP engine is run against a firm job, you can limit the suggestions placed against it. You can freeze a firm job's Due Date or Quantity by selecting the appropriate Lock check box. The MRP engine cannot make suggestions against locked values. Locked values, however, are still evaluated as part of the MRP calculations in order to determine the total supply available against the current demand requirements.

Similar logic is used for purchase orders. After a PO is created from a purchase suggestion, its status is set to Open and suggestions can be placed against it each time the MRP engine is run. You can pull these suggestions into the PO record, updating its releases with the new results. To prevent a release from being changed, however, you can freeze each release's Due Date and Quantity by selecting the appropriate Lock check box. After you lock the PO, the MRP engine will no longer create suggestions for it. However, the engine will still consider this purchase order during its calculations.

After you close a PO, the MRP engine no longer counts this purchase order during its calculations.

Planning Contracts

The Process MRP processes demand for **Link to Contract** parts as individual part numbers.

Example: You create three sales orders for the same part, for instance **Part_A**, which is a Link To Contract part, and link each sales order do a different Planning Contract. When you run the MRP process, it will process the part in three separate cycles:

It will treat Part_A - Contract 1 as it were a unique Part number.

It will treat Part_A - Contract 2 as it were a unique Part number.

It will treat Part_A - Contract 3 as it were a unique Part number.

Four log files are created as follows:

- 03:18:52 Processing Part:Part-A Site:MfgSys Contract:
- 03:18:52 Processing Part:Part-A Site:MfgSys Contract:Contract-1
- 03:18:53 Processing Part:Part-A Site:MfgSys Contract:Contract-2
- 03:18:54 Processing Part:Part-A Site:MfgSys Contract:Contract-3

Note: The Process MRP will generate three unfirm jobs for a Contract (Contract Warehouse Bin) location defined in Planning Contract Maintenance.

You mark a part record as Link to Contract in the **Part Maintenance > Sites > Detail** sheet.

The MRP Planning Contracts Logic

- If a part on the Sales Order is a **manufactured** item that is linked to a Planning Contract, and the Method of Manufacture (MOM) for the part includes **purchased** materials that are marked as **Link To Contract** in the Part Maintenance > Sites > Detail sheet, then:
  - When an unfirm job is generated, the Contract ID on the Job Header, inherited from the Sales Order, is automatically linked to the Link To Contract materials in the job's MOM.
  - The Process MRP generates new Purchase Order Suggestions for the Link To Contract materials. The purchase order suggestions will displays the same Contract ID once you review them in Purchase Order Suggestion Entry. When you convert the suggestions to the Purchase Order, the Contract ID is inherited.

    The parent part and the materials will be stocked in a Contract bin defined in Planning Contract Maintenance.

If the MOM includes a sub-assembly with the Link To Contract materials, those materials will also inherit the Contract ID from the Job Header.

- If a Sales Order release is for a **Purchased** part (including **Buy To Order**) then:
  - The Process MRP will create a purchase suggestion that is linked to the same contract and the relevant Purchase Order when convert the suggestion.

The purchased part will be stocked in a Contract bin defined in Planning Contract Maintenance.

The supply generated to fulfill a Contract is consumed by the actual demand linked to the same part at the same Planning Contract.

Example: If there is a Planning Contract line for 100 units and there is demand (Sales Order, Job Materials, or Transfers) for 75, the MRP will also plan to fulfill the remaining 25 units defined at the Planning Contract line (at the Due Date of the Contract).

Important: Planning parameters for a part (Min, Max, Safety Stock) are not considered when planning a Part - Contract supply.

Filtering Options

Before you run the MRP process you can filter parts by Site, Part, Part Class, and Product Group.

Site

Use the **Site** sheet to search for and select site(s) that you want to include in the MRP process.

Only parts that belong to a site that you select in this sheet will be processed.

Example You select the **Main** site using the **Filter > Site** sheet. Only parts that belong to the Main site will be processed. If you select all the available sites in this sheet, the Epicor application will process all the parts (parent assembly parts) marked as **Process MRP** in Part Maintenance. For each of the parent parts the Process MRP will go through the Bill of Materials (BOM) and considers demand for materials and sub-assemblies that are part of the Method of Manufacture (MOM) of the parent part(s).

Once you select a site(s), you can run the MRP process in both the **Net Change** or **Regenerative** modes.

Part

Use the Part sheet to search for and select part(s) that you want to include in the MRP process.

Use this sheet to search for and select any number of parts to process. For each of the parent parts the Process MRP will go through the Bill of Materials (BOM) and consider demand for materials and sub-assemblies that are part of the Method of Manufacture (MOM) of the parent part(s). Only parts that you select in this sheet will be processed.

Example You select part **A** (one part only) using the **Filter > Part** card. The Epicor application will process only part **A**. If you select all the available parts in this sheet, the application will process all the parts (parent assembly parts) marked as **Process MRP** in Part Maintenance. Using this sheet you can search for and select any number of parts that you want to process. For each of the parent parts the Process MRP will go through the Bill of Materials (BOM) and considers demand for materials and sub-assemblies that are part of the Method of Manufacture (MOM) of the parent part (s).

Part **A** in this example includes materials **B** and **C**, both materials are purchased parts. Once you run the **Process MRP**, materials **B** and **C** are considered by the application (new demand), as they are needed to manufacture part A. This new demand (for parts B and C) comes from demand for part A. For example, a sales order placed for part A.

After you run Process MRP for part **A**, you also get demand for materials **B** and **C**. If you now create a sales order for material **C** only, the Epicor application will consider the demand for part **C** (which is also material used for part **A**) as unchanged requirements (static). The difference between a parent part, such as part **A**, and child parts, such as parts **B** and **C**, is that for part A all demand changes are considered, whereas for parts **B** and **C** only demand changes from **A** (and other parent parts) are considered. Additionally, demands from other sources are considered static, but are still included.

For more information about how the Epicor application treats unchanged requirements during the MRP processing, refer to the Part Class example included in the Part Class topic.

Important Once you select a part(s), you can run the MRP process in the Net Change mode only.

Job Tables

If you run Process MRP by part, the process also looks for subassemblies and materials in job tables.

Example You enter a sales order (demand) for **10** units of **Part A** (manufactured part). **Part A** includes **Part B** (purchased material; Qty/Parent: 1) in its method of manufacture (MOM). Next, you run the Process MRP and review the unfirm job for **10** units of **Part A**. If you change the **Quantity** value for **Part A** on the generated job in Job Entry from **10** to **8** and run the Process MRP again, the process will review the existent job table and create an additional job for **2** units of **Part A**.

If you change the **Qty/Parent** value for **Part B** on the generated job in Job Entry from **1** to **2** and run the Process MRP again, the process will double the suggestion from **10** to **20**.

Part Class

Use the **Part Class** sheet to search for and select part class(es) that you want to include in the MRP process.

Only parts that belong to a part class that you select in this sheet will be processed.

Using this sheet you can search for and select any number of part classes that you want to process. For each of the parent parts that belong to the selected part class the Process MRP will go through the Bill of Materials (BOM) and considers demand for materials and sub-assemblies that are part of the Method of Manufacture (MOM) of the parent part(s).

Example This example uses parts A, B, C, D, and E.

Example scenario:

1. Parts A, B, and D belong to a Part Class called Electrical.
2. Part A includes two materials in its Method of Manufacture (MOM), materials B and C.
3. Part D includes two materials in its MOM, materials C and E.
4. Parts B, C, and E do not include materials in their MOMs.
5. The demand for parts A, B, C, D, and E is as follows:

Part	Demand (Quantity)	Comment
A	100	N/A
B	120	• 100 units for part A (see the MOM for part A in point 2 above). • 20 units an independent demand.
C	200	• 100 units for part A (see the MOM for part A in point 2 above). • 100 units for part D (see the MOM for part D in point 3 above). The Qty/Parent value for material C in the MOM for part D is 2.
D	50	N/A
E	50	N/A

6. You process a normal MRP run.

Results:

Part	Processed Demand
A	100
B	120
C	200
D	50
E	50

7. You enter additional demand (sales orders) for the following parts.

Part	Sales Order Quantity
A	10
B	5
D	6
E	20

8. You process an MRP run by selecting the Electrical part class only.

9. **Results:**

Demand	A	B	C	D	E
Existing	100	120	200	50	50
New	10	10+5	10+6	6	20+6
Ignored	N/A	N/A	N/A	N/A	20
Processed Demand	110	135	216	56	56

10. **Part A** - Is a parent part and therefore **10** units coming from the new sales order are processed, plus the existing demand of **100** items from the first MRP run.

    Part B - Is a parent part and therefore **5** units coming from the new sales order are processed, **10** units derive from part **A** (as there is an additional demand of **10** units for part **A** and part **B** is material in part's **A** MOM), plus the existing demand of **120** items from the first MRP run.

Part C - Is not a parent part. The demand of **16** units coming from parent parts **A** and **D** is processed, plus the existing demand of **200** items from the first MRP run.

Part D - Is a parent part and therefore **6** units coming from the new sales order are processed, plus the existing demand of **50** items from the first MRP run.

Part E - Is not a parent part. The **20** units coming from the sales order are ignored, but the existing demand of **50** items from the previous MRP run remains unchanged. Additionally, the **6** units coming from demand for part **D** (part **E** is material in part's **D** MOM) are considered, resulting in a total demand of **56** items.

Once you select a part class(es), you can run the MRP process in the Net Change mode only.

Product Group

Use the **Product Group** sheet to search for and select product group(s) that you want to include in the MRP process.

Only parts that belong to a product group that you select in this sheet will be processed.

Using this sheet you can search for and select any number of product groups that you want to process. For each of the parent parts that belong to the selected product group the Process MRP will go through the Bill of Materials (BOM) and considers demand for materials and sub-assemblies that are part of the Method of Manufacture (MOM) of the parent part(s).

For more information and examples about how the Epicor application treats unchanged requirements during the MRP processing, refer to the Part and Part Class examples included in the Part and Part Class topics.

Once you select a product group(s), you can run the MRP process in the Net Change mode only.

Modifiers

The following section describes the MRP Processing values you can change.

- **Allow Historical Dates**- Select the Allow Historical Dates check box to indicate that the MRP engine will allow operations and purchasing start dates to be placed in the schedule before the Scheduled Start Date. If selected, the MRP process can suggest Start Dates values for jobs and purchase orders that are earlier than the Scheduled Start Date. Note however, that only job and purchase suggestion Start Dates can be placed earlier in the schedule history. MRP will not place a job's Required By Date or a PO's Need By Date earlier than the Scheduled Start Date. If this situation occurs, these records will have their Start Date set to the Scheduled Start Date or later. If this check box is clear, the MRP engine only schedules operations on or after the Scheduled Start Date. All jobs or purchase orders will be scheduled on or after this

date.

- **Cut Off Date**- The date on which the MRP engine will stop looking for demand.
- **Ignore Constrained Materials**- Select this check box to indicate that the scheduling process should ignore any required materials. When the MRP engine uses the scheduling engine to determine Start Date and End Date, the schedule will not be limited by the dates on which these material quantities are available.
- **Include Purchase Contract Items**- Select this check box to process purchase contract items during MRP calculations. During each process run, the MRP engine generates these items at the end of its calculations.
- **Number of MRP Processes**- This modifier defines how many separate threads your server runs to complete the MRP process. This feature improves performance, as you can split one large MRP process into several threads (if your hardware can handle multiple threads). The process then takes less time to complete. Use this value together with the Number of Schedulers field to optimize performance.
- **Number of Schedulers**- This modifier defines how many separate threads your server runs to schedule unfirm jobs. This feature improves performance, as you can schedule unfirm jobs on several threads (if your hardware can handle multiple threads). Use this value together with the Number of MRP Processes field to optimize performance.
- **Process Options**- MRP can be run using Net Change logic or Regenerative logic.
    - **Net Change**- This calculation method ignores any previously generated MRP information. Using this option changes unfirm jobs and PO suggestions only with updates in sales orders, forecasts, master production schedules, and other sources that were changed since the last time the MRP engine was run.
    - **Regenerative**- This calculation method processes all outstanding sales orders, forecasts and other demand sources, as well as any jobs or POs previously created by the MRP engine. All current unfirm jobs and PO suggestions are deleted. New unfirm jobs and suggested POs are generated at this time.
- **Run Finite Scheduling During MRP Calculation**- Select this check box to indicate that all job suggestions and unfirm jobs will be calculated using the Finite Scheduling method. This method prevents any resources used on operations from being scheduled for production above their capacity. Note however, that not all jobs will be finitely scheduled. The MRP engine also uses the Finite Horizon value with the Scheduled Start Date to define a limit for finite scheduling. Any jobs that have Required By Dates that occur after the Scheduled Start Date + the Finite Horizon will be infinitely scheduled. Thus, the scheduling engine will allow load to be placed against resources that is higher then their capacity to produce.
- **Run the Multi-Level Pegging Process** - Select this check box to indicate that the MRP process will run a calculation that provides you with additional supply and demand details. Each supply part quantity will be directly linked, or pegged, to the specific demand record that created it. You can view this information on the Multi-Level Pegging Display dashboard.
- **Scheduled Start Date**- The date that will be used to start both the MRP and scheduling processes. This date is the first date from which the MRP engine runs. For example, if this date is two days in the future but the MRP engine is run now, then today and tomorrow are both considered in the past. If scheduling in the past is not allowed because the Allow

Historical Dates check box is clear and a forward scheduled job has a Start Date that occurs before this date, the Scheduled Start Date will be used instead of the Start Date. The forward scheduling method uses a job record's Start Date to calculate when a job will end. If scheduling in the past is not allowed because the Allow Historical Dates check box is clear, and a backward scheduled job is supposed to begin before the Scheduled Start Date, the job will be forward scheduled using the Scheduled Start Date as its Start Date. If scheduling in the past is allowed because the Allow Historical Dates check box is selected, then a job's Start Date can be placed before this Scheduled Start Date. Its Required By Date, however, cannot be placed before this date.

- **Sort 0 Level MRP Jobs by Requested Date**- Specifies that while the MRP process generates jobs, it should delay starting the scheduling engine until all zero assembly level MRP jobs are created first. The scheduling engine then schedules the jobs in Requested Due Date order.
- **Use Production Preparation Buffer**- Select this check box to indicate that the Production Prep Buffer (or Production Prep Time) defined on part and site will be used by the MRP engine. The buffer defines how many days are needed by Production Planning to prepare a job before it can be released to production.

Where Located

You can access the MRP Processing functionality through the following locations.

- **Process MRP**-- This program launches the MRP engine. Note that because this is a processing program, you can run this process automatically through a regular schedule. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **Time Phase Inquiry**- Use this tracker to review time-phased material requirements for a specific part. Launch the tracker after the MRP process is run to review the impact on a specific report. The report's data is pulled from the PartDetail table.
- **Time Phase Material Requirements Report**- This report lets you review all the changes generated by the MRP engine. It displays future inventory balances by analyzing planned receipts and the requirements for each part. The report's data is pulled from the PartDetail table.

Logic/Algorithms

The MRP Processing functionality uses this logic to calculate its results.

- The MRP engine first processes all of the stock transactions. Then it runs all of the non-stock transactions, so it does not check for inventory during the final phase of the run.
- Each demand record's Required By Date must be >= the Scheduled Start Date and <= Cut Off Date.

Example(s)

The following example(s) illustrate how you use the MRP Processing functionality.

Non-Stock Part

You have a sales order for a 50 quantity of part 734-R, a non-stock part that has a valid part method. The order has a Required By Date of 4/12. When the MRP engine is run, it will not count any stock quantity against this demand. Because a 50 quantity is needed, an unfirm job for a 50 quantity is created. This unfirm job has an End Date of 4/12.

Stock Part

You have a sales order for a 50 quantity of part 453-K, a stock part. This order has a Required By Date of 8/23. When the MRP engine is run, it will count stock quantity against this demand. The engine discovers that there is a 23 quantity of part 453-K in stock. Because of this stock quantity, the MRP engine generates a job suggestion for a 27 quantity that has an End Date of 8/23.

Stock Part--Make Direct

Demand for part 453-K increases, and your stock quantities are completely consumed by current sales orders. To prevent the MRP engine from using the stock calculations, you select the Make Direct check box on the part record. This causes the MRP engine to treat this stock part as a non-stock part. Job suggestions will be created for this part that represents only the quantity needed for this part on the Required By Date.

MRP Recalculation Needed

The MRP Recalculation Needed is a calculation method that lets you reduce the need to run the MRP engine in Regenerative mode. This mode deletes all previously generated MRP information in order to calculate new job, transfer order, and purchase suggestions.

Constantly running the MRP engine in Regenerative mode can strain your network resources, which can cause the MRP process to run slowly.

The MRP Recalculation Needed method provides better results than when you run the MRP engine in Net Change mode. Net Change mode restricts the amount of calculations run by the MRP engine, because it ignores any previously generated information. When you use the MRP Recalculation Needed method, however, demand is recalculated for records that are typically ignored by Net Change mode.

For example, suppose that no activity is placed against a sales order when the MRP engine is first run. If the sales order has a future Due Date that is outside the Cut Off Date range, the sales order is recorded by the MRP engine, but it does not create any suggestions against it. When MRP processing is run in Net Change mode, no activity will be placed against the sales order, because its values were already recorded by the Process MRP program. Thus, the sales order is completely ignored by MRP.

The MRP Recalculation Needed method makes sure that all the sales orders are correctly evaluated by the MRP engine. Because it eliminates the need to do a full regeneration every time MRP is run, this calculation improves efficiency. This is because the MRP Recalucation Needed process does not review a part's Reschedule In, Reschedule Out, or Planning Time Fence date ranges. If no other

changes are made to records linked to this part, then this part is ignored during the Net Change MRP processing run.

Note that you can set up this calculation method to run automatically on a recurring schedule. If you process MRP automatically, you should set up the MRP Recalculation Needed process to run just before the MRP process. This maximizes effeciency during the MRP process.

Modifiers

The following section describes the MRP Recalculation Needed values you can change.

These are the values you can modify for this item:

- **Check Cutoff Window**- When selected, this check box causes the calculation to review the Cut Off Date used during the previous MRP run, and compare it to the proposed Cut Off Date you entered for this process. If there is demand for this part during this date range, demand for the MRP part is recalculated.
- **Check Finite Horizon**- When selected, this check box causes the calculation to review the resources assigned to a job. If any of the resources are scheduled using Finite Capacity, the calculation checks to see if the job operation's Schedule Date is within the finite horizon. If the job is within this horizon, demand for the MRP part is recalculated.
- **Check On Hand Quantity**- When selected, this check box causes the calculation to review the Safety Stock and Minimum On Hand Quantity defined on part-site detail. If the current On Hand Quantity is below the sum of these two fields, then the MRP part's demand is recalculated.
- **Check Short Horizon**- When selected, this check box causes the calculation to evaluate the Short Horizon defined on the part-site detail. If the date on the demand record was beyond the short horizon window on the previous MRP run, but now falls within the short horizon window for the current process, then the MRP part's demand is recalculated.
- **Cut Off Date**- The final date that you want this calculation to review. This field becomes active when you select the Check Cutoff Window check box.

Where Located

You can access the MRP Recalculation Needed functionality through the following locations.

- **MRP Recalculation Needed**- You run this calculation method through the MRP Recalculation Needed program. This is a process program that you can set up to run on a recurring schedule. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The MRP Recalcuation Needed functionality uses this logic to calculate its results.

Check Cut Off Window

- If Due Date > Last Cut Off Date and the Due Date <= Proposed Cut Off Date then MRPCalcNeeded is True.

Check Finite Horizon

- If the Job Operation End Date >= (Last Schedule Date + Finite Horizon) and Job Operation End Date <= (Proposed Schedule Date + Finite Horizon) then MRPCalcNeeded is True.

Check On-Hand Quantity

- If On Hand Quantity < (Minimum On Hand Quantity + Safety Quantity) then MRPCalcNeeded is True.

Check Short Horizon

If End Date >= (MRP Last Schedule Date + Short Horizon Days) and End Date <= (Proposed Scheduled Date + Short Horizon Days) then MRPCalcNeeded is True.

Example(s)

The following example(s) illustrate how you use the MRP Recalculation Needed functionality.

If a sales order is created for a part that has a Due Date that is outside the part's Cut Off Date range, the sales order is recorded, but it is not planned. When MRP processing is next run in Net Change mode, no activity will be placed against the sales order, because its values were already recorded by the Process MRP program. This causes the sales order to be ignored by MRP.If the MRP Recalculation Needed program is run prior to the new Process MRP run, the sales order will be included in the MRP Planning.

Multi-Level Pegging

The Multi-Level Pegging calculation provides you with additional supply and demand details. Each supply part quantity is directly linked, or pegged, to the specific demand record that created it.

You can view this information on the Multi-Level Pegging Display dashboard. This dashboard shows how much inventory quantity is available for the part, the jobs currently producing each part, the sales orders creating demand for the part, and so on.

You can view the multi-level pegging results by part, sales order, transfer order, job, and purchase order. After you select the record you wish to review and process the calculation, the Multi-Level Pegging Display program shows you a multi-level, indented display of its Demand, Supply, and Material.

The Demand sheets contain different views of the quantity requirements linked to the specific record. The Supply sheet shows you the records that will satisfy this demand. The Materials sheet displays the parts, down to the raw materials, required to create the main part specified in the demand.

Note: The Multi Level Pegging Process always allocates available warehouse quantity for a material required on a job before it considers a quantity on a purchase order.

Irrespective of the Due Date defined on a purchase order, the Multi Level Pegging Process first pulls the required material quantity from stock.

Planning Contracts

The **Multi-Level Pegging Display** displays planning contract information for the demand and supply.

The Multi-Level Pegging Process pegs demand and supply, if they are linked to the same planning contract.

The Multi-Level Pegging Process also pegs demand and supply not linked to a planning contract. You cannot peg demand tied to a planning contract to supply that is not linked to a planning contract.

The Contract ID field displays in the following sheets:

- Select > Job
- Select > Purchase Order
- Select > Sales Order
- Select > Transfer Order
- Select > Part
- Detail > Demand
- Detail > Material
- Detail > Supply

This is a read only field. The planning contract that defaults in this field comes from the corresponding Job, Purchase Order Release, Sales Order Release, and Transfer Order Line.

The Contract field also displays on the Part sheet, allowing the user to filter to only show demand/supplies linked to the planning contract in focus. The Contract field in this sheet is active.

Modifiers

The following section describes the Multi-Level Pegging values you can change.

These are the values you can modify for this item:

- **Run the Multi-Level Pegging Process** - To indicate that the MRP engine should include multi-level pegging calculation during its processing, select the Run the Multi level Pegging Process

check box.

Where Located

You can access the Multi-Level Pegging functionality through the following locations.

- **Process MRP**- Use this program to launch the MRP engine. The Run the Multi Level Pegging Process check box is on this program. You can locate this program by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **Process Multi-Level Pegging** - Run this program to complete the multi-leveling pegging process. It takes the raw data generated by the MRP engine and identifies, for a specific part, the sources of its gross requirements (demand). You can locate this program by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **Multi-Level Pegging Display** - Use this program to display the results of the multi-pegging calculations. Launch this program after the Process Multi-Level Pegging process is complete. You can locate this program by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Example(s)

The following example(s) illustrate how you use the Multi-Level Pegging functionality.

The Multi Level Pegging Display is useful when viewing the overall supply and demand for a top selling product. For example, if there is a part that is a high seller, use the Multi Level Pegging Display to see the supply and demand for all of the materials that make up the part. This helps you identify exactly what will be required to fulfill the demand and what purchase orders or sales orders are tied to the materials needed to manufacture the product.

Net Change

Net Change is a calculation mode you can select within the Process MRP program. Net Change mode restricts the amount of calculations run by the MRP engine, because it ignores any previously generated information.

If a demand requirement was changed since the last time the MRP engine was run, all the job, transfer order, and purchase suggestions originally generated for these requirements are updated. If a demand requirement was not changed for a suggestion, these records are left alone. It always uses the base inventory unit of measure assigned to the part in the Primary UOMs - Inventory field when performing MRP calculations.

If a value (especially a Date or Quantity value) is updated within any of the demand sources listed below, these updates will cause a Net Change to occur within any suggestions linked to the demand source. The demand sources are:

- Forecasts
- Master Production Schedules
- Sales Orders
- Transfer Orders
- Inventory Restock Quantities
- Material Requirements on Jobs
- Recurring Purchase Order Quantities
- Changes to the Part's Method of Manufacturing

More specifics on the logic that causes a Net Change are detailed in the Logic/Algorithms section on the next page.

This is one of two calculation modes you can run with MRP. The Regenerative calculation mode recalculates all the demand regardless of whether or not it was changed.

Modifiers

The following section describes the Net Change values you can change.

These are the values you can modify for this item:

- **Automatic Net Change Processing**- You select this calculation mode within the Process MRP program. Because this is a process, you can set this program up to run automatically on a recurring schedule. Thus, the MRP engine will run frequently, making sure that your suggestions provide results that reflect the changing demand received by your company. You can set up the Process MRP program to always run in Net Change mode. This will reduce the amount of data that is processed, giving you faster results and reducing the overhead on your network.
- **MRP Recalculation Needed**- This process provides better results than when you run the MRP engine in Net Change mode. Net Change mode restricts the amount of calculations run by the MRP engine, because it ignores any previously generated information. However, when you use the MRP Recalculation Needed method demand is recalculated for records that are typically ignored by Net Change mode. If you will automatically run this process with MRP Processing, be sure that the MRP Recalculation Needed process is run before MRP Processing within the process set.

Where Located

You can access the Net Change functionality through the following locations.

- **Process MRP**- The Net Change option is found within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Net Change functionality uses this logic to calculate its results.

These are the specific data changes in the data that will trigger a Net Change:

- Changing the Part Type value on a site record.
- Changing the MRP Planning or Short Horizon Planning parameters on a part-site detail record.
- Changing the revision level on a method of manfacturing.
- Changing a part record that is used within a method of manufacturing (BOM). The Net Change calculation will move through all the assemblies within an unfirm job, generating suggestions that reflect this part record change.
- Creating a new forecast.
- Changing the Customer, Number, Date, or Quantity on a forecast.
- Creating a new master production schedule.
- Changing the site, Date, or Quantity on a master production schedule.
- Creating a new sales order.
- Changing a Date or Quantity value on an existing sales order.
- Creating a new purchase order.
- Changing a Date or Quantity value on an existing purchase order.
- Changing the Lock check box on a PO release.
- Creating a new transfer order.
- Changing a Date or Quantity value on an existing transfer order. This will create Net Change suggestions for both the receiving site and the source site.
- Creating a new job for an MRP part.
- Changing a demand link Quantity on an existing job.
- Changing a Start Date on an existing job.
- Adding a new material to an existing job.
- Changing the Quantity Per Parent value within an operation detail on an existing job.
- Changing the Supplier ID on an operation detail within an existing job.
- Changing the Make Direct check box on an assembly detail within an existing job.
- Changing the Purchase Direct check box on a material detail within an existing job.
- Changing the Supplier ID on a material detail within an existing job.
- Changing either the job schedule or quantity Lock check boxes.
- If a job that is manufacturing part quantities for other jobs has either its Start Date or Quantity changed, a Net Change will be generated for each job that is linked to this changed job.
- DMR part transactions.
- Issue Material part transactions.

- Issue Assembly part transactions.
- Issue Miscellaneous part transactions.
- Receipt Entry part transactions.
- Transfer Order Receipt part transactions.
- Customer Shipment part transactions.
- Quantity Adjustment part transactions.

Example(s)

The following example(s) illustrate how you use the Net Change functionality.

When MRP runs in Net Change mode, it first locates all of the demand requirements that were changed since the previous MRP run. Then it removes all of the suggestions and unfirm jobs that were originally generated from the changed requirements and processes the updated demand requirements to generate new unfirm jobs and suggestions.

Quantity

The Quantity value is used in several ways by the MRP engine. Quantity values measure the amount of demand that is needed from various sources.

Quantity values are also used to determine the amount of supply that can satisfy the demand. Supply quantities come from jobs, purchase orders, and inventory.

A key quantity to constantly monitor is the On-Hand Quantity available for each stock part. As you use MRP, be sure that the application has an accurate count of the quantities of each available part.

Another key value is the Consumed Quantity that appears on sales forecasts. As sales orders are placed against the part quantity defined on the forecast, this Consumed Quantity increases. When the Consumed Quantity equals the Quantity entered on the forecast, the MRP engine considers the forecast Quantity completely satisfied, and the forecast is no longer used to calculate demand.

Modifiers

The following section describes the Quantity values you can change.

These are the values you can modify for this item:

- **Forecast Quantity**- This value defines the amount of a part that is predicted to be sold. This quantity places demand against the part.
- **Job Quantity**- This value defines the amount of a part manufactured on a job. This places supply against this part. This quantity places demand against the part.
- **Production Quantity (MPS)**- This value defines the quantity that needs to be produced by the Due Date on a master production schedule.

- **Purchase Order Quantity**- This value defines the amount of a part that is being purchased. This quantity places supply against the part.
- **Quantity Adjustment**- This program is useful for manually updating stock quantities. You can locate this program from the Main Menu by opening the Material Management folder, the Inventory folder, and the General Operations folder.
- **Sales Order Quantity**- This value defines the amount of a part being ordered by a customer. This quantity places demand against the part.

Where Located

You can access the Quantity functionality through the following locations.

- **Time Phase Detail**- This program shows the current demand and supply for the part. You launch this program by right-clicking the Part number field.
- **Part On Hand Status**- This program shows the current on-hand status for each part. You can also launch this program by right-clicking the Part number field.

Logic/Algorithms

The Quantity functionality uses this logic to calculate its results.

- Total On-Hand Quantity = On-Hand Quantity (Warehouse A) + On-Hand Quantity (Warehouse B) + On-Hand Quantity (Warehouse C) + and so on...

Example(s)

The following example(s) illustrate how you use the Quantity functionality.

A customer, Dalton Manufacturing, typically orders a 500 quantity of Part 378-0R every month. You want to have the MRP engine reflect this demand, so at the beginning of the year you create a three month forecast record for Part 378-0R. You add a forecast detail for Dalton Manufacturing. This forecast record contains a 1,500 Forecast Quantity and a Forecast Date of 3/31.

Now the MRP engine creates jobs against this forecast detail. As sales orders for Part 378-0R are created for Dalton Manufacturing, the Consumed Quantity value on the forecast increases, letting you track the progress of the forecast. The following table illustrates how a forecast quantity is consumed:

Date	Forecast Quantity	Consumed Quantity	Sales Order Quantity	Part Detail
1/02	1,500	0	0	1,500
1/25		500	500	1,000
2/25		1,000	500	500
3/31		1,500	500	0

Overload Scheduling

Overload Scheduling causes the scheduling engine to create job records within the Shop Load table. These overloaded resource records then display in the Shop Load Graph and the Overload Informer.

You can enhance scheduling performance by setting up an Overload Horizon timeframe, which is typically the number of days you manage overloaded resources. You can then use the Shop Load Graph and the Overload Informer to manage overload in the site within this relative time frame without loading data beyond the point you are managing.

If you do not use these tools, however, enter a "1" value in this field to load only one day's records into the Shop Load table.

The Overload Horizon does not affect the Shop Load report. The Shop Load report prints load hours for each operation scheduled for a resource group, and so is separate functionality from the Overload Horizon.

Note that the MRP engine does not handle the Overload Scheduling calculation. Instead, it calls the scheduling engine and, if this functionality is active, the overload schedule is generated. The scheduling engine automatically uses this calculation if you enter a value in the Overload Horizon field. This field is located within the site Maintenance program on the Detail sheet.

Modifiers

The following section describes the Rough Cut Scheduling values you can change:

- **Fixed** - Use this set of fields to define extra fixed time you wish to include during the rough cut scheduling calculation. You first define a percentage value for this modifier and then all fixed times will increase by the percentage you indicate. You can also enter Minimum Change and Maximum Change values; these values define the lowest amount of time and the highest amount of fixed time that can be added through this rough cut parameter. You define this value on codes within Rough Cut Parameter Maintenance and select these codes within Product Group Maintenance and Part Maintenance.
- **Rough Cut Horizon** - Use this field to define the number of days from the current system date (Today) where the Rough Cut Scheduling calculation will be used to schedule jobs. Any jobs that have End Date values that fall outside of this window are scheduled using the Rough Cut Scheduling calculation. You define this value on each site record.
- **Setup** - Use this set of fields to define extra setup time you wish to include during the rough cut scheduling calculation. You first define a percentage value for this modifier and then all setup times will increase by the percentage you indicate. You can also enter Minimum Change and Maximum Change values; these values define the lowest amount of time and the highest amount of setup time that can be added through this rough cut parameter. You define this value on codes within Rough Cut Parameter Maintenance and select these codes within Product Group Maintenance and Part Maintenance.

- **Subcontract** - Use this set of fields to define extra subcontract time you wish to include during the rough cut scheduling calculation. You first define a percentage value for this modifier and then all subcontract times will increase by the percentage you indicate. You can also enter Minimum Change and Maximum Change values; these values define the lowest amount of time and the highest amount of variable time that can be added through this rough cut parameter. You define this value on codes within Rough Cut Parameter Maintenance and select these codes within Product Group Maintenance and Part Maintenance.
- **Variable** - Use this set of fields to define extra variable time you wish to include during the rough cut scheduling calculation. You first define a percentage value for this modifier and then all variable times will increase by the percentage you indicate. You can also enter Minimum Change and Maximum Change values; these values define the lowest amount of time and the highest amount of variable time that can be added through this rough cut parameter. You define this value on codes within Rough Cut Parameter Maintenance and select these codes within Product Group Maintenance and Part Maintenance.

Where Located

You can access the Overload Scheduling functionality through the following locations.

- **site Maintenance**- You activate the Overload Scheduling modifier on the Detail sheet. To do this, enter a number of days value within the Overload Horizon field. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Process MRP**- You launch the MRP engine through the Process MRP program. You enter the Scheduled Start Date within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Overload Scheduling functionality uses this logic to calculate its results.

- If Required By Date > (Scheduled Start Date + Overload Horizon), then schedule the job using Infinite Capacity and place it on the Shop Load Table.

Example(s)

The following example(s) illustrate how you use the Overload Scheduling functionality.

You enter an Overload Horizon value of 30 days on a part-site detail for Part 345K-983. You receive a sales order for this part that is 45 days in the future from the Scheduled Start Date that you entered within the MRP Process program.

Because this demand requirement falls outside the Overload Horizon, MRP creates an unfirm job using Overload Scheduling. It uses the Need By Date on the sales order to create the Required By Date on the job. Then it calculates how long it will take to produce the part quantity by generating End Dates on operations that will allow the unfirm job be completed by the Required By Date.

It does not consider the capacity required to finish each operation, only the dates by which each operation needs to be completed to meet the Required By Date on the unfirm job.

Plan As Assembly

Run the Plan As Assembly calculation when you want to automatically generate firm jobs for materials within a method of manufacturing. You activate this functionality within the Engineering Workbench, as you can select this option on a material node within the bill of materials.

When a Plan As Assembly material is evaluated through MRP processing, the MRP engine checks to see if enough on-hand quantity is available within inventory to satisfy this demand material requirement. If enough quantity is available either through current stock or estimated future stock, the material quantity is considered satisfied and it is turned into a material requirement. If not enough quantity is available however, the MRP engine then splits off a new unfirm job for the subassembly that contains this material. This new job contains a Make to Job demand link for the original job record, and the subassembly node within the original job record is automatically changed into a material node.

The MRP engine then evaluates this split unfirm job independently from the original job, estimating when this job can best be produced during the schedule. If lot sizes are defined for the part, multiple unfirm job records may be needed to satisfy the demand material requirement.

Adjustments

You define the Plan As Assembly modifier using the following options:

- **Auto-Consume Stock -** When you select this check box, you indicate material requirements on part methods will automatically pull stock quantities as they become available. When the MRP engine evaluates an auto-consumed part, the Available to Promise calculation determines when some of this material quantity will be available in the future. This quantity amount is then considered when the MRP engine calculates whether an unfirm job (or jobs) should be created for the subassembly.
- **Minimum Lot Size -** The smallest quantity of a material you allow on each job record. If a demand material requirement is less than this amount, the MRP engine automatically increases the quantity on the generated job to the Minimum Lot Size value.
- **Maximum Lot Size -** The largest quantity of a material you allow on each job. If a demand material requirement is more than this amount, the MRP engine automatically divides the quantity into two or more jobs until the demand material requirement is satisfied.
- **Multiple -** This value defines the multiplying factor used by the MRP engine to create MRP jobs. When the MRP engine generates firm and unfirm jobs, the quantities on these jobs use this multiple value. For example, if you enter 100, all quantities for this part will be in multiples of 100 - like 300, 500, 600, and so on.
- **Plan As Assembly** - Select this check box within a material on a method of manufacturing. When not enough inventory quantity is available, this causes the MRP engine to automatically split the subassembly that contains the material into its own unfirm job or jobs.

Where Located

You can access the Plan As Assembly functionality through the following locations.

Engineering Workbench

The Plan As Assembly check box is located on the Method of Manufacturing - Materials - Detail card.

Menu Path

Navigate to this program from the Main Menu:

Production Management > Engineering > General Operations > Engineering Workbench

Part Maintenance

You indicate a part can automatically consume part quantities and define lot sizes through Part Maintenance. All of these modifiers are located on the Part - sites - Planning sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Plan As Assembly functionality uses the following logic to calculate its results.

The MRP engine evaluates Plan As Assembly materials through the following logical sequence:

- If the part can automatically consume part quantities, check the On-Hand-Quantity value for the material.
- If enough quantity is currently available or is estimated to be available through the Available to Promise calculation, create a material requirement for this part and move on through the part method.
- If not enough quantity is available, split off the subassembly that contains the material and create a new unfirm job.
- Assign the Unfirm Job Prefix to job number on the generated job.
- Evaluate the Minimum Lot Quantity and Maximum Lot Quantity values on the part record. If the material quantity on the unfirm job is larger than the Maximum Lot Quantity value, create multiple jobs until the quantity requirements are satisfied.

Example(s)

The following example(s) illustrate how you use the Plan As Assembly functionality.

The MRP engine is creating a job for Part A that contains assemblies AB and AC. Both assembly AB and assembly AC are set to Plan As Assembly within the part method. The Manufacturing Lead Time Calculation is run, and it generates the following times for each level within the part method:

- Part A:
  - Cumulative Lead Time -- 51 Days
  - This Level Lead Time -- 2 Days
- Part AB - 10 (contains purchased parts P1 and P2):
  - Cumulative Lead Time -- 28 Days
  - This Level Lead Time -- 7 Days
  - P1 Lead Time -- 14 Days
  - P2 Lead Time -- 21 Days
- Part AC - 20 :
  - Cumulative Lead Time -- 49 Days
  - This Level Lead Time -- 14 Days

The Cumulative Lead Time values include the manufacturing time for the cost lot quantity of each level plus the critical path for any dependant assemblies. The This Level Lead Time values include the total manufacturing time in days to produce the costing lot size quantity of the parts.

Notice how the lead times are calculated using the three assembly levels in the method hierarchy:

- The Cumulative Lead Time for Part A (51 days) is the sum of the Cumulative Lead Time for Part AC (49 days) plus the This Level Lead Time for Part A (2 days).

- The Cumulative Lead Time for Part AC (49 days) is the sum of Part AB Cumulative Lead Time (28 days) and This Level Lead Time (7 days) and Part AC - 20's This Level Lead Time (14 days).
- The Cumulative Lead Time for Part AB (28 days) and the This Level Lead Time (7 days) divides the total time it takes to receive purchase parts P1 and P2. P1 has a purchasing Lead Time of 14 days and P2 has a purchasing Lead Time of 21 days for a total of 35 days.

The MRP engine generates job MRP00010, a job that contains assemblies AB and AC. This creates demand for the purchased parts within PO Suggestions, and the purchasing lead times are factored into the lead time results. The MRP engines does this using the following logic:

1. Check whether the Auto Consume check box is selected on part records included as materials on the method.
2. Check whether the Pull As Assembly check box is selected on materials within the Engineering Workbench.
3. Review the Minimum Lot Size and Maximum Lot Size values and generate jobs based on these quantities.

Part AB automatically consumes stock quantities; you need a 25 quantity for this material. Currently inventory does not have enough on-hand quantity to satisfy the material requirement. However, the Available To Promise calculation determines that enough stock will be available during its Cumulative Lead Time of 28 days. Because of Part AB automatically consumes stock quantities and enough will be available to satisfy this requirement, a pull quantity is generated for Part AB, and the MRP engine moves on to Part AC.

Part AC also automatically consumes stock quantities. You need a 525 quantity for this material. Just like before, inventory does not have enough on-hand quantity available. This time the Available to Promise calculation determines that not enough quantity will become available during its Cumulative Lead Time required for this subassembly. Because of this, a job is created for this subassembly and given the firm status. The quantity on the firm job is greater than the Maximum Lot Size value on the part record, as this value is set to a 100 quantity. So five jobs are generated that use this Maximum Lot Quantity (100) value. The Minimum Lot Quantity value is set to 50; the remaining 25 quantity is less than this value. A sixth job is created for a 50 quantity.

Planner

A planner is the person responsible for turning job suggestions into unfirm jobs, evaluating the job method, and ultimately approving the jobs for production. They approve the jobs by clearing the Unfirm check box for each record within Job Entry.

The MRP engine includes the Planner with each job suggestion, so these individuals can quickly locate the suggestions generated for the products for which they are responsible. To accomplish this, you need to define a planner for each product group or each site linked to each product group. The MRP engine will use the planner linked to each product group or product group/site as the default value on job suggestions.

Global alerts can also be set up for each planner. As labor and material quantities are placed against this job, these alert messages are sent to the planner. This individual can then monitor the progress of a MRP generated job from start to finish.

Modifiers

The following section describes the Planner values you can change.

These are the values you can modify for this item:

- **Planner**- When a job suggestion is generated, the Planner defined on the part record's product group or product group site detail appears in the Job Entry program. If you need, however, you can change this value on each job record.

Where Located

You can access the Planner functionality through the following locations.

- **Person Maintenance**- Use this maintenance program to enter the individuals who will be the planners for your manufacturing center. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Product Group Maintenance**- Product groups classify the different kinds of parts that your company produces. Use this maintenance program to identify an individual who will be the overall planner for the product group. If you need, you can link sites to each product group, which lets you select a specific planner on each site detail. Thus, you can define multiple planners for each product group. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Part Maintenance**- You define the product group that will be used for each part record on the Part sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Job Entry**- Each job is assigned to a planner. The planner defined on the part's product group appears by default. If you need, however, you can change this value. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the General Operations folder.

Logic/Algorithms

The Planner functionality uses this logic to calculate its results.

The MRP engine checks for planners using the following logic:

- If a Planner value is defined on a product group's site- Detail sheet, use the planner on a job suggestion.
- If a Planner value is not selected on a site-Detail record, but a Planner value is defined on a part's Product Group - Detail sheet, use this planner on a job suggestion.
- If a Planner is selected on a job record, override the Planner generated by the job suggestion.

Example(s)

The following example(s) illustrate how you use the Planner functionality.

Bruce McCoy is your main job planner for your Pipe Fittings product group. Your company manufactures many parts that use this classification, however, so you also define the main sites that produce these parts. You indicate that Malena Jones is the planner for the Red site, and Peter Smith is the planner for the Blue site.

When the MRP engine runs, it reviews the sites that will manufacture the parts. Any job suggestions for parts manufactured at the Red site will use Malena Jones as the planner. Any job suggestions for parts manufactured at the Blue site will use Peter Smith as the planner. If any Pipe Fittings parts are manufactured in other sites not defined on the product group, Bruce McCoy will appear as the planner on these job suggestions.

Purchased Part Type

The Purchased part type indicates that a part is purchased from a supplier. The MRP engine creates purchase suggestions against this part record.

Individuals responsible for purchasing can then create PO's from these suggestions.

This value is also used as selection criteria on various reports and searches. It does not, however, limit how you can use this part record. You can purchase any part that is defined as manufactured, and you can manufacture any part that is defined as purchased.

Modifiers

The following section describes the Purchased Part Type values you can change.

These are the values you can modify for this item:

- **Non-Stock Item** - When a purchased part is a non-stock part, the demand for part will be satisfied by purchase orders that are linked to the job that created the demand. The MRP engine will create a purchase suggestion for the part. The suggestions will use any Minimum Lot Size, Maximum Lot Size and Multiple values on the part-site detail to determine the quantity on each suggestion.
- **Stock Item**- When a purchased part is a stock part, the demand for this part will be satisfied from inventory; allocations will be created to pull the part quantity on its Required By Date. The allocations will use any Minimum Lot Size, Maximum Lot Size, Safety Stock Size, and Multiple values on the part-site detail to determine the quantity on each suggestion.

Where Located

You can access the Purchased Part Type functionality through the following locations.

- **Part Maintenance**- You can indicate a part is a Purchased part in two locations within this program:
  - **Part- Detail sheet** - You select this value from the Type drop-down list.
  - **Part- sites - Detail sheet** - You also select this value from the Type drop-down list. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Purchased Part Type functionality uses this logic to calculate its results.

- If the purchased part is a non-stock item, satisfy the demand by using purchase orders that are linked to the job.
- If the purchased part is a stock item, satisfy the demand for this part from within inventory.

Example(s)

The following example(s) illustrate how you use the Purchased Part Type functionality.

Non-Stock Part

You are producing a 30 quantity for Part 345-09X. One of the last operations before the final assembly is a Paint subcontract operation. The MRP engine generates a purchase suggestion for this subcontract operation. There is a 30 quantity on this purchase suggestion and ClearCoat Paints is listed as the supplier for this purchase.

Stock Part

You need sheet metal material to manufacture Part 456T. As it evaluates the part's method, the MRP engine discovers this material and generates a purchase suggestion. When the supplier sends the part quantity to your site, this quantity is added to the On-Hand Quantity within the Primary Warehouse selected on the part-site detail.

Recycle Jobs

The Recycle Jobs calculation improves MRP processing performance by saving unfirm jobs that use active part revisions. Instead of deleting all unfirm jobs each time the MRP process is run, this calculation determines which unfirm jobs can be saved. When the MRP process begins generating unfirm jobs during the current process run, it uses these recycled jobs first to satisfy current demand.

A new job is only created when a valid recycled job cannot be found. Likewise, if any recycled jobs could not be linked to a new demand record, the recycled unfirm job is deleted.

The calculation uses three date values to decide if an unfirm job can be recycled. It first uses the Effective date on each part revision and the next earliest Effective Date to calculate a date range

during which each revision is active. It then evaluates whether the Requested Due Date on the original unfirm job and the new Requested Date on the demand record both fall within the part revision's active dates. If both dates occur within this date range, the job is recycled and any new part quantities are updated. If a revision contains materials with inactive part revisions, a new job is created as well.

Note that any jobs created for configured parts cannot be recycled.

To run this calculation, you use the Update Recycle Thresholds process. This process calculates the current effective dates for each part revision in your database. Then when the MRP process runs, you can activate the recycle jobs calculation to save any unfirm jobs that fall within the active part revision date ranges. Epicor recommends you always run the Update Recycle Thresholds process before you run MRP Processing; this makes sure you only recycle unfirm jobs with active part revisions. To do this, you can create a process set that runs the Update Recycle Thresholds process before the MRP Process.

Modifiers

The following section describes the Recycle Jobs values you can change:

- **Effective** - Use this date value to define the last date on which a part revision is effective. If the demand record's Requested Due Date is on or before this value and after the previous revision's Effective date, the original unfirm job is considered valid by the MRP engine and will be recycled. You define this value within the Engineering Workbench on the Revision - Detail sheet.
- **Recycle MRP Jobs** - Select this check box to indicate the MRP process will recycle valid unfirm jobs. You select this option on the Process MRP window.

Where Located

You can access the Recycle Jobs functionality through the following locations.

- **Engineering Workbench** - You define the Effective date range on each part revision on the Revision - Detail sheet. Main Menu Path: Production Management>Engineering>General Operations>Engineering Workbench
- **Process MRP** -- This program launches the MRP engine. You indicate this process will recycle jobs by selecting the Recycle MRP Jobs check box. Main Menu Path: Production Management>Material Requirements Planning>General Operations>Process MRP
- **Update Recycle Thresholds** - Use this process to calculate the date ranges currently available for each active part revision. If you want to recycle jobs, you must run this process before you run MRP processing. Epicor recommends you add this process and the Process MRP program to the same process set to make sure you generate accurate results. Be sure the Update Recycle Thresholds program runs before MRP processing. Main Menu Path: Production Management>Material Requirements Planning>General Operations>Update Recycle Threshold.

Logic/Algorithms

The Recycle Jobs functionality uses the following logic to calculate its results.

- Part Revision Threshold = Previous Revision's Effective Date - Effective Date
- If original unfirm job Request Date and current demand Request Date falls within the Part Revision Threshold, recycle the unfirm job.
- Update the recycled unfirm job quantity to reflect the new demand.
- Update the unfirm job's target demand Sales Order Number, Job Number or Warehouse

Example(s)

The following example(s) illustrate how you use the Recycle Jobs functionality.

Part A's current active revision is A10. Its Effective Date is 1/15. The next revision, A11, has an Effective Date on 2/15. The MRP engine generates job MRP00011 for Part A, revision A10 on 1/16 for a 50 quantity.

The MRP engine is next run on 2/2, and it encounters a new demand record for a 55 quantity on Part A. Because the A10 revision is still active and the new demand quantity also falls within this revisions effective date range, the MRP engine recycles job MRP00011 and updates the quantity on the job to 105.

Regenerative

Regenerative is a calculation mode you can select within the Process MRP program.

This calculation mode deletes all previously generated MRP information to calculate new job, transfer order, and purchase suggestions. This mode causes the MRP engine to process all outstanding sales orders, forecasts, master production schedules, and all other demand sources to create the new suggestions. It always uses the base inventory unit of measure assigned to the part in the Primary UOMs - Inventory field when performing MRP calculations. The MRP engine deletes any previously generated unfirm jobs, job suggestions, and purchase orders.

This is one of two calculation modes you can run with MRP. The Net Change calculation mode restricts the amount of calculations run by the MRP engine, as this mode only calculates suggestions from either new or updated demand sources.

Modifiers

The following section describes the Regenerative values you can change.

These are the values you can modify for this item:

- **Automatic Regenerative Processing**- You select this calculation mode within the Process MRP program. Because this is a process, you can set it up to run automatically on a recurring schedule. Thus, the MRP engine will run frequently, ensuring that the suggestions give you results that reflect the changing demand received by your company. You can set up this

process to always run in Regenerative mode, which causes the application to recalculate all of the MRP results on a regular basis. Note however, that running the MRP engine in Regenerative mode can consume large amounts of your network's resources, so regularly using this calculation mode is not recommended.

Where Located

You can access the Regenerative functionality through the following locations.

- **Process MRP**- The Regenerative option is found within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Regenerative functionality uses this logic to calculate its results.

- When the MRP engine runs in this calculation mode, all unfirm jobs, job suggestions, and purchase suggestions are immediately deleted. It then creates new unfirm jobs, job suggestions, and purchase suggestions based on the current sources of demand.

Example(s)

The following example(s) illustrate how you use the Regenerative functionality.

You are not happy with the MRP suggestions that were generated by the engine during its most recent run. You pull some forecasts into a master production schedule and modify the quantities within the schedule.

When you finish making these changes, you decide to completely recalculate all of the unfirm jobs, job suggestions, and purchase suggestions currently within your database by running the MRP Process program in Regenerative mode. Although this process will take a while to run, you want the MRP results to accurately reflect the changes you have made.

Rough Cut Scheduling

Rough Cut Scheduling is an MRP calculation option that generates a job schedule without placing load against your resources.

This reduces the processing time needed to generate the overall schedule, but still determines Material Required By Dates. Rough Cut Scheduling calculates these dates based on operation Start Dates and End Dates. Use this calculation option to get general idea about the production plan you may require in the future.

To activate Rough Cut Scheduling, define a Rough Cut Horizon value on each site record. Any job required on or before this date is scheduled using regular scheduling. However any jobs due after the Rough Cut Horizon are scheduled using the Rough Cut Scheduling calculation.

How It Works

Rough Cut Scheduling first evaluates the Setup Rate, Production Rate, and Run Quantity defined on each operation. It uses these values to calculate the Start Date and Due Date needed to begin and end the operation. When material is needed, the Material Required Date uses the related operation's Start Date. If the material does not have a related operation, the calculation assumes the material is required when the first operation begins in that assembly.

For purchased materials, the Rough Cut Scheduling calculation validates the Lead Time required for the material. This value is used to determine the Due Dates on purchase suggestions so the material is available by the job operation's Start Date. If the purchased material is pulled from stock, the calculation assumes the material is already available and does not calculate Lead Time.

After the calculation determines these values, it infinitely schedules each job backwards using its Need By Date. The scheduling boards will show the operations. However because load is not placed against your resources, time bars are not placed on the grids and the Overload Informer does not display overload.

Additional Calculation Details

All backward scheduled jobs use the End Date on which each part quantity is due to determine the dates when each operation can begin. The amount of time it takes each operation to complete is calculated by adding Setup Time, Production Time, and other factors. The total time required for each operation is then added to arrive at the overall total time required for each subassembly. This subassembly time is then totaled to determine the time needed for each assembly - and then the scheduling engine determines the Start Date for the job.

When a job is scheduled finitely, any setup and production time placed against the job is constrained by the number of hours available at each resource each day. Operations cannot be scheduled beyond this hour limit. Jobs that have a higher priority are assigned first to the capacity available on each resource. However when you schedule jobs infinitely, you generate the optimal schedule for each job as if it has the highest priority in your site. Other job operations compete for the same resources; because of this, the number of operations scheduled against each resource can be greater than the capacity available on the resource.

Rough Cut Parameters

Rough Cut Scheduling can also include any additional time you define through rough cut parameters. Four rough cut parameter types are available:

- Setup
- Fixed
- Variable
- Subcontract

You can define a percentage value for each type. When Rough Cut Scheduling determines the amount of time needed for each time type, the final time is increased by these percentage values.

You can also define minimum and maximum values for each time type to limit the additional time the calculation adds. Each set of parameters is grouped together under a specific code. You then select these rough cut codes on product groups and part revisions. The product group defines the default rough cut parameter set used on all the parts assigned to that group. However if a part revision contains a different rough cut code, these parameters override the values defined on the product group.

Rescheduling Rough Cut Jobs

At some point you must reschedule rough cut jobs so they use the load and capacity constraints defined at the site. To do this, either open the job in Job Entry and run the Job Scheduling program or run the Calculate Global Scheduling Process and select the Schedule Rough Cut Jobs Only check box. If you want to automatically schedule several rough cut jobs, use the Calculate Global Scheduling Process.

Rough Cut Scheduling Details

- Once a job is rough cut scheduled, it keeps these values. If the job is no longer within the Rough Cut Horizon and you run MRP again, the job is still scheduled without load.
- The Save Resource Load Process does not reschedule rough cut jobs, it only places load against them. After you run this program, you must run the Global Scheduling process to add these jobs to the regular schedule.
- When you indicate a rough cut job is Firm in Job Entry, this job is not automatically scheduled. You will need to run the Schedule Job program to place load against the job on the schedule.
- When MRP processes a part that uses Recycle Jobs, these jobs use the Recycle Job parameters to generate the job instead of Rough Cut parameters. However if the part does not use recycle jobs , the Rough Cut parameters are instead used to generate the job.

Modifiers

The following section describes the Rough Cut Scheduling values you can change.

These are the values you can modify for this item:

- **Rough Cut Horizon**- This value indicates the number of days from the Scheduled Start Date that used for the horizon. If an job or a job suggestion has a Required By Date greater than the Final Rough Cut Horizon date, it is calculated using Rough Cut Scheduling.
- **Scheduled Start Date**- This value defines the specific date used to begin the Rough Cut Horizon.

Where Located

You can access the Rough Cut Scheduling functionality through the following locations.

- **Site Maintenance** - You define the Rough Cut Horizon on each site record. You also indicate whether the rough cut parameters defined on part revisions and product groups will be

included during the rough cut scheduling calculation for this site. You set up these parameters on the Detail - Detail sheet.

Menu Path: Production Management > Job Management > Setup > Site Maintenance

- **Part Maintenance** -You can select the rough cut parameters code on each part revision using the Part-Revisions- Detail card. The selected code overrides the rough cut parameters defined on the product group defined for the part.

Menu Path: Production Management > Job Management > Setup > Part

- **Product Group Maintenance** - Product groups classify the different part types you sell. You can define a rough cut parameter code on each product group. By default, parts assigned to this product group automatically use these parameters unless a different rough cut parameter code is selected on a part revision.

Menu Path: Production Management > Job Management > Setup > Product Group

- **Rough Cut Parameters Maintenance** - Use this program to define additional time you would like to include during the rough cut schedule calculation. This extra time can be added to the setup, fixed, variable, and subcontract times calculated through rough cut scheduling. You define the additional percentage to add to each time category as well as the minimum and maximum times you allow. Each set of parameters is defined through a rough cut parameter code. You can then select this code on product groups and part revisions. The product group rough cut parameters are the default values used for all parts contained within the product group. If a different rough cut parameter code is used on a part revision, these values override the product group values.

Menu Path: Production Management > Scheduling > Setup > Rough Cut Parameter

- **Manufacturing Lead Time Calculation** - Use this process program to generate manufacturing lead times for a specific part, part group, and/or site. This program uses rough cut scheduling to generate its values. You can run this process whenever you need. You can also set up this process to run during an automatic recurring schedule you define.

Menu Path: Production Management > Engineering > General Operations > Mfg Lead Time Calculation

- **Calculate Global Scheduling Order Process** - Use this process to calculate and assign the order of jobs incorporated through the Global Scheduling process. This process has a Schedule Rough Cut Jobs Only check box; select this check box to only calculate the scheduling order of rough cut jobs.

Menu Path: Production Management > Scheduling > General Operations > Calculate Global Scheduling Order

Logic/Algorithms

The Rough Cut Scheduling functionality uses this logic to calculate its results.

- Rough Cut Schedule Date = Current System Date + Rough Cut Horizon
- If job's End Date > Rough Cut Schedule Date, then use Rough Cut Scheduling
- Rough Cut Scheduling:
    - Uses Backwards Scheduling
    - Schedules Infinitely
    - Load is not placed against resource records

Example(s)

The following example(s) illustrate how you use the Rough Cut Scheduling functionality.

The current date is 5/17, and you are running MRP to generate and schedule future jobs at the Blue site. This site has a Rough Cut Horizon value of 15 days, so any jobs with End Dates that occur on the day immediately after this horizon value (Current Date + Rough Cut Horizon) are scheduled using the rough cut calculation. The production calendar selected for the Blue site defines a five-day work week. Because of this schedule, no production time is available over the weekends.

Based on an incoming demand record, the MRP engine generates Job MRP000144. This job has an End By date of 7/15, so it falls outside the rough cut horizon. When the scheduling engine next generates the schedule for MRP000144, it will use the rough cut scheduling calculation. This job will produce a 100 quantity of Part 12W34, and it contains the following operation times and material times:

- Purchase Part: ALUM -- 2 Days Purchasing Lead Time
- Opr 10: MOLDING -- 4 Days
- Opr: 20: DEBURRING -- 5 Days
- Opr: 30: PAINTING -- 3 Days

Using rough cut scheduling, the scheduling engine begins with the 7/15 End Date, and moves backwards through the method to arrive at the scheduled Start Date for the job. Altogether the job requires 14 days to produce the 100 quantity, and so this days value is subtracted from the 7/15 End By date. Due to the production calendar, however, the rough cut calculation takes into account three weekends, or six non-production days, to arrive at a Start Date of 6/25 for this job.

The scheduling engine also discovers that another job, MRP000145, is planned to run A DEBURRING operation on the same resource on 7/8. Because the rough cut calculation uses infinite capacity, both operations are scheduled for production at this same resource, even though not enough time (capacity) is available to handle both operations; a bottleneck will occur at this resource on this date. No actual load, however, is placed against this resource, or any of the other resources required to complete job MRP000144.

Short Horizon Planning

A Short Horizon is a date range that you define on each Part-site detail record. The Short Horizon Planning calculation allows you to define a different set of lot sizes for items that have Required By Dates which occur within this date range.

If a job or purchase suggestion's Required By Date is less than or equal to the Scheduled Start Date plus the Short Horizon, the Short Horizon Min Lot Size, Max Lot Size, and Days of Supply are used during MRP processing instead of the part's normal lot size values.

Both sets of lot sizes are defined on the Part-site detail within a part record (Part Maintenance). The alternate lot sizes are entered within the Short Horizon Planning group box.

Note that even though the alternate lot sizes are used, the MRP engine still usse the Multiple defined for the original lot sizes, because the engine assumes that the Multiple applies in both situations.

Modifiers

The following section describes the Short Horizon Planning values you can change.

These are the values you can modify for this item:

- **Short Horizon**- The range of days that will be added to the Scheduled Start Date. This determines the Short Horizon date range used during each MRP engine run. If the Short Horizon field is blank, the MRP engine does not perform a Short Horizon calculation.
- **Min Lot Size (Short Horizon Planning)**- This field defines the minimum lot size used during the short horizon calculation.
- **Max Lot Size (Short Horizon Planning)**- This field defines the maximum lot size used during the short horizon calculation. Suggestions will continue to use this quantity until the remaining quantity can all be placed on one suggestion.
- **Days of Supply (Short Horizon Planning)**- This alternate value defines how many days into the future MRP will look to calculate the quantity needed on a job or purchase suggestion, if the demand falls within the Short Horizon. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range. All the demand records that fall within this range are combined to generate one or multiple (if over the Maximum Lot Size value) suggestions. Typically only one suggestion is created through this calculation.
- **Multiple (MRP Planning)**- This modifier defines the quantity at which your jobs for this part must be a multiple. The final quantity is always rounded up to the nearest modifier. For example, if you enter 100 in this field and a job suggestion is calculated at a 379 quantity, the MRP engine will calculate that a 400 quantity is required on this job suggestion.

Where Located

You can access the Short Horizon Planning functionality through the following locations.

- **Part Maintenance**- You activate the Short Horizon modifier on the Part - sites - Detail sheet. To do this, enter a number of days within the Short Horizon field. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Process MRP**- You launch the MRP engine through the Process MRP program. You enter the Scheduled Start Date value within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Short Horizon Planning functionality uses this logic to calculate its results.

- The MRP engine uses the Short Horizon Planning values instead of the MRP Planning values if the unfirm job or job suggestion's Required By Date is less than or equal to Scheduled Start Date plus the Short Horizon.

Example(s)

The following example(s) illustrate how you use the Short Horizon Planning functionality.

Dalton Manufacturing needs you to create jobs that only have a 1 quantity so that they can serial track these parts. Creating that many 1 quantity unfirm jobs, however, can greatly increase the time it takes to generate MRP suggestions.

You decide to use Short Horizon Planning. You enter 14 for the Short Horizon value. Then for the Short Horizon Maximum Lot Size, you enter a quantity of 1. For the standard Maximum Lot Size (MRP Planning), you enter a quantity of 100. Any unfirm jobs or job suggestions that have Required By Dates within the Short Horizon date range will be generated with a 1 quantity.

Supply Sources

There are several records within the application that are used as supply sources by the MRP engine. These records define the quantity of parts that will satisfy the demand generated for sales order and production activity.

The MRP engine first calculates the total demand required, during a defined date range, for each manufactured and purchased part handled by your company. It then goes through a series of calculations to calculate the sources of supply that can satisfy this demand.

The MRP engine calculates these supply sources against the demand:

- **Job Suggestions**- These records are potential jobs that will be used to manufacture needed part quantities. Planners can evaluate these suggestions and turn them into unfirm jobs.
- **Unfirm Jobs**- A job that has the unfirm status is job record can updated by MRP. If a demand requirement changes the Required By Date or quantity linked to an unfirm job, the MRP engine will delete this job and create a new unfirm job in its place.
- **Firm Jobs**- To release an unfirm job to your manufacturing center, you turn it into a firm job. Suggestions, however, will still be generated against these jobs each time the MRP engine is run. You can, however, limit the suggestions placed against firm jobs. You can freeze a firm job's Due Date or Quantity by selecting the appropriate Lock check box. The MRP engine will then not be able to make suggestions against key values. These locked values, however, are still evaluated as part of the MRP calculations in order to determine the total supply available against the current demand requirements.

  To lock a single part on a job, select the **Prevent Suggestions** check box in the Job > Co-Parts sheet in Job Entry.

- **Purchase Suggestions and PO Orders**- These records are potential purchase orders that will be used to buy materials required for production. Buyers and their authorized users can turn these suggestions into open PO's. As long as the purchase order has the Open status, suggestions can be generated against it. Your company's buyers and authorized users can then update these PO's by pulling in these suggestions and turning them into PO releases.
- **Transfer Order Suggestions**- These are sales orders placed by other companies within your organization. These are handled in a similar way as sales orders, but these transactions are handled internally between these companies.

Modifiers

The following section describes the Supply Sources values you can change.

You must define the date range that the MRP engine will use while it is run. These are the dates you must define within the Process MRP program:

- **Cut Off Date**- The date on which the MRP engine will stop looking for demand. Enter the date you need in this field.
- **Scheduled Start Date**- The date that will be used to start both the MRP and scheduling processes. This date is the first date from which the MRP engine runs. For example, if this date is two days in the future but the MRP engine is run now, then today and tomorrow are both considered in the past by the MRP engine. If scheduling in the past is not allowed because the Allow Historical Dates check box is clear and a forward scheduled job has a Start Date that occurs before this date, then this Scheduled Start Date value will be used instead as the Start Date. The forward scheduling method uses a job record's Start Date to calculate when a job will end. If scheduling in the past is not allowed because the Allow Historical Dates check box is clear, and a backward scheduled job is supposed to begin before the Scheduled Start Date, the job will instead be forward scheduled using the Scheduled Start Date as its Start Date. The backward scheduling method uses a job record's End Date to calculate when a job will begin. If scheduling in the past is allowed because the Allow Historical Dates check

box is selected, then a job's Start Date can be placed before this Scheduled Start Date. Its Required By Date, however, cannot be placed before this date.

Where Located

You can access the Supply Sources functionality through the following locations.

- **Process MRP Program**- This program is located under the Production Management directory located in the Material Requirements Planning folder in the General Operations section. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **Planning Workbench**- Use this program to create new jobs or make changes to existing jobs based on job suggestions generated by the MRP engine. These job suggestions can be linked to sales orders. They can also be job suggestions for job quantities for required stock quantities.
- **PO Entry**- Use this program to create purchase orders based on purchase suggestions generated by the MRP engine. As long as the purchase order has the Open status, purchase suggestions may be created against it.
- **Job Entry**- Use this program to create unfirm job records based on job suggestions generated by the MRP engine. As long as the job order has the Unfirm status, its dates and quantities can be automatically updated by the MRP engine. When a planner changes the job status to Firm, however, any changes to this job record must be entered manually.

Logic/Algorithms

The Supply Sources functionality uses this logic to calculate its results.

The MRP supply logic asks these questions:

- **What quantities of a part are coming in from different locations?** The MRP engine calculates supply quantities from the following sources:
  - Purchase Orders
  - Other Jobs
  - Transfer Orders
  - Receipts from Inspection
- **If this is a stock part, what quantities can be used from inventory?** The MRP engine calculates these supply quantities using the following considerations:
  - The Total On-Hand Quantity available in all warehouses that stock the part.
  - The Minimum On-Hand Quantity required to be kept within stock.
  - The Safety Stock Quantity required to be kept in stock for emergency situations.
- **What quantities are being manufactured?** The MRP engine calculates these supply quantities from the jobs that are currently manufacturing part quantities.

- **What quantities are needed each day?** When the available supply quantities do not equal the required demand quantities on a specific date, the MRP engine creates job, transfer order, and purchase suggestions. The MRP engine calculates the quantities required on these suggestions using the following methods:
    - If this is a non-stock part, create a job or purchase suggestion for the demand.
    - If this is a stock part, calculate the amount of supply available on a specific day and then create the job or purchase suggestion.
    - If this is a stock part, is the On-Hand Quantity under the Minimum On-Hand Quantity? If so, create a suggestion for the demand.
    - If the Re-Stock to Max check box is selected, the job or purchase suggestion will use the quantity defined within the Part-site detail's Maximum On-Hand Quantity.
    - If this is a stock part, is the On-Hand Quantity under the Safety Stock Quantity? If so, create a suggestion for the demand.
    - If the Re-Stock to Max check box is selected, this job or purchase suggestion will use the quantity defined within the Part-site detail's Maximum On-Hand Quantity.

Example(s)

The following example(s) illustrate how you use the Supply Sources functionality.

You enter a sales order for a 300 quantity for Part 45T-872. This is the demand source that the MRP engine will use - it will then locate the supply sources that can be used to satisfy this demand.

This is a stocked part, so the engine locates 100 parts in the Red Warehouse and allocates the parts to this sales order.

Because the MRP engine can locate a valid part method for this part, it then generates unfirm jobs to satisfy the remaining demand requirement. There is unresolved demand for 200 parts. The part-site detail has a Maximum Lot Size of 50, so the MRP engine generates 4 unfirm jobs - each for a 50 quantity of Part 45T-872.

Tables Used by MRP

The MRP engine both checks and writes to a number of tables in the database. This section displays a list of these tables and the information the MRP engine either checks or updates within these tables.

This list is useful for any Business Activity Queries (BAQs) that you may want to create to help you monitor the MRP calculation results.

Modifiers

The following section describes the Tables Used by MRP values you can change.

This is the list of tables:

- **PARTDTL**- This is the main table evaluated by the MRP engine. It contains all the transactions that are being made against a specfic part. Other programs - PO Entry, Job Entry, and Sales Order Entry - write data to this table.
- **PARTSUG**- This table contains all the job suggestions. When the MRP engine cannot locate an approved method of manufacturing for a part, it generates a job suggestion instead of an unfirm job. These job suggestion records are then stored within this table.
- **SUGPODTL**- This table contains all the new purchase suggestions that are generated by the MRP engine.
- **SUGPOCHG**- This table stores all the purchase suggestions generated against existing purchase orders. These changed PO suggestions can be used to update an existing PO release.
- **TFORDDTL**- This table contains all the new transfer order suggestions that are generated by the MRP engine.
- **TFORDCHG**- This table stores all the transfer order suggestions generated against existing transfer orders. These change transfer order suggestions can be used to update an existing transfer order.
- **JOBHEAD**- This table contains the primary information the MRP engine generates for unfirm jobs. These jobs are created when the JobFirm value equal No. As part of the unfirm job calculation, the MRP engine also automatically populates the following tables:
    - **JOBMTL**- Contains the material records required to produce the part quantity on the unfirm job.
    - **JOBOPR**- Contains the operation records required to produce the part quantity on the unfirm job.
    - **JOBOPRDTL**- Contains the operation detail records required by the scheduling engine to schedule the job.
    - **JOBPROD**- Contains the demand links that are created against this job. You can create Make to Stock, Make to Order, and Make to Job demand links.
    - **JOBPART**- Contains the information on the part being produced by the unfirm job.
    - **JOBASMBL**- Contains the assembly records required to produce the part quantity on the unfirm job.

Where Located

You can access the Tables Used by MRP functionality through the following locations.

These tables are located within the application database.

Logic/Algorithms

The Tables Used by MRP functionality uses this logic to calculate its results.

A key value within the PARTDTL table is the RequirementFlag. This values determines if the source being evalulated against the part will be either a demand record or a supply record:

- If this value evaluates to TRUE, the record becomes a demand.
- If this value evaluates to FALSE, the record becomes a supply.

The RequirementFlag value is set by the source file type. This is a list of these source file types and the values they set for the RequirementFlag:

- Purchase Order = FALSE (supply)
- Sales Order = TRUE (demand)
- Job Material = TRUE (demand)
- Subcontract Operation = TRUE (demand)
- Job = FALSE (supply)
- Transfer Order = This value is set differently at the receiving site and the source site:
    - Receiving site = TRUE (demand)
    - Source site = FALSE (supply)

A key value within the PARTDTL table is the RequirementFlag. This values determines if the source being evalulated against the part will be either a demand record or a supply record:

- If this value evaluates to TRUE, the record becomes a demand.
- If this value evaluates to FALSE, the record becomes a supply.

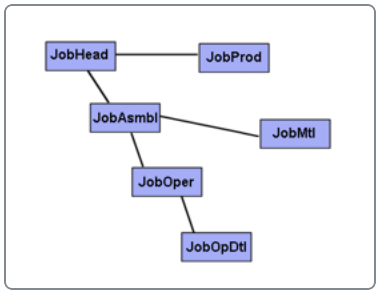
The RequirementFlag value is set by the source file type. This is a list of these source file types and the values they set for the RequirementFlag:

- Purchase Order = FALSE (supply)
- Sales Order = TRUE (demand)
- Job Material = TRUE (demand)
- Subcontract Operation = TRUE (demand)
- Job = FALSE (supply)
- Transfer Order = This value is set differently at the receiving site and the source site:
    - Receiving site = TRUE (demand)
    - Source site = FALSE (supply)

Example(s)

The following example(s) illustrate how you use the Tables Used by MRP functionality.

The following illustration shows how each job record is structured and the relationship between the main tables and the sub-tables.


JobHead
JobProd
JobAsmbl
JobMtl
JobOper
JobOpDtl

Modifiers

This section details the various fields and tools you can use to adjust the primary MRP calculations. These items are located in jobs and scheduling programs.

Use the modifiers you need to generate MRP results that best reflect your production workflow.

Allow Consumption of Minimum Quantity

Select this check box to activate the **Consume Minimum Quantity** calculation. When you activate this calculation, you cause both the MRP and PO Suggestion processes to use another level of lead time calculations. When certain supply conditions are met within the purchase lead time, an additional set of **Urgent Planning** parameters activate. These parameters use the Minimum Quantity available within inventory to satisfy demand while at the same time generate purchase orders suggestions that require more immediate resolution. You can then reduce the gaps that can occur when standard lead times spread out demand though lengthy time intervals.

After the MRP engine finishes calculating supply and demand requirements during the lead time window (MRP Scheduled Start Date + Standard Lead Time), it then calculates supply and demand requirements using standard MRP logic.

The Consume Minimum Quantity calculation uses two quantity thresholds to determine its lead time results. When the available On-Hand Quantity falls below the Minimum On-Hand Quantity, the purchase order suggestions use the regular inventory parameters to arrive at the purchase quantities required on each PO suggestion. If the projected On-Hand Quantity falls below the Safety Stock or a zero (0) quantity, the Urgent Planning parameters are used to calculate the purchase suggestion quantities. Through these additional parameters, you can define specific quantities, lead times, and suppliers to use for these immediate supply needs.

Each PO suggestion also displays the reason why the MRP or PO Suggestion engines arrived at this quantity. The **Below Reorder**, **Below Safety**, and **Below Zero** reasons display on the respective purchasing change or suggestion.

You set up the Consume Minimum Quantity calculation on site and part-site records.

Adjustments

You can change the Allow Consumption of Minimum Quantity modifier using the following options.

site Maintenance

You modify this value in **site Maintenance**:

- **Allow Consumption of Minimum Qty** -- Select this check box to activate the Consume Minimum Quantity calculation for a specific site. When the projected On-Hand Quantity for a purchased part falls below the Safety Stock quantity or a 0 quantity, the Urgent Planning

parameters are used to determine quantities on the PO suggestions that fall within the lead time window (MRP Scheduled Start Date + Standard Lead Time).

Part Maintenance

You modify the **Urgent Planning** values in **Part Maintenance** on the Part > sites > Detail sheet. They define the values you use when the purchase quantity needs to arrive quickly to satisfy demand:

- **Lead Time** -- Defines the length of time it takes to receive the purchase quantity from the supplier after you place the purchase order. If you leave this value at 0 and the application finds a Supplier value on a Supplier Price List, the suggestion then uses the Lead Time value from the supplier list.
- **Minimum Order Quantity** -- Defines the smallest quantity that must be placed on each PO suggestion.
- **Multiple Order Quantity** -- Indicates the nearest multiple PO suggestions use to calculate the purchase quantity. For example, if you enter a 100 in this field, the PO suggestions will always use values in hundreds like 200, 400, 600, and so on each PO suggestion generated for the part-site record.
- **Supplier** -- Indicates the specific supplier from whom you purchase these parts when you need to receive them quickly. If you leave this field blank, the MRP and Purchase Suggestion calculations use the standard Supplier value on the part-site record or the Supplier defined on the supplier price list.

Where Located

You can access the Allow Consumption of Minimum Quantity functionality through the following location.

Site Maintenance

You activate the Consume Minimum Quantity calculation using the Allow Consumption of Minimum Quantity check box on the Detail > Planning sheet.

Menu Path

Navigate to this program from the Main Menu:

- Financial Management > Multi-Site > Setup > Site Maintenance
- Material Management > Inventory Management > Setup > Site Maintenance
- Production Management > Job Management > Setup > Site Maintenance
- Service Management > Field Service Integration > Setup > Site Maintenance
- System Setup > Company/Site Maintenance > Site Maintenance

Logic/Algorithms

The Allow Consumption of Minimum Quantity functionality uses this logic to calculate its results.

Reorder Point Quantity

Reorder Point Quantity = Minimum Quantity + Safety Stock Quantity

PO Suggestion Calculations

To activate various calculations:

- If PO Quantity + Net On-Hand Quantity is >= Reorder Point Quantity, then do not generate suggestions.
- If PO Quantity + Net On-Hand Quantity is < Reorder Point Quantity, then create a PO Suggestion where its Quantity = Reorder Point Quantity - (PO Quantity + Net On-Hand Quantity).
- If PO Quantity + Net On-Hand Quantity is < Safety Stock Quantity or < 0 Quantity, then create a PO Suggestion using the Urgent Planning parameters. This PO Suggestion Quantity = Reorder Point Quantity - (PO Quantity + Net On-Hand Quantity).

Example(s)

The following example(s) illustrate how you use the Allow Consumption of Minimum Quantity functionality.

You are generating purchasing suggestions for Part 010-0112. The part-site record uses a Purchasing (Standard) Lead Time value of 10 days. You typically purchase this part from Global Supply, as they give you the best price breaks. This part-site record also has a 20 Safety Stock quantity.

However, Global Supply's turnaround time, 10 days lead time, can sometimes be problematic. In order to satisfy demand, you set up Urgent Planning values on this part-site record. When the MRP calculation detects that the On-Hand Quantity falls below the Safety Stock value, these Urgent Planning values are used instead to calculate the purchase changes. Another supplier Speed-E Supply, can turn around a part quantity in 5 days lead time, so you use this supplier for emergency points in your schedule.

You set up the part-site record as the following:

Safety Stock: 20	Supplier	Lead Time	Min Order Qty	Mul Order Qty
Purchasing	Global Supply	10	100	N/A
Urgent Planning	Speed-E Supply	5	50	10

You generate MRP using a Scheduled Start Date of 8/12. The engine discovers that on 8/17, the available On-Hand Quantity will be 18, a two quantity below the Safety Stock quantity. Because this low quantity falls within the Standard Lead time window (in this case 8/12 - 8/22), this causes MRP to activate the Consume Minimum Quantity calculation. MRP generates a purchase change to create a PO for Speed-E Supply for part 0101-0112. The Purchase Quantity on this purchase order with be

50 and the Lead Time value will be 5 days. This purchase suggestion should then answer the increased demand needed for part 010-0112 at this point in the schedule.

Allow Historical Dates

Select the Allow Historical Dates modifier to indicate that the MRP engine allows job start dates and purchase order due dates and order by dates to be placed in the schedule before the Scheduled Start Date. The MRP process may then suggest Start Dates values for jobs and purchase orders that are earlier than the Scheduled Start Date.

Note however, that only the job Start Dates can be placed earlier in the schedule history. It will not place a job's Required By Date earlier than the Scheduled Start Date. If this situation occurs, these records will have their Start Date values placed on the Scheduled Start Date or later.

If this check box is clear, however, the MRP engine will only schedule an operation on or after the Scheduled Start Date. All jobs or purchase orders will then be scheduled on or after this date.

This modifier is useful if the Scheduled Start Date value is a future date. This will let you process upcoming supply and demand for a future date range while still taking into account any current demand that still exists.

Example

You can change the Auto Consume Stock modifier using the following options.

Lead time = 10 days and Schedule Start Date = Dec 2

Allow Historical Dates = Selected

Demand Date	Job Requested Due Date	Job Start Date	Job Due Date	PO Order By Date	PO Due Date
Nov 30	Dec 2	Nov 15	Dec 2	Nov 16	Nov 30
Dec 6	Dec 6	Nov 17	Dec 6	Nov 22	Dec 6
Dec 31	Dec 31	Dec 14	Dec 31	Dec 17	Dec 31

Allow Historical Dates = Cleared

Demand Date	Job Requested Due Date	Job Start Date	Job Due Date	PO Order By Date	PO Due Date
Nov 30	Dec 2	Nov 2	Dec 19	Nov 2	Nov 16
Dec 3	Dec 6	Nov 2	Dec 19	Nov 2	Dec 16
Dec 17	Dec 31	Dec 14	Dec 31	Dec 17	Dec 31

- For POs, both the Order By Date and the Due Date can go in the past if Allow Historical Dates = selected.
- For Jobs, the Requested Due Date can never go in the past but the Start Date can be in the past if Allow Historical Dates = selected.

Adjustments

You can change the Allow Historical Dates modifier using the following options.

These are the adjustments you can do with this modifier:

- **Active/Inactive**- Select this check box to include this calculation in MRP processing.

Where Located

You can access the Allow Historical Dates functionality through the following locations.

- **Process MRP**- The Allow Historical Dates check box is within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Allow Historical Dates functionality uses this logic to calculate its results.

Allow Historical Dates - Active

If this modifier is active, the MRP engine can calculate Start Date values on unfirm jobs, job suggestions, and purchase orders scheduled earlier than the Scheduled Start Date value.

Note that the MRP engine does not account for the current system date during these calculations. It assumes that the Schedule Start Date is the current date, and generates its calculations to reflect this date.

Allow Historical Dates - Inactive

If this modifier is not active, the MRP engine will use the Scheduled Start Date as the beginning date for all the generated suggestions and unfirm jobs. All records will be forward scheduled from this date value.

Example(s)

The following example(s) illustrate how you use the Allow Historical Dates functionality.

Within the Process MRP program, you enter a date that is 5 days in the future within the Scheduled Start Date field. You also select the Allow Historical Dates check box. You then run the MRP engine. There are 3 sales orders that have demand requirements before the Scheduled Start Date.

The MRP engine generates unfirm jobs to satisfy demand requirements for these sales orders. Because the sales orders have Need By dates that occur before the Scheduled Start Date, all of these unfirm jobs use the Scheduled Start Date value as their Start Date value as well.

Auto Consume Stock

Select this check box to indicate, that when MRP creates an unfirm job, it should verify the on hand quantities when a part being used as material is marked as Pull As Assembly on the job's parent part. Clear the check box if it should not.

When the MRP engine evaluates an auto-consumed part, it uses the Available to Promise calculation to determine whether stock is available for materials marked as Pull As Assembly, when required by the job. The expected stock on hand quantity for the material is then set as a Pull Quantity on the subassembly, and the production quantity for the subassembly is reduced by the pull quantity.

The Available to Promise calculation determines when some of this material quantity will be available in the future. This quantity amount is then considered when the MRP engine calculates whether an unfirm job (or jobs) should be created for the subassembly through the Plan As Assembly functionality.

Adjustments

You can change the Auto Consume Stock modifier using the following options.

- **Auto-Consume Stock -** When you select this check box, you indicate material requirements on part methods will automatically pull stock quantities as they become available. You select this check box on part records within the Parts - sites - Planning sheet.
- **Plan As Assembly** - Select this check box within a material on a method of manufacturing within the Engineering Workbench. When not enough inventory quantity is available, this causes the MRP engine to automatically split the subassembly that contains the material into its own unfirm job or jobs.

Where Located

You can access the Auto-Consume Stock functionality through the following locations.

Engineering Workbench

The Plan As Assembly check box is located on the Method of Manufacturing - Materials - Detail card.

Menu Path

Navigate to this program from the Main Menu:

Production Management > Engineering > General Operations > Engineering Workbench

Part Maintenance

The Auto Consume Stock check box is located on the Part - Sites - Planning sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Auto Consume Stock functionality uses this logic to calculate its results.

- If the part can automatically consume part quantities, check the On-Hand-Quantity value for the material.
- If enough quantity is currently available or is estimated to be available through the Available to Promise calculation, create a material requirement for this part and move on through the part method.
- If not enough quantity is available, split off the subassembly that contains the material and create a new firm job.

Example(s)

The following example(s) illustrate how you use the Auto Consume Stock functionality.

The MRP engine generates job MRP00010, a job that contains assemblies AB and AC. This creates demand for the purchased parts within PO Suggestions, and the purchasing lead times are factored into the lead time results. The MRP engines does this using the following logic:

1. Check whether the Auto Consume check box is selected on part records included as materials on the method.
2. Check whether the Pull As Assembly check box is selected on materials within the Engineering Workbench.
3. Review the Minimum Lot Size and Maximum Lot Size values and generate jobs based on these quantities.

Part AB automatically consumes stock quantities; you need a 25 quantity for this material. Currently inventory does not have enough on-hand quantity to satisfy the material requirement. However, the Available To Promise calculation determines that enough stock will be available during its Cumulative Lead Time of 28 days. Because of Part AB automatically consumes stock quantities and enough will be available to satisfy this requirement, a pull quantity is generated for Part AB, and the MRP engine moves on to Part AC.

Part AC also automatically consumes stock quantities. You need a 525 quantity for this material. Just like before, inventory does not have enough on-hand quantity available. This time the Available to Promise calculation determines that not enough quantity will become available during its Cumulative Lead Time required for this subassembly. Because of this, a job is created for this subassembly and given the firm status.

Auto Consume Window

The Auto Consume Window % and Days modifier allows you to specify a window of time to look for goods needed to complete a job when the full quantity is not available on the required date.

The window is calculated by calculating a specified percentage of the Manufacturing Lead Time and then adding it to the Required Date. This determines the date on which the application will check to see if the goods are available.

The percentage is specified for the site and that percentage is the default used for the part site record. When you run the Manufacturing Lead Time process or when you change the percentage for a part, the Auto Consume Window is recalculated to find the number of days for the autoconsume window. The value is read only to avoid performance issues during the scheduling process. The value will round down if it is less than 0.5 and rounds up if it is greater than or equal to 0.5.

Adjustments

You define the Auto Consume Window modifier using the following options:

- Auto Consume Window (%) - This value determines the calculation of the Auto Consume Window by applying the percentage entered to the manufacturer lead time value. Enter a percentage value between 1 and 100.

Where Located

You can access the Auto Consume Window functionality through the following locations.

- Site Maintenance - The default percentage value (between 1-100) for the site can be entered on the Detail > Planning sheet in Site Maintenance.
- Part Maintenance - You can specify a percentage value for a part on the Part > Sites > Planning sheet.

Logic/Algorithms

The Auto Consume Window functionality uses this logic to calculate its results.

- When the full quantity is not available on the required date, the window is calculated by calculating a specified percentage of the Manufacturing Lead Time and then adding it to the Required Date. This determines the date on which the application will check to see if the goods are available.

Example(s)

The following example(s) illustrate how you use the Auto Consume Window functionality.

Subassembly DSS-100 requires 10 pieces and there is an original pull quantity of 2. The job bounces forward and is scheduled on 7/25, at which time the worker tries to pull the remaining quantity. Only 3 more pieces are available (for a total of 5 of the necessary 10), and there is still not enough for the requirement. The window percentage is added to calculate a new date when the material should be reviewed to see if the pull quantity is available.

Auto Firm Horizon

The Auto Firm Horizon modifier defines a date range the MRP process uses for generating firm jobs.

Any demand records with Need By dates that fall within this date range automatically generate jobs that have the Firm status. If any previously generated unfirm jobs fall within this horizon, the MRP process automatically turns these unfirm jobs into firm jobs as well. These jobs are then ready to both engineer and release to your manufacturing center.

Any demand records with Need By dates outside this horizon, however, automatically generate jobs that use the Unfirm job status.

Adjustments

You define the Auto Firm Horizon modifier using the following options:

- **Auto Firm Horizon** - This value defines the date range the MRP engine will use to generate firm jobs. Enter a value, in days, in this field.

Where Located

You can access the Auto Firm Horizon functionality through the following locations.

- **Site Maintenance** - You define the Auto Firm Horizon values on the Detail - Planning sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Auto Firm Horizon functionality uses this logic to calculate its results.

- Last Auto Firm Horizon Date = Current Date + Auto Firm Horizon
- If a demand record or an unfirm job's Need By date occurs on or before the Last Auto Firm Horizon Date, generate firm jobs for the original record.

Example(s)

The following example(s) illustrate how you use the Auto Firm Horizon functionality.

You are processing MRP for the Blue site; this site has an Auto Firm Horizon of 10 days. The current date is 10/15.

The MRP process locates three demand records that all have Need By dates before 10/25, so they fall within the current auto firm horizon date range. These three MRP jobs generate with the Firm status. Two previously generated unfirm jobs, MRP000876 and MRP000877, respectively have Need By dates on 10/18 and 10/21. These unfirm jobs are also within the horizon range, so they automatically change into firm jobs. All of these jobs are ready to be engineered.

Cumulative Time

Cumulative Time indicates the total number of days it takes to produce the part within the current site.

This value is generated through the Manufacturing Lead Time Calculation, and it displays within Part Maintenance on the Part-site-Planning sheet. The calculation arrives at its final value by using the values generated through the Rough Cut Scheduling calculation to determine how long it takes material quantities to arrive and production quantities to be produced. Additional factors can also be included in this calculation such as purchasing Lead Time, Receive Time, Kit Time, and so on; you indicate the additional time values you want to include on each site record.

The MRP engine does not directly use the manufacturing lead time values. The Cumulative Time and This Level Time values, however, are the main factors the MRP engine uses to determine if a demand record quantity can be split into two jobs using the Start Minimum Quantity functionality. Through this functionality, if the calculated manufacturing lead time falls within Start Minimum Quantity lead time, the demand quantity is divided into two or more jobs.

If you need, you can override the Cumulative Time generated by the Manufacturing Lead Time Calculation. To do this, click the Manual check box and enter the specific time, in days, that you want instead.

Adjustments

You define the Cumulative Time modifier using the following options:

- **Kit Time** - Select this check box to indicate the time it takes in days to assemble manufactured parts will be included during the manufacturing lead time calculation. Only used on manufactured parts, the MRP engine uses it to calculate the End Date for any materials within the parent part's assembly. This value is defined on site records and part records.
- **Lead Time** - Select this check box to indicate you want to include the purchasing Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes purchased part quantities to arrive at your site.
- **Manual** -- Select this check box to override the Cumulative Time value generated by the Manufacturing Lead Time Calculation for a specific part. This check box activates the manual column on the part record within the Part-site-Planning sheet. Enter the new value, in days, that you need.
- **Receive Time** - Select this check box to indicate you want to include the Receive Time values in this calculation. This value is defined on part records, and it indicates how long it takes, in

days, to move purchased part quantities from the shipping dock to the resources that need them.

- **Rough Cut Parameters** - Select this check box to indicate any rough cut parameters defined on product groups or part revisions will be included in the manufacturing lead time calculation. These parameters add extra time for the setup, fixed, variable, and subcontract values used for generating the rough cut schedule. Each set of parameters is defined on a rough cut parameter code; you set up each code within Rough Cut Parameter Maintenance and then select these codes within Part Maintenance and/or Product Group Maintenance.
- **Transfer Lead Time** - Select this check box to indicate you want to include the Transfer Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes part quantities to arrive at your site from other locations within your organization.

Where Located

You can access and update the Cumulative Time modifier in the following locations.

- **Manufacturing Lead Time Calculation** - Use this process program to generate manufacturing lead times for a specific part, part group, and/or site. You can run this process whenever you need. You can also set up this process to run during an automatic recurring schedule you define. Main Menu Path: Production Management>Engineering>General Operations>Manufacturing Lead Time
- **Part Maintenance** - You can review and manually update the various lead time values (Receive Time, Kit Time, Lead Time, Transfer Lead Time) included in the manufacturing lead time calculation. You can also select the rough cut parameters code on each part revision; this overrides the rough cut parameters defined on the product group selected for the part. After the manufacturing lead time calculation is run, it displays both the Cumulative Time and the This Level Time values within the Part - sites - Planning sheet. If you select the Manual check box, you can update the Cumulative Time and the This Level Time values as you need. Main Menu Path: Production Management>Engineering>Setup>Part
- **site Maintenance** - You use this maintenance program to define what lead times will be included for the manufacturing lead times generated for the current site. You can also indicate whether the rough cut parameters defined on part revisions and product groups will be included in the calculation. Main Menu Path: Production Management>Job Management>Setup>site
- **Product Group Maintenance** - Product groups classify the different part types you sell. You can define a rough cut parameter code on each product group. By default, parts assigned to this product group automatically use these parameters. However, each part revision can also have its own rough cut parameters; during MRP processing, these parameters override the rough cut parameters selected on the product group. Main Menu Path: Main Menu Path: Production Management>Job Management>Setup>Product Group

Logic/Algorithms

The Cumulative Time modifier uses this logic to calculate its results.

- Cumulative Time = Subassembly 1 Time + Subassembly 2 Time + Subassembly 3 Time and so on…

Example(s)

The following example(s) illustrate how you use the Cumulative Time modifier.

The MRP engine is creating a job for Part A that contains assemblies AB and AC. The Manufacturing Lead Time Calculation is run, and it generates the following times for each level within the part method:

- Part A:
  - Cumulative Lead Time -- 51 Days
  - This Level Lead Time -- 2 Days
- Part AB (contains purchased parts P1 and P2):
  - Cumulative Lead Time -- 28 Days
  - This Level Lead Time -- 7 Days
  - P1 Lead Time -- 14 Days
  - P2 Lead Time -- 21 Days
- Part AC:
  - Cumulative Lead Time -- 49 Days
  - This Level Lead Time -- 14 Days

The Cumulative Lead Time values include the manufacturing time for the cost lot quantity of each level plus the critical path for any dependant assemblies. The This Level Lead Time values include the total manufacturing time in days to produce the costing lot size quantity of the parts.

Notice how the lead times are calculated using the three assembly levels in the method hierarchy:

- The Cumulative Lead Time for Part A (51 days) is the sum of the Cumulative Lead Time for Part AC (49 days) plus the This Level Lead Time for Part A (2 days).
- The Cumulative Lead Time for Part AC (49 days) is the sum of Part AB Cumulative Lead Time (28 days) and This Level Lead Time (7 days) and Part AC's This Level Lead Time (14 days).
- The Cumulative Lead Time for Part AB (28 days) and the This Level Lead Time (7 days) divides the total time it takes to receive purchase parts P1 and P2. P1 has a purchasing Lead Time of 14 days and P2 has a purchasing Lead Time of 21 days for a total of 35 days.

Cut Off Date

The Cute Off Date modifier defines the final date on which the MRP engine stops looking for demand. Any current demand requirements found on this day back through the entire schedule is evaluated by the MRP engine.

Only demand requirements on forecasts and master production schedules that occur before the Scheduled Start Date are not evaluated.

Note that this value is also used for the MRP Recalculation Needed calculation method. This value is used in the same way within this calculation.

Adjustments

You can change the Cut Off Date modifier using the following options.

These are the adjustments you can do with this modifier:

- **Scheduled Start Date**- The date used to start both the MRP and scheduling processes. This is the first date from which the MRP engine runs, and therefore the base date used for all the MRP calculations.
- **Cut Off Date**- The date used to end the MRP and scheduling processes.

Where Located

You can access the Cut Off Date functionality through the following locations.

- **Process MRP**-- This program launches the MRP engine. You define the Cut Off Date within the Process MRP program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **MRP Recalculation Needed**- Use this calculation method to get better results than when you run the MRP engine in Net Change mode. This method also uses a Cut Off Date value you must define before it is run. You launch this method within the MRP Recalculation Needed program; this is a process program you can set up to run on a recurring schedule. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Cut Off Date functionality uses this logic to calculate its results.

- Each demand record's Required By Date must be greater than or equal to the Scheduled Start Date and the Cut Off Date.

Example(s)

The following example(s) illustrate how you use the Cut Off Date functionality.

It is July 28th, and you want to generate suggestions for the month of August. You launch the Process MRP program and enter August 1st for the Scheduled Start Date and August 31st and the Cut Off Date. The MRP engine will calculate all the demand requirements it discovers up to August 31st.

It ignores any demand requirements, however, on forecasts and master production schedules that occur before August 1st.

Days After

The Days After value defines a date range used with sales forecasts. It defines how many days after the Forecast Date that sales orders may still consume the Forecast Quantity.

If a sales order occurs on a date that is after the Forecast Date but on or before the last day of this range, it is included against the Consumed Quantity calculation on the sales forecast.

Along with the Days Before field, this field defines a range of dates on either side of the Forecast Date during which sales order demand should be included in the forecast.

Do not make the Days Before - Days After range too large. A typical range is 5 Days Before and 25 Days After. If you enter a range like 25 Days Before and 25 Days After, you will generate unsatisfactory MRP results. The forecast quantity will be consumed against too many demand requirements and so MRP cannot accurately predict future demand.

Adjustments

You can change the Days After modifier using the following options.

These are the adjustments you can do with this modifier:

- **Company Configuration**- You enter the Days After value you want to use with this maintenance program. The Days After field is located on the Modules - Production - MRP sheet.

Where Located

You can access the Days After functionality through the following locations.

- **Forecast Entry**- The Days After value is displayed each time you create a new forecast. You cannot edit this value, it is only displayed for your reference. You locate this program by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.

Logic/Algorithms

The Days After functionality uses this logic to calculate its results.

- If the sales order Required By Date is less than or equal to the Forecast Date plus the Days After Value, then add its Sales Order Quantity to the Consumed Quantity on the forecast record.

Example(s)

The following example(s) illustrate how you use the Days After functionality.

The Days After value is set at 15, and the Forecast Date is defined as November 1st. All sales orders from November 1 to 15 will be included against this forecast record. If a sales order has a Due Date of November 7th, it consumes the sales forecast. If a sales order has a Due Date of November 16th, however, it is not included. The demand created by MRP will be the greater quantity - either the actual sales order or the sales forecast - during that period.

If the Days Before value is also set at 15 and the Forecast Date is November 1st, then all sales orders from October 16 to November 1 are also included. So the total date range used against each sales forecast is October 16 to November 15.

Days Before

The Days Before value defines a date range that is used with sales forecasts. It defines how many days ahead of the Forecast Date that sales orders may still consume the Forecast Quantity.

If a sales order occurs on a date that is before the Forecast Date but on or after the first day of this range, it is included against the Consumed Quantity calculation on the sales forecast.

Along with the Days After field, this field defines a range of dates on either side of the Forecast Date during which sales order demand should be included by the MRP engine in the overall forecast.

Do not make the Days Before - Days After range too large. A typical range is 5 Days Before and 25 Days After. If you enter a range like 25 Days Before and 25 Days After, you will generate unsatisfactory MRP results. The forecast quantity will be consumed against too many demand requirements and so MRP cannot accurately predict future demand.

Adjustments

You can change the Days Before modifier using the following options.

These are the adjustments you can do with this modifier:

- **Company Configuration**- You enter the Days Before value that you will use with this maintenance program. The Days Before field is located on the Modules - Production - MRP sheet.

Where Located

You can access the Days Before functionality through the following locations.

- **Forecast Entry**- The Days Before value is displayed each time you create a new forecast. You cannot edit this value, it is only displayed for your reference. You locate this program by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.

Logic/Algorithms

The Days Before functionality uses this logic to calculate its results.

If the sales order Required By Date is greater than or equal to the Forecast Date minus the Days After Value, then add its Sales Order Quantity to the Consumed Quantity on the forecast record.

Example(s)

The following example(s) illustrate how you use the Days Before functionality.

The Days Before value is set at 15, and the Forecast Date is defined as November 1st. All sales orders from October 16 to November 1 will be included against this forecast record. If a sales order has a Due Date of October 20, it will consume the sales forecast. If a sales order has a Due Date of November 2, however, it is not included. The demand created by MRP will be the greater quantity - either the actual sales order or the sales forecast - during that period.

If the Days After value is also set at 15 and the Forecast Date is November 1st, then all sales orders from October 16 to November 1 will also be included. So the total date range that will be used against each sales forecast is October 16 to November 15.

Days of Supply (MRP Planning)

The Days of Supply modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job. This value is used against both stock quantities and job quantities.

It reduces the number of suggestions generated by the MRP engine.

The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.

All the demand records for a part occurring within this range are combined to generate one suggestion. If this suggestion is larger than the Maximum Lot Size value, however, two or more suggestions are generated.

Adjustments

You can change the Days of Supply (MRP Planning) modifier using the following options.

These are the adjustments you can do with this modifier:

- The field found within the MRP Planning group box defines the date range you will normally use.
- The field found within the Short Horizon group box defines the date range you will use when a demand source occurs within this alternate date range.

Where Located

You can access the Days of Supply (MRP Planning) functionality through the following locations.

- **Part Maintenance**- This field is located on the Part - sites - Detail sheet. It is found within the MRP Planning group box. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Days of Supply (MRP Planning) functionality uses this logic to calculate its results.

- **Days of Supply Start Date = Date on which On**-Hand Quantity < Minimum On-Hand Quantity
- Days of Supply Date Range = Days of Supply Start Date + Days of Supply
- The MRP engine uses the Days of Supply value entered for Short Horizon Planning before the Days of Supply value entered for MRP Planning.

Example(s)

The following example(s) illustrate how you use the Days of Supply (MRP Planning) functionality.

For part 67-892Z, you enter a Days of Supply value of 10. It is October 5th. You have four sales orders for this part, and they are all due by October 15th. You have an On-Hand Quantity of 5 and a Minimum On-Hand Quantity of 10. When you run the MRP engine, it calculates the following demand and supply sources that exist from October 5th - October 10th. The following table illustrates the demand and supply sources:

Demand to Oct. 15	Order Quantity	On-Hand Quantity
SO 234 (Oct 5th)	5	5 (-5)
SO 235 (Oct 6th)	5	-10

Demand to Oct. 15	Order Quantity	On-Hand Quantity
SO 236 (Oct 9th)	5	-10
SO 237 (Oct 10th)	7	-10

Between Oct. 5th- 15th, there is a demand requirement for a 22 quantity of Part 67-892Z. The 5 On-Hand Quantity satisfies some of this demand (22 demand -5 On-Hand Quantity), so a 17 demand quantity demand must created to satisfy the customer demand.

However, the Minimum On-Hand Quantity is below 10 starting on Oct. 5, which means that the Days of Supply range falls from Oct. 5 -- Oct. 15. This creates an additional inventory demand against Part 67-892Z. The MRP engine will create a job suggestion for a 27 part quantity.

Days of Supply (Short Horizon Planning)

This alternate Days of Supply modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job if the demand source occurs within the Short Horizon date range.

If a job or purchase suggestion Required By Date is less than or equal to the Scheduled Start Date plus (+) the Short Horizon value, the Short Horizon Days of Supply value is used instead of the part's normal Days of Supply value. This lets the MRP engine generate different quantities for emergency sales orders or other short-term demand requirements.

The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.

All the demand records for a part occurring within this range are combined to generate one suggestion. If this suggestion is larger than the Maximum Lot Size value, however, two or more suggestions are generated.

Adjustments

You can change the Days of Supply (Short Horizon Planning) modifier using the following options.

These are the adjustments you can do with this modifier:

- The field found within the MRP Planning group box defines the date range you will normally use.
- The field found within the Short Horizon group box defines the date range you will use when a demand source occurs within this alternate date range.

Where Located

You can access the Days of Supply (Short Horizon Planning) functionality through the following locations.

- **Part Maintenance**- This field is located on the Part - sites - Detail sheet. It is found within the MRP Planning group box. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Days of Supply (Short Horizon Planning) functionality uses this logic to calculate its results.

- Short Horizon Planning Date Range = Scheduled Start Date + Short Horizon
- If the demand source's Required By Date occurs on a date that is equal to or greater than the Scheduled Start Date and equal to or less than the Short Horizon, then use the Short Horizon Planning values on the job suggestion.
- **Days of Supply Start Date = Date on which On**-Hand Quantity < Minimum On-Hand Quantity
- Days of Supply Date Range = Days of Supply Start Date + Days of Supply
- The MRP engine uses the Days of Supply value entered for Short Horizon Planning before the Days of Supply value entered for MRP Planning.

Example(s)

The following example(s) illustrate how you use the Days of Supply (Short Horizon Planning) functionality.

For part 67-892Z, you enter a Days of Supply value of 10 and a Short Horizon value of 5. It is October 5th. You have four sales orders for this part, and they are all due by October 10, so they fall within the Short Horizon date range. You have an On-Hand Quantity of 5 and a Minimum On-Hand Quantity of 5. When you run the MRP engine, it calculates the following demand and supply sources that exist during the Short Horizon from October 5th - October 10th. The following table illustrates the demand and supply sources:

Demand to Oct. 15	Order Quantity	On-Hand Quantity
SO 234 (Oct 5th)	5	0
SO 235 (Oct 6th)	5	-5
SO 236 (Oct 9th)	5	-5
SO 237 (Oct 10th)	7	-5

Between Oct. 5th- 15th, there is a demand requirement for a 22 quantity of Part 67-892Z. The 5 On-Hand Quantity satisfies some of this demand (22 demand -5 On-Hand Quantity), so a 17 demand quantity demand must created to satisfy the customer demand.

However, the Minimum On-Hand Quantity is below 5 starting on Oct. 5, which means that the Short Horizon Days of Supply range falls from Oct. 5 -- Oct. 15. This creates an additional inventory demand against Part 67-892Z. The MRP engine will create a job suggestion for a 22 part quantity.

Finite Horizon (Modifier)

The Finite Horizon modifier defines a date range. During this date range, all job suggestions and unfirm jobs are calculated using the Finite Capacity calculation.

When the MRP engine reaches the end of this date range, however, job suggestions and unfirm jobs use the Infinite Capacity calculation. To determine this date range, the Finite Horizon value is added to the Scheduled Start Date defined on the Process MRP program. the Epicor application then determines the last date on which the Finite Capacity calculation is used.

When a job suggestion is finitely scheduled, the demand placed against the resources cannot be greater than their available capacity for work. When a job is infinitely scheduled, however, this limit is ignored, allowing the job suggestion to be scheduled based on completion date.

The MRP engine does not actually schedule the job suggestions and unfirm jobs. Instead, it calls the scheduling engine, which in turn runs the scheduling calculations. When this engine starts scheduling past the last Finite Horizon date, the Infinite Capacity calculation is used.

Adjustments

You can change the Finite Horizon (Modifier) modifier using the following options.

These are the adjustments you can do with this modifier:

- **Finite Horizon**- This value defines the limit at which the MRP engine stops using the Finite Capacity calculation against this resource at this site, and switchs to the Infinite Capacity calculation.

Where Located

You can access the Finite Horizon (Modifier) functionality through the following locations.

- **Site Maintenance** - You define the Finite Horizon range for each site on the Detail > Planning sheet. This lets you set up different finite horizons for the various sites that manufacture each part. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Finite Horizon (Modifier) functionality uses this logic to calculate its results.

- If the unfirm job or job suggestion's Required By Date is greater than the Scheduled Start Date + the Finite Horizon, then schedule the item using the Infinite Capacity calculation.

Example(s)

The following example(s) illustrate how you use the Finite Horizon (Modifier) functionality.

The Blue site has a Finite Horizon value of 10. You run the Process MRP program using a Scheduled Start Date of 10/15. Unfirm job U783 has a Required By Date value of 10/26. Because this date is outside the Finite Horizon, the scheduling engine places this job in the scheduling using the Infinite Capacity calculation.

Firm Job Prefix

This optional modifier is a prefix value automatically applied to firm jobs generated through the MRP engine.

When a planner clears the Unfirm check box on an unfirm job and saves this job record, the Unfirm Job Prefix value is replaced with the Firm Job Prefix value. This prefix is also used when you manually create a job and select the Next Job button. This prefix value is added to the job number.

This value lets you continue to track MRP created jobs that are released to production. The MRP engine will no longer be able to automatically remove and replace these jobs, but it can continue to create suggestions against them. The engine also continues to include them in the supply and demand calculations until the job record is closed.

Note that you must define an Unfirm Job Prefix, but a Firm Job Prefix is not required. Only define this prefix value if you want a way to track firm jobs that were created by the MRP engine.

Adjustments

You can change the Firm Job Prefix modifier using the following options.

These are the adjustments you can do with this modifier:

- **Company Configuration**- If your company does not use the Multi-Site module, you define the Firm Job Prefix within this program. The Firm Job Prefix field is located on the Modules - Production - MRP sheet. Note that if your company does use the Multi-Site module, this field is not available within the Company Configuration program.
- **Site Configuration Control**- If your company uses the Multi-Site module, you must define the Firm Job Prefix value for each site by using the Site Configuration Control program. You define job number prefixes that indicate which site is producing the part on the part record. You enter this value on the Modules > Production Management sheet.

Where Located

You can access the Firm Job Prefix functionality through the following locations.

- **Job Entry**- Use the Firm Job Prefix value to find and select MRP generated jobs that are now in production.

- **Job Tracker**- Use the Firm Job Prefix value to find and select MRP generated jobs that are now in production.
- **Job Traveler**- Use the Firm Job Prefix value to find, select, and print out MRP generated jobs that are now in production.

Logic/Algorithms

The Firm Job Prefix functionality uses this logic to calculate its results.

- If the Unfirm check box is cleared and the job record is saved, remove the Unfirm Job Prefix value from the job number. This job will automatically be renumbered using the firm job number system, and the Firm Job Prefix value is added in front of this new number.

Example(s)

The following example(s) illustrate how you use the Firm Job Prefix functionality.

You want the ability to track firm MRP jobs that are being produced at the Blue site. You first create this site record within the Site Maintenance program. Then you launch Site Configuration Control and navigate to the Modules - Production Management sheet. Within the Firm Job Prefix field, you enter MRPBLU.

Now when planners clear the Unfirm check box on MRP generated job records that will be produced at this site, the job number will automatically remove the original Unfirm Job Prefix and use this MRPBLU value.

You see this in action when Bob McCoy, your planner, decides to produce a MRP generated job. This job at first uses the Unfirm Job Prefix on the job number (for example UFMBLU -945). After Bob clears the Unfirm check box and saves the record, this job now uses MRPBLU - 148 for its job number.

Notice that the firm job uses both the Firm Job Prefix and a new job number.

Forecast Date

The Forecast Date modifier defines when a sales forecast takes place. Sales forecast records are used to estimate the future demand that may be ordered against a specific part.

This value as the final date by which demand requirements are generated for this forecast record.

You can create sales forecasts for a part quantity estimate that will generally sell to your customer base. You can also create forecast details that estimate how much part quantity will sell to a specific customer.

Adjustments

You can change the Forecast Date modifier using the following options.

These are the adjustments you can do with this modifier:

- **Days Before**- The number of days before the actual Forecast Date that the forecast should include sales order demand. Along with the Days After field, this field establishes a range/window around the Forecast Date in which sales order demand should be included in the overall forecast. You define this value within the Company Configuration program on the MRP sheet.
- **Days After**- The number of days after the actual forecast date that the forecast should include sales order demand. Along with the Days Before field, this field establishes a range/window around the Forecast Date in which sales order demand is included in the overall forecast. You define this value within the Company Configuration program on the MRP sheet.

Where Located

You can access the Forecast Date functionality through the following locations.

- **Forecast Entry**- Use this program to create the forecast records. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.
- **Process MRP**- The MRP engine uses forecast records to create job suggestions to satisfy future demand. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Forecast Date functionality uses this logic to calculate its results.

- If a forecast is Forecast Date + Days After < Scheduled Start Date, the forecast is ignored during the MRP engine run. All sales orders, however, will be calculated by the MRP engine.
- **If a Sales Order (open, firm) has a Forecast Date <= orderrel.regdate + Days Before and a fore date > ordered.regdate**- Days After, the sales order's quantity is counted against the forecast

Example(s)

The following example(s) illustrate how you use the Forecast Date functionality.

The Days Before and Days After values determine the range within which sales orders are included within the forecast. If the Days Before value is 15, then the forecast for November 20, 2011, includes all sales orders whose required due date is between November 5, 2011, and November 20, 2011. Likewise if the Days After value is 15, the forecast for November 20, 2011 includes all sales orders whose required due date is between November 20, 2011, and December 5, 2011. The total date range for this forecast is November 5, 2011 to December 5, 2011.

Forecast Quantity

The Forecast Quantity modifier defines the quantity of a part that you estimate will sell by a specific date.

Sales forecast records are used to predict the future demand that may be ordered against a specific part. The MRP engine uses this value as the final date by which demand requirements are generated by this forecast record. Note that forecast quantities are always entered in the base inventory unit of measure defined for the part in the Primary UOMs - Inventory field in the Part Maintenance - Part - Detail sheet.

You can create sales forecasts for a part quantity estimate that will generally sell to your customer base. You can also create forecast details that estimate how much part quantity will sell to a specific customer.

As actual sales order demand is placed against a forecast, its Forecast Quantity is considered partially used, or consumed, by the MRP engine. As long as some quantity remains on the forecast, however, job suggestions and unfirm jobs will continue to be generated for its remaining quantity.

Adjustments

You can change the Forecast Quantity modifier using the following options.

These are the adjustments you can do with this modifier:

- **Forecast Date**- The date by which a specific part quantity is predicted to be sold to customers.
- **Customer**- If you need, you can also define a specific customer for each forecast. As sales orders are created for this customer and part, the job records are linked to the sales orders that consumes the part quantities on each record.

Where Located

You can access the Forecast Quantity functionality through the following locations.

- **Forecast Entry**- Use this program to create the forecast records. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder. If you do not have a Material Requirements Planning license, but do have Order Management and Purchase Management licenses, you can locate it by opening the Sales Management folder, the Order Management folder, and the General Operations folder.
- **Process MRP**- The MRP engine uses forecast records to create job suggestions to satisfy future demand. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Forecast Quantity functionality uses this logic to calculate its results.

- If a sales forecast is in use and a sales order is placed in the same time frame as the forecast, MRP uses the greater quantity on the forecast or the sales order.
- The MRP engine first looks for any customer specific forecasts, followed by any company forecasts, to call sales orders used to calculate the current Consumed Quantity.
- Each time the MRP engine is run (Process MRP), the Consumed Quantity value is updated to reflect how much of the forecast is being used (consumed) by current demand.

Example(s)

The following example(s) illustrate how you use the Forecast Quantity functionality.

A customer, Dalton Manufacturing, typically orders a 500 quantity of Part 378-0R every month. You want to have the MRP engine reflect this demand, so at the beginning of the year you create a three month forecast record for Part 378-0R. You add a forecast detail for Dalton Manufacturing. This forecast record contains a 1,500 Forecast Quantity and a Forecast Date of 3/31.

Now the MRP engine creates jobs against this forecast detail. As sales orders for Part 378-0R are created for Dalton Manufacturing, the Consumed Quantity value on the forecast increases, letting you track the progress of the forecast. The following table illustrates how a forecast quantity is consumed:

Date	Forecast Quantity	Consumed Quantity	Sales Order Quantity	Part Detail
1/02	1,500	0	0	1,500
1/25		500	500	1,000
2/25		1,000	500	500
3/31		1,500	500	0

Generate PO Suggestions

The Generate PO Suggestions modifier indicates whether or not you want the MRP engine to create purchase suggestions for this part record each time MRP is processed.

Depending on whether this is a manufactured or purchased part type, this calculation runs differently:

- **Purchased Part Type**- PO suggestions are calculated for any demand requirements the MRP engine discovers for this specific purchased part.They are calculated in the base inventory unit of measure defined for the part in the Primary UOMs - Inventory field in the Part Maintenance - Part - Detail sheet. No attempt is made to merge PO suggestions with different units of measure into a single purchase order record.
- **Manufactured Part Type**- When you use the Generate PO Suggestions modifier against a manufactured part, the MRP engine searches for any subcontract operations on the part

method. If the engine encounters a subcontract operation, a purchase suggestion is created against the material that will be worked on by a supplier.

Note that by default, this check box is selected on all records for manufactured parts. This makes sure the MRP engine accounts for any materials that need to be purchased for the job method.

Adjustments

You can change the Generate PO Suggestions modifier using the following options.

These are the adjustments you can do with this modifier:

- **Generate PO Suggestions**- This modifier by selecting a check box. To activate these additional MRP calculations, select this check box. If this check box is clear, purchase suggestions will not be generated against this part.

Where Located

You can access the Generate PO Suggestions functionality through the following locations.

- **Part Maintenance**- The Generate PO Suggestions check box is located on the Part sheet with this maintenance program. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Generate PO Suggestions functionality uses this logic to calculate its results.

Purchased Part Type

If a demand requirement is for a purchase part, generate a purchase suggestion against the quantity needed on the requirement.

Manufactured Part Type

If a demand requirement is for a manufactured part, evaluate the part method to determine whether or not it contains a subcontract operation. If the part method does, generate a purchase suggestion against the material quantity that will be sent to the supplier.

Example(s)

The following example(s) illustrate how you use the Generate PO Suggestions functionality.

Purchased Part Example

You purchase aluminum from ABC Metals. Within Part Maintenance, you enter the ALUM part record, indicating that ABC Metals is your main supplier. You then select the PO Suggestions check box.

The MRP engine monitors this material on the unfirm jobs it generates. When it encounters an unfirm job that requires this material, it generates a purchase suggestion for both the quantity of the aluminum material and the date by which it is due.

Manufactured Part Type

You use a subcontractor, Paint 2 Perfection, Ltd., to paint your beverage can parts. Within Part Maintenance, you create a part record for 100-CAN, and indicate it is a manufactured part. You then select the PO Suggestions check box. You then engineer the method of manufacturing for the 100-CAN part, indicating that the Paint operation will be handled by Paint 2 Perfection, Ltd., your subcontractor.

The MRP engine monitors this subcontract operation on unfirm jobs that produce the 100-CAN part. When it discovers this subcontract operation, it generates a purchase suggestion that contains the quantity and due date for the outside painting work. An authorized user can then turn this suggestion into an open purchase order.

Horizon Days

The Horizon Days modifier activates the Short Horizon Planning calculation on specific site details with part records. This value defines the date range used by the MRP engine.

If a job suggestion, purchase suggestion, or unfirm job has an End Date occurring within this date range, the short horizon lot size values defined for this part-site detail's are used instead of the main MRP Planning lot size values.

Use Short Horizon Planning to generate different suggestions for rush sales orders or emergency situations. When you enter a value in the Horizon Days field, Short Horizon Planning can be used. Define these alternate lot sizes within the Minimum Lot Size, Maximum Lot Size, and Days of Supply fields contained within the Short Horizon Planning group box.

Any demand source that has a Due Date between the Scheduled Start Date (from the Process MRP program) and the last date calculated for the short horizon will use these alternate values.

Note that the MRP engine will still use the Multiple value from the MRP Planning section to determine the multiplier used to create part quantity values on the MRP suggestions.

Adjustments

You can change the Horizon Days modifier using the following options.

These are the adjustments you can do with this modifier:

- **Days of Supply**- This alternate value defines how many days into the future MRP will look in order to calculate the quantity needed on a job or purchase suggestion - if the demand falls within the Short Horizon. All the demand records that fall within this range are combined to generate one suggestion.

- **Horizon Days**- You activate the Short Horizon Planning calculation by entering 1 or more days within this field. If this field is blank, Short Horizon Planning is not calculated for this part-site detail.
- **Minimum Lot Size**- This value indicates the smallest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range.
- **Maximum Lot Size**- This value indicates the highest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range. These suggestions will continue to use this quantity value until the remaining quantity can all be placed on one suggestion.
- **Multiple**- This value defines the quantity increments that will be placed on each job or purchase suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. For example, if a demand quantity is 379 and the Multiple value is defined as 100, the MRP engine creates a job suggestion that has a 400 part quantity. The extra quantity is automatically recorded to inventory. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.

Where Located

You can access the Horizon Days functionality through the following locations.

- **Part Maintenance** - You activate the Short Horizon modifier on the Part > Sites > Detail sheet. You can create Short Horizon values for each sites-Detail within each part record. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Horizon Days functionality uses this logic to calculate its results.

Short Horizon Calculation

If the job suggestion or unfirm job Due Date is less than or equal to the Scheduled Start Date + Short Horizon, then use the Short Horizon Planning values.

MRP Planning Calculation

If the job suggestion or unfirm job Due Date is greater than the Scheduled Start Date + Short Horizon, then use the MRP Planning values.

Example(s)

The following example(s) illustrate how you use the Horizon Days functionality.

You manufacture Part 239-M4 in quantities of 1. Using this value as the standard Maximum Lot Size, however, will cause the MRP engine to generate many unfirm jobs. To avoid this, you use Short

Horizon Planning for the jobs you actually are working on, but calculate future demand by using larger Maximum Lot Size for MRP Planning.

You enter the following values:

- Short Horizon = 14 (Days)
- Maximum Lot Size (Short Horizon) = 1 (Quantity)
- Maximum Lost Size (MRP Planning) = 100 (Quantity)
- Days of Supply = 60

You have a sales order coming in against this part for a 5 quantity every week for eight weeks. The MRP engine creates the following unfirm jobs:

- 10 jobs for a 1 quantity that fall within the short horizon.
- 1 job with a 30 quantity for the remaining demand.

Ignore Constrained Materials

When a material is constrained, the scheduling engine determines when a material will be available for an operation. It then uses this date as the operation's Start Date.

If a material is not available, the engine does not schedule the operation until it finds a date when this material is available.

In some situations, however, you may wish to ignore these material constraints. To do this, you can select the Ignore Material Constraints check box within the Process MRP program. This modifier causes the scheduling engine to ignore arrival dates for constrained materials. The operation is scheduled at the resource group or resource at a point where there is capacity available. The MRP engine then uses these values calculated by the scheduling engine to determine the Start Date and End Date values for each job or purchase suggestion.

Adjustments

You can change the Ignore Constrained Materials modifier using the following options.

These are the adjustments you can do with this modifier:

- **Constrained Materials**- You indicate that a material is constrained on its part record. You define this value within the Part Maintenance program on the Part sheet. Select the Constrained Material check box on this sheet.
- **Ignore Constrained Materials**- This modifier causes the scheduling engine to ignore arrival dates for constrained materials. The operation will be scheduled at a point where there is capacity available to run it. The MRP engine will then assign Start Date and End Date values by totaling only when these operations will start and finish.

Where Located

You can access the Ignore Constrained Materials functionality through the following locations.

- **Part Maintenance**- Use the Part Maintenance program to indicate when a material is constrained. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Process MRP**- Select the Ignore Material Constraints check box to indicate that the MRP engine should not account for constrained materials during its calculations. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **Time Phase Material Requirements Report**- This report projects future inventory balances by analyzing planned receipts and requirements for each part. You can locate this report from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Reports folder.

Logic/Algorithms

The Ignore Constrained Materials functionality uses this logic to calculate its results.

- If Material Lead Time > Required By Date on the operation, then schedule the operation.

Example(s)

The following example(s) illustrate how you use the Ignore Constrained Materials functionality.

You have a number of jobs coming up next month, and you want to get a quick look at the possible schedule you will follow to produce these jobs. At this point, you do not know how you will supply the material you need to work on these jobs.

You launch the MRP Process program and select the Ignore Material Constraints check box. The MRP engine then calls the scheduling engine by indicating that this engine should not check for the availability of any constrained materials.

The unfirm jobs are placed in the schedule, and you get a good idea of when the operations on each job are scheduled to start and end. You can then see when materials required on these operations are due, letting you plan how you will supply these materials to the operations.

Include in Manufacturing Lead Time Calculation

Use this series of check boxes to indicate what additional times to include with the manufacturing lead times for the current site.

Each option you select adds more time to manufacturing lead times for parts produced and/or consumed. You define the lead time values you want within each site record.

Adjustments

You adjust the Include in Manufacturing Lead Time Calculation modifier using the following options:

- **Kit Time** - Select this check box to indicate the time it takes in days to assemble manufactured parts will be included during the manufacturing lead time calculation. Only used on manufactured parts, the MRP engine uses it to calculate the End Date for any materials within the parent part's assembly. This value is defined on site records and part records.
- **Lead Time** - Select this check box to indicate you want to include the purchasing Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes purchased part quantities to arrive at your site.
- **Receive Time** - Select this check box to indicate you want to include the Receive Time values in this calculation. This value is defined on part records, and it indicates how long it takes, in days, to move purchased part quantities from the shipping dock to the resources that need them.
- **Rough Cut Parameters** - Select this check box to indicate any rough cut parameters defined on product groups or part revisions will be included in the manufacturing lead time calculation. These parameters add extra time for the setup, fixed, variable, and subcontract values used for generating the rough cut schedule. Each set of parameters is defined on a rough cut parameter code; you set up each code within Rough Cut Parameter Maintenance and then select these codes within Part Maintenance and/or Product Group Maintenance.
- **Transfer Lead Time** - Select this check box to indicate you want to include the Transfer Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes part quantities to arrive at your site from other locations within your organization.

Where Located

You can access the Include in Manufacturing Lead Time Calculation functionality through the following locations.

- **site Maintenance**- Select the lead times you want to include on the Detail sheet. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Include in Manufacturing Lead Time Calculation functionality uses this logic to calculate its results.

- If Kit Time = True, then add kit time values to total Cumulative Time and This Level Time values.
- If Lead Time = True, then add purchasing lead time values to total Cumulative Time and This Level Time values.
- If Receive Time = True, then add receive time values to total Cumulative Time and This Level Time values.
- If Rough Cut Parameters = True, include rough cut parameters defined on product groups and part revisions. Use the following hierarchy:

1. **Product Group** -- If a Rough Cut Code is defined on the product group, use these parameters for all parts linked to this group.
2. **Part Revision** -- If a Rough Cut Code is assigned to a part revision, use these parameters for the part revision. These parameters override the rough cut parameters defined on the product group.

- If Transfer Lead Time = True, then add transfer lead time values to total Cumulative Time and This Level Time values.

Example(s)

The following example(s) illustrate how you use the Include in Manufacturing Lead Time Calculation functionality.

The MRP engine is creating a job for Part A that contains assemblies AB and AC. The Manufacturing Lead Time Calculation is run, and it generates the following times for each level within the part method:

- Part A:
  - Cumulative Lead Time -- 51 Days
  - This Level Lead Time -- 2 Days
- Part AB (contains purchased parts P1 and P2):
  - Cumulative Lead Time -- 28 Days
  - This Level Lead Time -- 7 Days
  - P1 Lead Time -- 14 Days
  - P2 Lead Time -- 21 Days
- Part AC:
  - Cumulative Lead Time -- 49 Days
  - This Level Lead Time -- 14 Days

The Cumulative Lead Time values include the manufacturing time for the cost lot quantity of each level plus the critical path for any dependant assemblies. The This Level Lead Time values include the total manufacturing time in days to produce the costing lot size quantity of the parts.

Notice how the lead times are calculated using the three assembly levels in the method hierarchy:

- The Cumulative Lead Time for Part A (51 days) is the sum of the Cumulative Lead Time for Part AC (49 days) plus the This Level Lead Time for Part A (2 days).
- The Cumulative Lead Time for Part AC (49 days) is the sum of Part AB Cumulative Lead Time (28 days) and This Level Lead Time (7 days) and Part AC's This Level Lead Time (14 days).
- The Cumulative Lead Time for Part AB (28 days) and the This Level Lead Time (7 days) divides the total time it takes to receive purchase parts P1 and P2. P1 has a purchasing Lead Time of 14 days and P2 has a purchasing Lead Time of 21 days for a total of 35 days.

Include Purchase Contract Items

The Include Purchase Contract Items modifier is used to include purchase contracts in system generated purchase suggestions. These contracts let you purchase stock part quantities using a recurring schedule.

Your suppliers will then regularly deliver these part quantities to your sites.

Purchase contracts are another demand source used to calculate demand requirements. When you select this check box, you activate additional calculations to handle these items. The MRP engine searches for active purchase contracts generating inventory demand based on this data. This will let you satisfy your purchase contracts through the MRP process.

During each process run, the MRP engine generates these items at the end of its calculations.

Adjustments

You can change the Include Purchase Contract Items modifier using the following options.

These are the adjustments you can do with this modifier:

- **Include Purchase Contract Items**- Select this check box to activate this additional MRP calculation.

Where Located

You can access the Include Purchase Contract Items functionality through the following locations.

- **Process MRP program**- You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Include Purchase Contract Items functionality uses this logic to calculate its results.

- If the Include Purchase Contract Items check box is selected, then locate the purchase contract data. Generate additional suggestions to satisfy these demand requirements.

Example(s)

The following example(s) illustrate how you use the Include Purchase Contract Items functionality.

You have a regular contract with ABC Metals to deliver 1,000 sheets of Sheet Metal parts every two weeks. Using the Purchase Contracts Management module, you create this contract and this recurring schedule.

You then set up the Process MRP program to run automatically one a week. You select the Include Purchase Contracts Items check box, indicating this default value. Now each time the MRP Process is run, the demand schedule from the ABC Metals purchase contract is included as part of the MRP calculations.

Kit Time

The Kit Time modifier lets you define the number of days required to assemble a part within a specific site.

This Kit Time value is only used on manufactured parts. The MRP engine uses it to calculate the End Date for any materials in the parent part's assembly. If an assembly does not have any sub-assemblies, the Kit Time value is subtracted from the Start Date value to determine the how many days of kit planning are required before the job starts.

Adjustments

You can change the Kit Time modifier using the following options.

These are the adjustments you can do with this modifier:

- **Production Prep Buffer**- The Kit Time value can be used with the Production Prep Buffer (or Production Prep Time on a site record) value to calculate the total amount of time it takes to plan the job.

Where Located

You can access the Kit Time functionality through the following locations.

- **Part Maintenance** - You can define the Kit Time value on site details (Part - sites - Detail sheet) within part records. This indicates how long it takes to assemble this specific part at this specific site. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Site Maintenance**- You can define the Kit Time value on the Detail > Planning sheet within site records. This indicates how long it takes to assemble parts at this site. If you enter a value here, it becomes the default value used on all parts that are assembled at this site. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Kit Time functionality uses this logic to calculate its results.

- Total Planning Time = Production Prep Buffer + Kit Time
- If the part method does not have any sub-assemblies, then the Final Start Date value is calculated by subtracting the Kit Time from the Start Date value.

Example(s)

The following example(s) illustrate how you use the Kit Time functionality.

Kit Time Example

If a part assembly on a job had a scheduled start date of August 15th and the Kit Time was set to 2 for the part, then the Planned Kit Date would be August 13th.

Production Prep Buffer + Kit Time Example

The Blue site detail for Part 456-89K has a Kit Time of 5 and a Production Prep Buffer of 10. Because you have entered both values, the MRP engine adds the values to calculate the number of days required to a prepare for production on a job quantity at this site. In this case, it will take 15 days.

The MRP engine initially calculates that a job will start on August 15th. Because of the combined Production Prep Buffer and Kit Time values, the preparation period for this job begins on August 1st.

Lead Time

A modifier which defines the number of days that pass between the day the purchased parts are ordered from a supplier and the day the parts arrive at the site.

This value is used by the MRP engine to calculate the Order By Date on a purchase order suggestion. It does this by pulling the Need By Date from a demand record, like a job material, and then subtracting this Lead Time value from it.

The MRP engine also uses this value to determine the Lead Time window (MRP Scheduled Start Date + Lead Time). This date range reflects the available days indicated on the production calendar used for the transaction. By default, these days match the production calendar assigned to the supplier selected on the part-site detail record. However if you do not select a supplier on the part-site record, or if a production calendar is not assigned to the supplier you select, then the MRP engine instead uses the production calendar defined for the site.

If you use the **Consume Minimum Quantity** calculation, you can define two Lead Time values for each part-site detail record. The Lead Time you enter within the Purchasing section indicates the Lead Time used on PO suggestions to satisfy a calculated On-Hand Quantity that falls below the Reorder Quantity (Minimum Quantity + Safety Stock Quantity) but is more than the Safety Stock Quantity. The Lead Time you enter with the Urgent Planning section defines the Lead Time used on PO suggestions to satisfy an On-Hand Quantity that falls below the Safety Stock Quantity.

Adjustments

You can change the Lead Time modifier using the following options.

Adjustments you can define for this modifier:

- You enter specific Lead Time values for each site detail on a purchase part record. You enter values that reflect the length of time it takes to deliver purchased quantities from the supplier the specific site.
- If you use the Consume Minimum Quantity calculation, you can define two Lead Time values for each purchase part site detail. You can define one supplier for typical PO suggestions and another supplier for urgent planning PO suggestions.
- **Supplier** -- Defines the supplier from which this site will receive the purchased quantities. By default, the production calendar selected on the supplier record determines the actual days it takes to receive the site quantity. If a production calendar is not defined through the supplier, the production calendar defined on the site is used instead.

Where Located

You can access the Lead Time functionality through the following locations.

- **Part Maintenance**- You can define the Lead Time value on site details (Part > Sites > Detail sheet) within part records.
- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Lead Time functionality uses this logic to calculate its results.

- Lead Time Window = MRP Scheduled Start Date + Lead Time
- Order By Date = Need By Date - Lead Time
- Actual Days = If Production Calendar is on supplier record, use it to calculate actual ship days. Otherwise, use the Production Calendar on the part-site record.

Consume Minimum Quantity

If the Consume Minimum Quantity calculation is active, use the following logic:

1. If the Lead Time is defined on the part-site record in the Urgent Planning section, this lead time value is used on the purchase suggestion.
2. If the Urgent Supplier Lead Time value is blank and the supplier is defined on the supplier price list, the PO suggestion uses the Lead Time value from the supplier price list.

Example(s)

The following example(s) illustrate how you use the Lead Time functionality.

You are setting up the part-site details for 687TH, a purchased part. You have two sites -- a Red site located in New Zealand and a Blue site located in Arizona. Your supplier for 687TH is True Metal, Inc., a manufacturer located in Delaware. You need each part-site record to reflect the days it takes to ship a part quantity from Delaware to both the Red site and the Blue site.

It takes four days for the part quantity to be ordered and arrive at the Blue site in Arizona, while it takes seven days for a part quantity to be ordered and arrive at the Red site in New Zealand. On the part-site record for the Blue site, you enter a Lead Time value of 4. On the part-site record for the Red site, you enter a Lead Time value of 7.

Consume Minimum Quantities Example

You are generating purchasing suggestions for Part 010-0112. The part-site record uses a Purchasing (Standard) Lead Time value of 10 days. You typically purchase this part from Global Supply, as they give you the best price breaks. This part-site record also has a 20 Safety Stock quantity.

However, Global Supply's turnaround time, 10 days lead time, can sometimes be problematic. In order to satisfy demand, you set up Urgent Planning values on this part-site record. When the MRP calculation detects that the On-Hand Quantity falls below the Safety Stock value, these Urgent Planning values are used instead to calculate the purchase changes. Another supplier Speed-E Supply, can turn around a part quantity in 5 days lead time, so you use this supplier for emergency points in your schedule.

You set up the part-site record as the following:

Safety Stock: 20	Supplier	Lead Time	Min Order Qty	Mul Order Qty
Purchasing	Global Supply	10	100	N/A
Urgent Planning	Speed-E Supply	5	50	10

You generate MRP using a Scheduled Start Date of 8/12. The engine discovers that on 8/17, the available On-Hand Quantity will be 18, a two quantity below the Safety Stock quantity. Because this low quantity falls within the Standard Lead time window (in this case 8/12 - 8/22), this causes MRP to activate the Consume Minimum Quantity calculation. MRP generates a purchase change to create a PO for Speed-E Supply for part 0101-0112. The Purchase Quantity on this purchase order with be 50 and the Lead Time value will be 5 days. This purchase suggestion should then answer the increased demand needed for part 010-0112 at this point in the schedule.

Locked

The Locked modifier status is used to define specific values on both job and purchase order records. When a value is frozen, or locked, the MRP engine can not change the value.

This status is useful for item you do not want the MRP engine to change. The MRP calculations uses the record to determine supply and demand, but generates suggestions based on and around these locked items.

You can freeze two values on firm job records - the End Date and the Total Quantity. Both values may be locked at the same time. You can also freeze two values on PO releases - the PO Date and the Total Quantity. Both values may be locked at the same time.

Adjustments

You can change the Locked modifier using the following options.

To activate these modifiers, you select the Lock check box next to the value you wish to freeze. These check boxes are located in different areas within the Job Entry and PO Entry programs.

- **Job Entry**- These are the values within Job Entry you can lock:
  - **Quantity**- Select the Lock check box next to this value to prevent the MRP engine from increasing, decreasing, or canceling the Quantity value on the firm job.
  - **Priority**- Select the Lock check box next to the Priority drop-down list to prevent the End Date from being changed during MRP processing. No expedite or postpone suggestions can be generated against this firm job.
- **PO Entry**- These are the values within PO Entry you can lock:
  - **Total Quantity**- Select the Lock check box next to this value to prevent the MRP engine from increasing, decreasing, or canceling the Quantity value on this PO release.
  - **PO Date**- Select the Lock check box next to this Date Field to prevent it from being changed during MRP processing. No purchase suggestions can update this date.

Where Located

You can access the Locked functionality through the following locations.

- **Job Entry**- The Lock check boxes are located on the Job sheet.
- **PO Entry**- The Lock check boxes are located on the Releases sheet.

Logic/Algorithms

The Locked functionality uses this logic to calculate its results.

- If the Lock check box is selected against the Quantity value on a firm job, do not generate a suggestion against this quantity.
- If the Lock check box is selected against the Priority value on a firm job, do not generate a suggestion that changes this job's End Date value.
- If the Lock check box is selected against the Total Quantity value on an open purchase order, do not generate a suggestion against this quantity.
- If the Lock check box is selected against the PO Date value on an open purchase order, do not generate a suggestion that changes this purchase order's date value.

Example(s)

The following example(s) illustrate how you use the Locked functionality.

Unfirm job U542 will produce a 30 quantity of Part 34397-U23. You decide to firm up this job and release it to production, changing the job's number to F299. This quantity will supply a demand requirement, a sales order, from Dalton Manufacturing. Although you want to keep the End Date for this firm job flexible, the production quantity cannot be changed.

You launch Job Entry and open job F299. You then select the Lock check box next to the Quantity field. The MRP engine will no longer generate quantity suggestions against job F299.

Maximum On-Hand

The Maximum On-Hand modifier defines the largest amount of inventory allowed for a part. When a part's current On-Hand Quantity reaches this or a highe value, the MRP engine will not generate job or purchase suggestions against this part-site detail.

You enter this quantity on each part-site detail on a part record. This lets you define the Maximum On-Hand quantity that can be stocked at each site.

Note that this value can also be defined at the warehouse or bin level. The value at this level, however, just affects inventory calculations. The MRP engine only uses the Maximum On-Hand quantity on part-site detail records.

Adjustments

You can change the Maximum On-Hand modifier using the following options.

These are the adjustments you can do with this modifier:

- **Maximum On-Hand** - Use this field to define the highest stock quantity for a specific part at each site.
- **Re-Order to Max** - Select this check box to indicate that the MRP engine will create inventory demand requirements using the Maximum On-Hand quantity. When the On-Hand Stock quantity is less than the Minimum On-Hand quantity, an inventory demand suggestion (or suggestions) is created that uses the Maximum On-Hand value minus any quantity remaining below the Minimum On-Hand quantity. The actual size of this quantity on each suggestion depends on the Maximum Lot Size defined within the MRP Planning or the Short Horizon Planning group boxes. If the total quantity from this inventory demand source is greater than the Maximum Lot Size value, then two or more suggestions are generated. These suggestions continue to use this quantity value until the remaining quantity can be placed on one suggestion.

Where Located

You can access the Maximum On-Hand functionality through the following locations.

- **Part Maintenance**- You can define the Maximum On-Hand value on site details (Part - sites- Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Maximum On-Hand functionality uses this logic to calculate its results.

- If the On-Hand Quantity is the Maximum On-Hand quantity, then do not generate suggestions for this part at this site.
- If the Re-Order to Max check box is selected, then use the Maximum On-Hand quantity for the demand quantity. If this quantity is larger than the Maximum Lot Size, then create multiple suggestions until the Maximum On-Hand quantity is consumed.

Example(s)

The following example(s) illustrate how you use the Maximum On-Hand functionality.

Maximum On-Hand Example

You manufacture Part 569-45R within the Blue site. The Maximum On-Hand quantity allowed at this site is a 3,000. Several jobs for Part 569-45R are completed and their quantities are sent to inventory. When these transactions are complete, the On-Hand Quantity for this part at the Blue site is 3,241.

Until this part quantity is reduced, the MRP engine will not calculate any suggestions against this part- site detail.

Re-Order to Max Example

You manufacture Part 569-45R within the Blue site. The Maximum On-Hand quantity is a 3,000, while the Minimum On-Hand quantity is a 1,000. The Maximum Lot Size within MRP Planning is 500.

Several sales orders are completed for Part 569-45R, and the On-Hand Quantity for this part at the Blue site drops to 500. You run the MRP engine, and it calculates that there is a total inventory demand for a 2,500 quantity. Because the Maximum Lost Size is set at 500, the MRP calculations generate 5 job suggestions for Part 569-45R, each for a 500 quantity.

Maximum Lot Size (MRP Planning)

The Maximum Lot Size modifier used for MRP Planning defines the largest quantity that can be manufactured or purchased through each suggestion. You can define this value on each site detail for each part record; this lets you define the maximum quantities that can be handled by site.

When the MRP engine calculates demand quantities, it uses this value to determine how many suggestions to generate. If the total demand quantity is greater than the Maximum Lot Size quantity, the MRP engine creates two or more job/purchase suggestions using this maximum value on each suggestion. The engine then continues to create suggestions with this quantity until the remaining quantity can be placed on one suggestion.

Note that there are two Maximum Lot Size values available for each part-site detail. You can also define a Maximum Lot Size value for demand that occurs during a Short Horizon date range. This date range lets you create different quantity suggestions for rush orders and emergency situations. The functionality of this field is identical to the Maximum Lot Size field used for MRP Planning.

Adjustments

You can change the Maximum Lot Size (MRP Planning) modifier using the following options.

These are the adjustments you can do with this modifier:

- **Minimum Lot Size (MRP Planning)**- This value defines the smallest quantity that can be manufactured or purchased for this part. If the total demand quantity is less than this quantity, the MRP engine creates a single job or purchase suggestion that uses this minimum value for the quantity. If this is a job suggestion, the extra quantity is automatically recorded to inventory.
- **Multiple**- This value defines the quantity increments placed on each job or purchase suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. This Multiple value, however, will not cause the MRP engine to calculate a quantity higher than the Maximum Lot Size quantity. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.
- **Days of Supply (MRP Planning)**- This modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job. This value is used against both stock quantities and job quantities. It reduces the number of suggestions generated by the MRP engine. The MRP engine monitors

the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.

- **Costing Lot Size**- This value defines how many parts must be manufactured before each job suggestion justifies its setup cost. Typically this value is the same as the Minimum Lot Size value. The MRP engine does not actually use this value during calculations. The value is useful, however, for users who are determining the Minimum Lot Size and Multiple values. These values need to be large enough to justify the setup cost.

Where Located

You can access the Maximum Lot Size (MRP Planning) functionality through the following locations.

- **Part Maintenance**- You can define the Maximum Lot Size value for MRP Planning on site details (Part - sites- Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Maximum Lot Size (MRP Planning) functionality uses this logic to calculate its results.

- If the Total Demand Quantity is > Maximum Lot Size, then create multiple suggestions to handle the demand.
- Each Suggestion Quantity = Maximum Lot Size until the final Suggestion Quantity

Example(s)

The following example(s) illustrate how you use the Maximum Lot Size (MRP Planning) functionality.

Maximum Lot Size Example

If MRP calculates demand for 100 parts and the Maximum Lot Size is set to 40, three unfirm jobs are created: two jobs for 40 parts and a third job for 20 parts.

Multiple Example

A Part Hingehas a demand quantity for 374. It has a Maximum Lot Size of 100 and a Multiple value of 25.

Using these values, the MRP engine will generate 3 jobs for a 100 quantity and 1 job with a 75 quantity. Notice that all of these quantities are multiples of 25.

The following example(s) illustrate how you use the Kit Time functionality.

Kit Time Example

If a part assembly on a job had a scheduled start date of August 15th and the Kit Time was set to 2 for the part, then the Planned Kit Date would be August 13th.

Production Prep Buffer + Kit Time Example

The Blue site detail for Part 456-89K has a Kit Time of 5 and a Production Prep Buffer of 10. Because you have entered both values, the MRP engine adds the values to calculate the number of days required to a prepare for production on a job quantity at this site. In this case, it will take 15 days.

The MRP engine initially calculates that a job will start on August 15th. Because of the combined Production Prep Buffer and Kit Time values, the preparation period for this job begins on August 1st.

Maximum Lot Size (Short Horizon Planning)

The Maximum Lot Size used for Short Horizon Planning defines the largest quantity calculated on job/purchase suggestions that occur within the Short Horizon. The short horizon is a range of dates you define; if a demand source Required By Date falls between the Scheduled Start Date (entered on the Process MRP program) and the last date of this range, the MRP engine uses the short horizon lot size values.

This lets you create different quantity suggestions for rush orders and emergency situations.

When the MRP engine calculates demand quantities occurring within the short horizon, it uses this value to determine how many suggestions to generate. If the total demand quantity is greater than the Maximum Lot Size quantity, the MRP engine creates two or more job/purchase suggestions that use this maximum value on each suggestion. The engine will continue to create suggestions with this quantity until the remaining quantity can all be placed on one suggestion.

You can define this value on each site detail for each part record; this lets you define the maximum quantities that can be handled by site during the short horizon date range.

Note that if a demand source Due Date occurs after the Short Horizon date range, the Maximum Lot Size value defined for MRP Planning is used instead by the MRP engine.

Adjustments

You can change the Maximum Lot Size (Short Horizon Planning) modifier using the following options.

These are the adjustments you can do with this modifier:

- **Horizon Days (Short Horizon Planning)**- The number of days used to determine the Short Horizon date range. If the demand Due Date falls between the Scheduled Start Date plus this Horizon Days value, the MRP engine uses the short horizon values to calculate quantities on job/purchase suggestions. If there is not a value within the Horizon Days field, the Short Horizon functionality is not active on this part-site detail.

- **Minimum Lot Size (Short Horizon Planning)**- This is the smallest quantity that can be generated on suggestions to satisfy demand falling within the Short Horizon date range.
- **Days of Supply (Short Horizon Planning)**- This alternate Days of Supply modifier defines how many days into the future the MRP engine looks to calculate the final quantity on a job suggestion, purchase suggestion, or unfirm job if the demand source occurs within the Short Horizon date range. If a job or purchase suggestion's Required By Date is less than or equal to the Scheduled Start Date plus (+) the Short Horizon value, the Short Horizon Days of Supply value is used instead of the part's normal Days of Supply value. This lets the MRP engine generate different quantities for emergency sales orders or other short-term demand requirements. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.
- **Multiple**- This value defines the quantity increments placed on each job or purchase suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.

Where Located

You can access the Maximum Lot Size (Short Horizon Planning) functionality through the following locations.

- **Part Maintenance**- You can define the Maximum Lot Size value for Short Horizon Planning on site details (Part - sites- Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Maximum Lot Size (Short Horizon Planning) functionality uses this logic to calculate its results.

- If the demand source Due Date is the last date within the Short Horizon date range, then use the alternate Short Horizon Planning values.
- If the Total Demand Quantity is > Maximum Lot Size, then create multiple suggestions to handle the demand.
- Each Suggestion Quantity = Maximum Lot Size until the final Suggestion Quantity

Example(s)

The following example(s) illustrate how you use the Maximum Lot Size (Short Horizon Planning) functionality.

Maximum Lot Size Example

MRP calculates that a 100 quantity needs to be manufactured quickly, so its demand source Due Date occurs during the Short Horizon date range. If MRP calculates demand for 100 parts and the Max Lot Size is set to 40, three unfirm jobs are created: two jobs for 40 parts and a third job for 20 parts.

Multiple Example

Part Hinge A has a demand quantity for 374. It has a Maximum Lot Size of 100 and a Multiple value of 25.

Using these values, the MRP engine generates 3 jobs for a 100 quantity and 1 job with a 75 quantity. Notice that all of these quantities are multiples of 25.

Minimum Lot Size (MRP Planning)

The Minimum Lot Size value determines the smallest quantity that can be used on a job or purchase suggestion. When you define this value, all job or purchase suggestions that the MRP engine generates for this part-site detail will have at least this quantity.

If the total demand quantity is less than this quantity, the MRP engine creates a single job or purchase suggestion that uses this minimum value. If this is a job suggestion, the extra quantity will be automatically recorded to inventory.

Note that two Minimum Lot Size values are available for each part-site detail. You can also define a Minimum Lot Size value for demand occurring during a Short Horizon date range. This date range lets you create different quantity suggestions for rush orders and emergency situations. The functionality of this field is identical to the Minimum Lot Size field used for MRP Planning.

Adjustments

You can change the Minimum Lot Size (MRP Planning) modifier using the following options.

These are the adjustments you can do with this modifier:

- **Maximum Lot Size**- This value defines the highest quantity that can be manufactured or purchased for this part. If the total demand quantity is greater than this quantity, the MRP engine creates two or more job/purchase suggestions using the maximum quantity value on each suggestion. These suggestions continue to use this quantity value until the remaining quantity can be placed on one suggestion.
- **Multiple**- This value defines the quantity increments that will be placed on each job or purchase suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.
- **Days of Supply (MRP Planning)**- This modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job. This value is used against both stock quantities and job quantities. It

reduces the number of suggestions generated by the MRP engine. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.

- **Costing Lot Size**- This value defines how many parts must be manufactured before each job suggestion justifies its setup cost. Typically this value is the same as its Minimum Lot Size value. The MRP engine does not actually use this value during calculations. The value is useful, however, if you are determining the Minimum Lot Size and Multiple values. These values need to be large enough to justify the setup cost.

Where Located

You can access the Minimum Lot Size (MRP Planning) functionality through the following locations.

- **Part Maintenance**- You can define the Minimum Lot Size value for MRP Planning on site details (Part - sites- Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Minimum Lot Size (MRP Planning) functionality uses this logic to calculate its results.

- If the Total Demand Quantity is > Minimum Lot Size, then create one suggestion that has a quantity = Minimum Lot Size.
- Inventory Allocation = Minimum Lot Size- Demand Quantity

Example(s)

The following example(s) illustrate how you use the Minimum Lot Size (MRP Planning) functionality.

Minimum Lot Size Example

A demand source for Part 785-21A requires a 4 quantity. Within the site that will manufacture these parts, the Minimum Lot Size is 10.

When the MRP engine runs, it will create a job suggestion for a 10 quantity. The remaining 6 quantity will be added to stock.

Multiple Example

A Part Hinge has a demand quantity for 374. It has a Maximum Lot Size of 100 and a Multiple value of 25.

Using these values, the MRP engine generates 3 jobs for a 100 quantity and 1 job with a 75 quantity. Notice that all of these quantities are multiples of 25.

Minimum Lot Size (Short Horizon Planning)

The Minimum Lot Size used for Short Horizon Planning defines the smallest quantity that can be calculated on job/purchase suggestions that occur within the Short Horizon. The short horizon is a range of dates you define; if a demand source Due Date falls between the Scheduled Start Date (entered on the Process MRP program) and the last date of this range, the MRP engine uses the short horizon lot size values.

This lets you create different quantity suggestions for rush orders and emergency situations.

When the MRP engine calculates demand quantities occurring within the short horizon, it uses this alternate Minimum Lot Size value to determine the smallest quantity that can be used on a job or purchase suggestion. When you define this value, all job or purchase suggestions that the MRP engine generates for this part-site detail have at least this quantity.

If the total demand quantity is less than this quantity, the MRP engine still creates a single job or purchase suggestion that uses this minimum value. If this is a job suggestion, the extra quantity is automatically recorded to inventory. You can define this value on each site detail for each part record; this lets you define the minimum quantities that can be handled by site during the Short Horizon date range.

Note that if a demand source Due Date occurs after the Short Horizon date range, the Minimum Lot Size value defined for MRP Planning is used instead by the MRP engine.

Adjustments

You can change the Minimum Lot Size (Short Horizon Planning) modifier using the following options.

These are the adjustments you can do with this modifier:

- **Costing Lot Size**- This value defines how many parts must be manufactured before each job suggestion justifies its setup cost. Typically this value is the same as the Minimum Lot Size value. The MRP engine does not actually use this value during calculations. The value is useful, however, if you are determining the Minimum Lot Size and Multiple values. These values need to be large enough to justify the setup cost.
- **Days of Supply (Short Horizon Planning)**- This alternate Days of Supply modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job if the demand source occurs within the Short Horizon date range. If a job or purchase suggestion's Required By Date is less than or equal to the Scheduled Start Date plus (+) the Short Horizon value, the Short Horizon Days of Supply value is used instead of the part's normal Days of Supply value. This lets the MRP engine generate different quantities for emergency sales orders or other short-term demand requirements. The MRP engine monitors the supply quantity of a part. When it discovers a date in the schedule where a part's On-Hand Quantity falls below the Minimum On-Hand

value, it uses this value as the Start Date to determine a date range. This is the range during which the Minimum On-Hand quantity must be maintained. When this date is defined, the MRP engine then adds together all the quantities that are below the Minimum On-Hand Quantity on each working day within this range. This determines the total supply needed during this specific Days of Supply date range.

- **Maximum Lot Size (Short Horizon Planning)**- This value indicates the highest quantity that can be generated on suggestions to satisfy demand falling within the Short Horizon date range. These suggestions will continue to use this quantity value until the remaining quantity can be placed on one suggestion.Horizon Days (Short Horizon Planning) - The number of days used to determine the Short Horizon date range. If the demand Due Date falls between the Scheduled Start Date plus this Horizon Days value, the MRP engine uses the short horizon values to calculate quantities on job/purchase suggestions. If there is not a value within the Horizon Days field, the Short Horizon functionality is not active on this part-site detail.
- **Multiple**- This value defines the quantity increments placed on each job or purchase suggestion. When generating suggestions, the MRP engine rounds up to the nearest multiple value. Note that if a Multiple value is entered, both the Minimum Lot Size and the Maximum Lot Size fields must also contain values that are multiples of this value.

Where Located

You can access the Minimum Lot Size (Short Horizon Planning) functionality through the following locations.

- **Part Maintenance**- You can define the Minimum Lot Size value for Short Horizon Planning on site details (Part - sites- Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Minimum Lot Size (Short Horizon Planning) functionality uses this logic to calculate its results.

- If the demand source Due Date is the last date within the Short Horizon date range, then use the alternate Short Horizon Planning values.
- If the Total Demand Quantity is < Minimum Lot Size, then create a suggestion that uses the Minimum Lot Size value for its quantity.

Example(s)

The following example(s) illustrate how you use the Minimum Lot Size (Short Horizon Planning) functionality.

Minimum Lot Size Example

MRP calculates that a quantity needs to be manufactured quickly, so its demand source Due Date occurs during the Short Horizon date range. This demand for Part 785-21A requires a 4 quantity. Within the site that will manufacture these parts, the Minimum Lot Size is 10.

When the MRP engine runs, creates a job suggestion for a 10 quantity. The remaining 6 quantity will be added to stock.

Multiple Example

A Part Hinge has a demand quantity for 374. It has a Maximum Lot Size of 100 and a Multiple value of 25.

Using these values, the MRP engine will generate 3 jobs for a 100 quantity and 1 job with a 75 quantity. Notice that all of these quantities are multiples of 25.

Minimum On-Hand

The Minimum On-Hand modifier defines the smallest inventory amount allowed for a specific part. This part-site value is used as a trigger by the MRP engine.

When the On-Hand Quantity for a part is lower than this value, the MRP engine generates job or purchase suggestions against this part-site detail.

The calculated quantity for the purchase suggestions varies according to the Re-Order to Max check box selection. If this check box is selected, the suggestion quantity is the Maximum On-Hand value. If this check box is clear, however, the suggestion quantity is the Minimum On-Hand value.

The calculation method you choose depends on how you want costing and quantity levels run for these parts. Using the Maximum On-Hand will cause higher expenses to occur at one time, but will also ensure that large quantities will be available. Using the Minimum On-Hand value will cause smaller expenses to occur at one time, but will also cause smaller quantities to be available.

Note that this value can also be defined at the warehouse or bin level. The value at this level, however, just affects inventory calculations. The MRP engine only uses the Minimum On-Hand quantity on part-site detail records.

Adjustments

You can change the Minimum On-Hand modifier using the following options.

These are the adjustments you can do with this modifier:

- **Minimum On-Hand** - Use this field to define the lowest quantity that you will allow to be stocked for a specific part at each site.
- **Re-Order to Max** - Select this check box to create inventory demand requirements using the Maximum On-Hand quantity. When the On-Hand Stock quantity is less than the Minimum On-Hand quantity, an inventory demand suggestion (or suggestions) is created using the Maximum On-Hand value plus any quantity below the Minimum On-Hand quantity. The actual size of the quantity on each suggestion depends on the Maximum Lot Size defined within either the MRP Planning or the Short Horizon Planning group boxes. If the total quantity from

the inventory demand source is greater than the Maximum Lot Size value, then two or more suggestions are generated.

Where Located

You can access the Minimum On-Hand functionality through the following locations.

- **Part Maintenance**- You can define the Minimum On-Hand value on each site detail (Part - sites - Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Minimum On-Hand functionality uses this logic to calculate its results.

- If the On-Hand Quantity is < the Minimum On-Hand quantity, then generate one or more suggestions for this part at this site.
- If the Re-Order to Max check box is selected, then use the Maximum On-Hand quantity for the demand quantity. If this quantity is larger than the Maximum Lot Size, then create multiple suggestions until the Maximum On-Hand quantity is consumed.

Example(s)

The following example(s) illustrate how you use the Minimum On-Hand functionality.

Minimum On-Hand Example

You manufacture Part 569-45R within the Blue site. The Minimum On-Hand quantity that can be stocked at this site is a 1,000 quantity, and the Maximum Lot Size within MRP Planning is a 500 quantity. Several sales orders are processed, and their combined demand quantity reduces the inventory level for this part at the Blue site to a 400 quantity.

Because this 400 quantity is below the minimum value, the MRP engine generates two job suggestions. It creates one suggestion for a 500 quantity and another suggestion for a 100 quantity. When these suggestions are turned into jobs and manufactured, they will restore the On-Hand Quantity for Part 569-45R to its minimum 1,000 quantity.

Re-Order to Max Example

You manufacture Part 569-45R within the Blue site. The Maximum On-Hand is a 3,000 quantity, while the Minimum On-Hand is a 1,000 quantity. The Maximum Lot Size within MRP Planning is a 500 quantity.

Several sales orders are completed for Part 569-45R, and the On-Hand Quantity for this part at the Blue site drops to 500. You run the MRP engine, and it calculates that there is a total inventory demand for a 2,500 quantity. Because the Maximum Lost Size is set at 500, the MRP calculations generate 5 job suggestions for Part 569-45R, each for a 500 quantity.

Minimum Order Quantity

This value defines the smallest quantity that must be placed on each PO suggestion. When a PO suggestion generates, it uses this value or higher for its quantity.

You can define two Minimum Order Quantity values on part-site records. The Minimum Order Quantity (Min Order Qty) field is available in the **Purchasing** section and the **Urgent Planning** section. If you do not use the **Consume Minimum Quantity** calculation, the value you define in the Purchasing section is used as the minimum value on all PO suggestions.

However if you use the Consume Minimum Quantity calculation, another set of calculations automatically run. When the MRP or PO Suggestions engine discovers that the Net On-Hand Quantity is less than the Reorder Quantity (Minimum On-Hand + Safety Stock Quantity) but greater than the Safety Stock Quantity, the value you enter in the Purchasing group box is used. If the On-Hand Quantity is less than the Safety Stock Quantity, the value you enter in the Urgent Planning section is used instead.

Adjustments

The following adjustments are available for the Minimum Order Quantity field.

- **Min Order Quantity (Purchasing)** -- Enter the smallest quantity you want on each typical PO suggestion.
- **Min Order Quantity (Urgent Planning)** -- Enter the smallest quantity you want on each urgent PO suggestion. The MRP and PO Suggestion engines use this value when they detect the normal lead times cannot be used to purchase supply quantities needed to satisfy current demand.

Where Located

You can define the Minimum Order Quantity in the following locations.

Part Maintenance

You define Minimum Order Quantity values on the Part > sites > Detail sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part

- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Minimum Order Quantity field uses the following logic.

Reorder Point Quantity

Reorder Point Quantity = Minimum Quantity + Safety Stock Quantity

Minimum Order Quantity

- When the Net On-Hand Quantity > Reorder Point Quantity and the Consume Minimum Quantities calculation is not active, use the Purchasing Minimum Order Quantity.
- When the Net On-Hand Quantity < Reorder Point Quantity and is also > Safety Stock Quantity and the Consume Minimum Quantities calculation is active, use the Purchasing Minimum Order Quantity.
- When the Net On-Hand Quantity < Safety Stock Quantity and the Consume Minimum Quantities calculation is active, use the Urgent Planning Minimum Order Quantity

Example(s)

The following example explains how you use the Minimum Order Quantity field.

You are generating purchasing suggestions for Part 010-0112. The part-site record uses a Purchasing (Standard) Lead Time value of 10 days. You typically purchase this part from Global Supply, as they give you the best price breaks. This part-site record also has a 20 Safety Stock quantity.

However, Global Supply's turnaround time, 10 days lead time, can sometimes be problematic. In order to satisfy demand, you set up Urgent Planning values on this part-site record. When the MRP calculation detects that the On-Hand Quantity falls below the Safety Stock value, these Urgent Planning values are used instead to calculate the purchase changes. Another supplier Speed-E

Supply, can turn around a part quantity in 5 days lead time, so you use this supplier for emergency points in your schedule.

You set up the part-site record as the following:

Safety Stock: 20	Supplier	Lead Time	Min Order Qty	Mul Order Qty
Purchasing	Global Supply	10	100	N/A
Urgent Planning	Speed-E Supply	5	50	10

You generate MRP using a Scheduled Start Date of 8/12. The engine discovers that on 8/17, the available On-Hand Quantity will be 18, a two quantity below the Safety Stock quantity. Because this low quantity falls within the Standard Lead time window (in this case 8/12 - 8/22), this causes MRP to activate the Consume Minimum Quantity calculation. MRP generates a purchase change to create a PO for Speed-E Supply for part 0101-0112. The Purchase Quantity on this purchase order with be 50 and the Lead Time value will be 5 days. This purchase suggestion should then answer the increased demand needed for part 010-0112 at this point in the schedule.

Multiple

The Multiple modifier defines the quantity increments for each job or purchase suggestion. For example, if you enter 100 for this multiple, all job/purchase suggestion quantities will be values like 200 or 1,100 - multiples of this value.

When generating suggestions against a demand source, the MRP engine rounds this quantity up to the nearest multiple value. If this is a job suggestion, any additional quantity produced above the demand quantity will be sent to inventory.

This value is used for all the lot size values entered on a part-site detail. The Maximum Lot Size and the Minimum Lot Size values defined for MRP Planning will use the Multiple value. Likewise, if you use Short Horizon Planning, the Maximum Lot Size and Minimum Lot Size values will also be generated using this modifier.

Note however, that in order for this MRP calculation to work, the Minimum Lot Size and Maximum Lot Size values must also be a multiple of the value you enter in this field.

Adjustments

You can change the Multiple modifier using the following options.

These are the adjustments you can do with this modifier:

- **Maximum Lot Size (MRP Planning)**- This value defines the highest quantity that can be manufactured or purchased for this part. If the total demand quantity is greater than this quantity, the MRP engine creates two or more job/purchase suggestions that use this maximum value for the quantity on each suggestion. These suggestions continue to use this quantity value until the remaining quantity can be placed on one suggestion.

- **Maximum Lot Size (Short Horizon Planning)**- This value indicates the highest quantity that can be generated on suggestions to satisfy demand falling within the Short Horizon date range. These suggestions continue to use this quantity value until the remaining quantity can be placed on one suggestion.
- **Minimum Lot Size (MRP Planning)**- This value defines the smallest quantity that can be manufactured or purchased for this part. If the total demand quantity is less than this quantity, the MRP engine creates a single job or purchase suggestion using this minimum value for the quantity. If this is a job suggestion, the extra quantity is automatically recorded to inventory.
- **Minimum Lot Size (Short Horizon Planning)**- This value indicates the smallest quantity that can be generated on suggestions to satisfy demand that falls within the Short Horizon date range.

Where Located

You can access the Multiple functionality through the following locations.

Part Maintenance

You can define the Multiple value on each Part > sites > Planning sheet within part records.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Multiple functionality uses this logic to calculate its results.

- Suggestion Quantity = Trunc(Demand Quantity/Multiple,0) x Multiple
- Remaining Quantity = Demand Quantity- Suggestion Quantity
- Round up the Remaining Quantity to the nearest Multiple value.

Example(s)

The following example(s) illustrate how you use the Multiple functionality.

A Part Hinge has a demand quantity for 374. It has a Maximum Lot Size of 100 and a Multiple value of 25.

Using these values, the MRP engine generates 3 jobs for a 100 quantity and 1 job with a 75 quantity. Notice that all of these quantities are multiples of 25. The quantity on the last job is rounded up to 75.

Multiple Order Quantity

This value defines the multiple quantity value used on urgent PO suggestions to calculate the purchase quantity.

You use this value to purchase specific quantities of a specific part. For example, if you enter a 100 in this field, the PO suggestions will always generate quantities rounded up in hundreds like 200, 400, 600, and so on.

This value is only calculated if you activate the **Consume Minimum Quantities** calculation. Use this calculation to prevent long lead times that can cause some PO suggestions to either never execute or generate excessive PO suggestions.

Adjustments

The following adjustments are available for the Multiple Order Quantity field.

- **Mul Order Qty** -- Enter the multiple value you want urgent PO suggestions to use. When an urgent PO suggestion generates, it rounds up to the nearest multiple value that satisfies the demand.

Where Located

You can define the Multiple Order Quantity in the following locations.

Part Maintenance

You define Minimum Order Quantity values on the Part > sites > Detail sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Multiple Order Quantity field uses the following logic.

- PO Suggestion Quantity = Nearest Multiple Order Quantity rounded up from the generated Purchase Quantity

Example(s)

The following example explains how you use the Multiple Order Quantity field.

You are generating purchasing suggestions for Part 010-0112. The part-site record uses a Purchasing (Standard) Lead Time value of 10 days. You typically purchase this part from Global Supply, as they give you the best price breaks. This part-site record also has a 20 Safety Stock quantity.

However, Global Supply's turnaround time, 10 days lead time, can sometimes be problematic. In order to satisfy demand, you set up Urgent Planning values on this part-site record. When the MRP calculation detects that the On-Hand Quantity falls below the Safety Stock value, these Urgent Planning values are used instead to calculate the purchase changes. Another supplier Speed-E

Supply, can turn around a part quantity in 5 days lead time, so you use this supplier for emergency points in your schedule.

You set up the part-site record as the following:

Safety Stock: 20	Supplier	Lead Time	Min Order Qty	Mul Order Qty
Purchasing	Global Supply	10	100	N/A
Urgent Planning	Speed-E Supply	5	50	10

You generate MRP using a Scheduled Start Date of 8/12. The engine discovers that on 8/17, the available On-Hand Quantity will be 18, a two quantity below the Safety Stock quantity. Because this low quantity falls within the Standard Lead time window (in this case 8/12 - 8/22), this causes MRP to activate the Consume Minimum Quantity calculation. MRP generates a purchase change to create a PO for Speed-E Supply for part 0101-0112. The Purchase Quantity on this purchase order with be 50 and the Lead Time value will be 5 days. This purchase suggestion should then answer the increased demand needed for part 010-0112 at this point in the schedule.

Next Job

Select this radio button option to indicate MRP jobs will use the next available job numbers for each generated unfirm job.

The MRP engine does this by checking for the highest job number and incrementing this value by adding one. This job number does not change. When you later firm the job either manually or through the **Auto Job Firm Process**, this generated job number is maintained on the firm job record.

Adjustments

You can change the Next Job modifier using the following options.

- **Next Job** -- Select this radio button option to cause the MRP engine to use the next available job number on each MRP job.
- **Order Release** -- Select this radio button option to cause the MRP engine combine the sales order-line-release values defined on the order release, and use the resulting value for the job number.

Where Located

You access the Next Job functionality within the Company Configuration program. This radio button option is located on the **Modules>Production>MRP** sheet.

Menu Path

Navigate to this program from the Main Menu:

• System Setup > Company/Site Maintenance > Company Configuration

Logic/Algorithms

The Next Job functionality uses the following logic to calculate its results.

- If **Next Job** = True, then get the next available job number.
- If **Order Release** = True and **Make to Order** = False, then get the next available job number.
- Next Available Job Number = Highest Job Number + 1
- **MRP Job Number** = Next Available Job Number

Example(s)

The following example(s) illustrate how you use the Next Job functionality.

You want the MRP engine to generate MRP jobs using the next available job numbers. To do this, you launch Company Configuration and select the Next Job radio button option. The next time you run MRP, three unfirm MRP jobs generate. These MRP jobs use 7433, 7434, and 7435 for their numbers.

Later you decide to produce these jobs. You run the Auto Firm Job Process, and these MRP jobs are automatically changed to firm. They keep the job numbers -- 7433, 7434, and 7435 -- originally generated by the MRP engine.

Non-Stock

The Non-Stock modifier indicates whether this part is normally stored within inventory. When selected, the Non-Stock check box indicates that this part is not stored within inventory.

The MRP engine calculates non-stock parts and stock parts differently. Non-stock parts are assigned directly to the records that need them, while stock parts are placed within inventory. Material allocations are then required to pull stock quantities to satisfy demand for job or sales order records.

Adjustments

You can change the Non-Stock modifier using the following options.

The part type value affects how the MRP engine handles non-stock and stock parts. These are the adjustments the MRP engine makes with these part types:

- **Manufactured**- When a manufactured part is a non-stock part, all demand for this part is satisfied by jobs. If the demand comes from a sales order, the sales order is linked to a job that will satisfy its demand. If this demand comes from another record that uses this part on a sub-assembly or as a material, the demand is satisfied by creating a job linked to the sub-assembly level on the original job. When the manufactured part is a stock part, it indicates that all demand for this part will be satisfied from inventory. The job suggestions and unfirm jobs assume that this demand will be satisfied from inventory allocations.

- **Purchased**- When a purchased part is a non-stock part, the demand for part will be satisfied by purchase orders linked to the job creating the demand. The MRP engine creates a purchase suggestion for the part. When a purchased part is a stock part, the demand for this part is satisfied from inventory; allocations are created to pull this part quantity on its Required By Date.
- **Sales Kit**- A sales kit part is not calculated by the MRP engine. The component parts that make up a sales kit, however, will generate job, transfer order, and purchase suggestions. When all the component part quantities are manufactured, the sales kit is ready to be assembled. This process, however, is handled outside of the MRP engine.

Where Located

You can access the Non-Stock functionality through the following locations.

- **Part Maintenance**- You can select the Non-Stock check box on the Part sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Non-Stock functionality uses this logic to calculate its results.

Manufactured, Non-Stock

- If this is a non-stock manufactured part, then all demand for this part is satisfied by job quantities.
- The lot size values on the part-site detail (MRP Planning or Short Horizon Planning) are used to determine the quantities generated on the job suggestions and unfirm jobs.
- These quantities are then assigned directly to the sales orders that are the sources for this demand.

Purchased, Non-Stock

- If this is a non-stock purchased part, then all demand for this part is satisfied by PO release quantities.
- The lot size values on the part-site detail (MRP Planning or Short Horizon Planning) are used to determine the quantities generated on the purchase suggestions.
- These quantities are assigned directly to the jobs that are the sources for this demand.

Example(s)

The following example(s) illustrate how you use the Non-Stock functionality.

Manufactured, Non-Stock

Part 7854-E3 is a manufactured, non-stock part. Dalton Manufacturing places a sales order against this part for a 120 quantity. The Maximum Lot Size value for this part is a 50 quantity.

The MRP engine generates Job 4598, 4599, and 4600 to produce this 120 quantity:

- Job 4598- 50 Quantity
- Job 4599- 50 Quantity
- Job 4600- 20 Quantity

When the job is complete, these three jobs are linked to the sales order. This quantity is then shipped immediately to Dalton Manufacturing.

Purchased, Non-Stock

Part Plastic Mold, is purchased, non-stock part. You need a 112 quantity to satisfy a material requirement on Job 4598. The Maximum Lost Size value for this part is a 30 quantity.

The MRP engine generates purchase suggestions for this 112 quantity. These are the suggested quantities on each release:

- Release 1- 30
- Release 2- 30
- Release 3- 30
- Release 4- 22

These suggestions are turned into a PO that contains all the releases for the 112 quantity. When this shipment arrives at your manufacturing center, the quantity is assigned directly to job 4598.

Number of MRP Processes

The Number of MRP Processes modifier defines how many separate threads your server runs to complete the MRP process.

This feature improves performance, as you can split one large MRP process into several threads. The process then takes less time to complete.

Use this value together with the Number of Schedulers value to maximize the performance of MRP processing and scheduling. The Number of Schedulers value is similar, as it defines how many separate threads the MRP engine uses to schedule unfirm jobs.

You should run tests to determine what is the ideal number of threads you can run at the same time. To review these performance times, use the MRP log. You can set this log to run at the **Basic** level to see the overall time it takes to run the MRP process. If you want more details in the log, select the **MRP** level to see how long it takes to run each MRP process thread by Load Level and part, or select **MRP and Scheduling** to review both the MRP process and scheduler threads through separate logs. You can also use the **Performance Monitor** (PerfMon) to see if a CPU or the disks are causing a performance bottleneck.

Keep in mind that more threads are not always better. As you run your tests, start with a small value to get a base time. Then increase the Number of MRP Processes and/or Number of Schedulers values for each test. Be sure you always make these changes in small increments. Your performance should improve each run, but you will get to a point where it starts to run slower again. This indicates that your server cannot handle any more MRP process or scheduling threads, and you need to reduce the MRP process threads and scheduling threads back to the point where you achieved optimal performance.

If you notice times in the log where the MRP process threads are idle, these processor threads can also be used as scheduling threads. By increasing the number of schedulers, you can then improve the performance of the MRP processors as well. For more information on how to use these logs to improve performance, review the **MRP Logs** section later in this guide.

When you are in a hosted environment, two processors and two schedulers are available for your use. However if you require more, contact your system administrator. In your email, be sure to detail your business need.

Adjustments

You can change the Number of MRP Processes modifier using the following options.

Here are the adjustments you can do with this modifier:

- **Number of MRP Processes**- The higher the number, the more MRP process threads run at the server. Although you may enter values 1-99, the best performance is typically found between 2 and 8 processors, depending on the number of central processing units, or cores, available on your system.
- **Number of Schedulers**- The higher the number, the more scheduler threads run at the server. Although you may enter values 1-99, the best performance is typically found between 2 and 8 schedulers, depending on the number of central processing units, or cores, available on your system.

Where Located

You can access the Number of MRP Processes functionality through the following locations.

- **Process MRP**- Use this program to launch the MRP engine. This program also contains several modifiers, like Number of MRP Processes, that you can define each time you run the MRP engine. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Number of MRP Processes functionality uses this logic to calculate its results.

- Number of MRP Processes = X threads
- Run the MRP Process threads X times at once at the server.

Example(s)

The following example(s) illustrate how you use the Number of MRP Processes functionality.

Your company runs production 24/7 five days a week, so you do not have an ideal time to run MRP processing. You run several tests and determine that the best performance you can achieve is to run two MRP threads and five scheduler threads at the same time at two o'clock in the morning. Because of this, you enter 2 in the Number of MRP Processes field and 5 in the Number of Schedulers field.

Now when the application launches MRP, it starts two MRP threads, each creating part transactions like transfer orders, purchasing suggestions, and unfirm jobs. The application also starts 5 scheduling threads to schedule the unfirm jobs in the order in which they were created. In this scenario it takes 5 scheduling threads to keep up with the 2 MRP threads; this enables MRP to complete its run in the shortest amount of time possible with your hardware configuration.

Number of Schedulers

The Number of Schedulers modifier defines how many separate threads your server runs to schedule unfirm jobs. This feature improves performance, as you can schedule unfirm jobs on several threads and the process takes less time to complete.

Use this value together with the Number of MRP Processes value to maximize the performance of both MRP processing and scheduling. The Number of MRP Processes value is similar, as it defines how many separate threads the MRP engine uses to generate purchase suggestions, transfer orders, and unfirm jobs.

You should run tests to determine what is the ideal number of threads you can run at the same time. To review these performance times, use the MRP log. You can set this log to run at the **Basic** level to see the overall time it takes to run the MRP process. If you want more details in the log, select the **MRP** level to see how long it takes to run each MRP process thread by Load Level and part, or select **MRP and Scheduling** to review both the MRP process and scheduler threads through separate logs. You can also use the **Performance Monitor** (PerfMon) to see if a CPU or the disks are causing a performance bottleneck.

Keep in mind that more threads are not always better. As you run your tests, start with a small value to get a base time. Then increase the Number of MRP Processes and/or Number of Schedulers values for each test. Be sure you always make these changes in small increments. Your performance should improve each run, but you will get to a point where it starts to run slower again. This indicates that your server cannot handle any more MRP process or scheduling threads, and you need to reduce the MRP process threads and scheduling threads back to the point where you achieved optimal performance.

If you notice times in the log where the scheduler threads are idle, these scheduler threads can also be used as MRP processor threads. By increasing the number of MRP processors, you can then improve the performance of the schedulers as well. For more information on how to use these logs to improve performance, review the **MRP Logs** section later in this guide.

When you are in a hosted environment, two processors and two schedulers are available for your use. However if you require more, contact your system administrator. In your email, be sure to detail your business need.

Finite Scheduling

Note that the first scheduler thread always handles finitely scheduled jobs. If the site does not have a Finite Horizon value and the resource is set to Finite Capacity, all jobs will only be scheduled through the first scheduler thread and additional scheduler threads are not needed. The Finite Horizon value indicates a point in the schedule where the scheduling engine begins placing jobs in the schedule using infinite capacity; a zero Finite Horizon indicates that all jobs that this site are finitely scheduled.

If you use finite scheduling and the site does not have a Finite Horizon, enter a one value in the Number of Schedulers field. However if you use finite scheduling and the site does have a Finite Horizon value, try using two or more scheduler threads. You should see an improvement in performance.

Adjustments

You can change the Number of Schedulers modifier using the following options.

Available adjustments:

- **Number of MRP Processes**- The higher the number, the more MRP process threads run at the server. Although you may enter values 1-99, the best performance is typically found between 2 and 8 processors, depending on the number of central processing units, or cores, available on your system.
- **Number of Schedulers**- The higher the number, the more scheduler threads run at the server. Although you may enter values 1-99, the best performance is typically found between 2 and 8 schedulers, depending on the number of central processing units, or cores, available on your system.

Where Located

You can access the Number of Schedulers functionality through the following locations.

- **Process MRP**- Use this program to launch the MRP engine. This program also contains several modifiers, like Number of Schedulers, you can define each time you run the MRP engine. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Number of Schedulers functionality uses this logic to calculate its results.

- Number of Schedulers = X threads
- Run the Scheduler threads X times at once at the server.

Example(s)

The following example(s) illustrate how you use the Number of Schedulers functionality.

Your company runs production 24/7 five days a week, so you do not have an ideal time to run MRP processing. You run several tests and determine that the best performance you can achieve is to run two MRP threads and five scheduler threads at the same time at two o'clock in the morning. Because of this, you enter 2 in the Number of MRP Processes field and 5 in the Number of Schedulers field.

Now when the application launches MRP, it starts two MRP threads, each creating part transactions like transfer orders, purchasing suggestions, and unfirm jobs. The application also starts 5 scheduling threads to schedule the unfirm jobs in the order in which they were created. In this scenario it takes 5 scheduling threads to keep up with the 2 MRP threads; this enables MRP to complete its run in the shortest amount of time possible with your hardware configuration.

On Hand Quantity

A key quantity value to constantly monitor is the On-Hand Quantity available for each stock part. As you use MRP, be sure the application has an accurate count of the quantities of each available part.

The Inventory module runs several calculations to constantly update the On-Hand Quantity available, and this value can be viewed in several locations. You can, however, manually change On-Hand Quantity values through the Quantity Adjustment program.

Adjustments

You can change the On Hand Quantity modifier using the following options.

The following program lets you manually update the On-Hand Quantity available:

- **Quantity Adjustment**-This program is found by opening the Material Management folder, the Inventory folder, and the General Operations folder.

Where Located

You can access the On Hand Quantity functionality through the following locations.

- **Time Phase Detail**- This program shows the current demand and supply for the part. You launch this program by right-clicking the Part number field.

- **Part On Hand Status**- This program shows the current on hand status for each part. This program is also located by right-clicking the Part number field.

Logic/Algorithms

The On Hand Quantity functionality uses this logic to calculate its results.

- Total On-Hand Quantity = On-Hand Quantity (Warehouse A) + On-Hand Quantity (Warehouse B) + On-Hand Quantity (Warehouse C) + and so on...

Example(s)

The following example(s) illustrate how you use the On Hand Quantity functionality.

Part 569-F3 is a stocked part, so the MRP engine monitors available inventory quantities. Your current On-Hand Quantity for Part 569-F3 is 500. The MRP engine calculates that a 43 quantity is required on an unfirm job.

The planner changes this job to firm, and the 43 quantity is pulled from stock by the Due Date. The On-Hand Quantity value is recalculated, and there is now a 457 quantity available.

Order Release

Select this radio button option to indicate MRP jobs will automatically use **Sales Order-Line-Release** numbers for generating job numbers.

If the sales order release is defined as **Make to Order**, the MRP engine creates an unfirm job number using the sales order-line-release values from the release. When you firm an MRP job either manually or through the **Auto Job Firm Process**, this original sales order-line-release number is maintained on the job record.

However, the MRP engine uses the next available job number when the Make to Order check box is not selected on the order release. In this situation, the MRP calculation will check for the highest job number and increment this value by adding one.

Adjustments

You can change the Order Release modifier using the following options.

- **Next Job** -- Select this radio button option to cause the MRP engine to use the next available job number on each MRP job.
- **Order Release** -- Select this radio button option to cause the MRP engine pull together the sales order-line-release values from the order release, and use the resulting value for the job number.

Where Located

You access the Order Release functionality within the Company Configuration program. This radio button option is located on the **Modules>Production>MRP** sheet.

Menu Path

Navigate to this program from the Main Menu:

- System Setup > Company/Site Maintenance > Company Configuration

Logic/Algorithms

The Order Release functionality uses the following logic to calculate its results.

- If **Order Release** = True, then get sales order values.
  - **MRP Job Number** = Sales Order Number + Line Number + Release Number
- If **Order Release** = True and **Make to Order** = False, then get next available job number.
  - Next Available Job Number = Highest Job Number + 1
  - **MRP Job Number** = Next Available Job Number

Example(s)

The following example(s) illustrate how you use the Order Release functionality.

You want the MRP engine to generate MRP job numbers using the sales order release. To do this, you launch Company Configuration and select the Order Release radio button option. The next time you run MRP, three unfirm MRP jobs generate. These MRP jobs use 5678-1-1, 5678-1-2, and 5678-1-3 for their numbers. The first number is the sales order, followed by the line number, and then followed by the release number.

Later you decide to produce these jobs. You run the Auto Firm Job Process, and these MRP jobs are automatically changed to firm. They keep the job numbers, 5678-1-1, 5678-1-2, and 5678-1-3,originally generated by the MRP engine.

Overload Horizon

Defines the number of days from the current date the scheduling engine uses to create job records within the Shop Load table. These overloaded resource records then display in the Shop Load Graph and the Overload Informer.

You can enhance scheduling performance by setting up an Overload Horizon timeframe, which is typically the number of days you manage overloaded resources. You can then use the Shop Load Graph and the Overload Informer to manage overload in the site within this relative time frame without loading data beyond the point you are managing.

If you do not use these tools, however, enter a "1" value in this field to load only one day's records into the Shop Load table.

Please note that the Overload Horizon does not affect the Shop Load report. The Shop Load report prints load hours for each operation scheduled for a resource group, and so is separate functionality from the Overload Horizon.

Adjustments

You can change the Overload Horizon modifier using the following options.

- **Overload Horizon**- This value indicates the number of days from the Scheduled Start Date that used for the horizon. If an job or a job suggestion has a Required By Date greater than the Final Overload Horizon date, it is calculated using Overload Scheduling.
- **Scheduled Start Date**- This value defines the specific date used to begin the Overload Horizon.

Where Located

You can access the Overload Horizon functionality through the following locations.

- **Site Maintenance** - You activate the Overload Scheduling modifier on the Detail > Planning sheet. To do this, enter a number of days value within the Overload Horizon field. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Process MRP** - You launch the MRP engine through the Process MRP program. You enter the Scheduled Start Date within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Overload Horizon functionality uses this logic to calculate its results.

- If Required By Date > (Scheduled Start Date + Overload Horizon), then schedule the job using Infinite Capacity and place it on the Shop Load Table.

Example(s)

The following example(s) illustrate how you use the Overload Scheduling functionality.

You enter an Overload Horizon value of 30 days on a part-site detail for Part 345K-983. You receive a sales order for this part that is 45 days in the future from the Scheduled Start Date that you entered within the MRP Process program.

Because this demand requirement falls outside the Overload Horizon, MRP creates an unfirm job using Overload Scheduling. It uses the Need By Date on the sales order to create the Required By

Date on the job. Then it calculates how long it will take to produce the part quantity by generating End Dates on operations that will allow the unfirm job be completed by the Required By Date.

It does not consider the capacity required to finish each operation, only the dates by which each operation needs to be completed to meet the Required By Date on the unfirm job.

Plan As Assembly (Modifier)

Select this check box within a material on a method of manufacturing. When not enough inventory quantity is available, this causes the MRP engine to automatically split the subassembly that contains the material into its own firm job or jobs.

When a Plan As Assembly material is evaluated through MRP processing, the MRP engine checks to see if enough on-hand quantity is available within inventory to satisfy this demand material requirement. If enough quantity is available either through current stock or estimated future stock, the material quantity is considered satisfied and it is turned into a material requirement. If not enough quantity is available however, the MRP engine then splits off a new firm job for the subassembly that contains this material.

Adjustments

You can change the Plan As Assembly modifier using the following options.

- **Auto-Consume Stock -** When you select this check box, you indicate material requirements on part methods will automatically pull stock quantities as they become available. You select this check box on part records within the Parts - sites - Planning sheet.
- **Plan As Assembly** - Select this check box within a material on a method of manufacturing within the Engineering Workbench. When not enough inventory quantity is available, this causes the MRP engine to automatically split the subassembly that contains the material into its own firm job or jobs.

Where Located

You can access the Plan As Assembly modifier functionality through the following locations.

Engineering Workbench

The Plan As Assembly check box is located on the Method of Manufacturing - Materials - Detail sheet.

Part Maintenance

The Auto Consume Stock check box is located on the Part - sites - Planning sheet.

Menu Path

Navigate to this program from the Main Menu:

- Material Management > Inventory Management > Setup > Part
- Material Management > Purchase Contracts Management > Setup > Part
- Material Management > Purchase Management > Setup > Part
- Material Management > Supplier Relationship Management > Setup > Part
- Production Management > Engineering > Setup > Part
- Production Management > Job Management > Setup > Part
- Production Management > Material Requirements Planning > Setup > Part
- Production Management > Quality Assurance > Setup > Part
- Sales Management > Configurator Management > Setup > Part
- Sales Management > Demand Management > Setup > Part
- Sales Management > Order Management > Setup > Part
- Service Management > Field Service > Setup > Part
- Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Plan As Assembly modifier functionality uses this logic to calculate its results.

If a part is defined as a Pull As Assembly material on a part method, do the following:

- If the part can automatically consume part quantities, check the On-Hand-Quantity value for the material.
- If enough quantity is currently available or is estimated to be available through the Available to Promise calculation, create a material requirement for this part and move on through the part method.
- If not enough quantity is available, split off the subassembly that contains the material and create a new firm job.
- Assign the Firm Job Prefix to job number on the generated job.
- Evaluate the Minimum Lot Quantity and Maximum Lot Quantity values on the part record. If the material quantity on the firm job is larger than the Maximum Lot Quantity value, create multiple jobs until the quantity requirements are satisfied.

Example(s)

The following example(s) illustrate how you use the Plan As Assembly modifier functionality.

The MRP engine generates job MRP00010, a job that contains assemblies AB and AC. This creates demand for the purchased parts within PO Suggestions, and the purchasing lead times are factored into the lead time results. The MRP engines does this using the following logic:

1. Check whether the Auto Consume check box is selected on part records included as materials on the method.
2. Check whether the Pull As Assembly check box is selected on materials within the Engineering Workbench.
3. Review the Minimum Lot Size and Maximum Lot Size values and generate jobs based on these quantities.

Part AB automatically consumes stock quantities; you need a 25 quantity for this material. Currently inventory does not have enough on-hand quantity to satisfy the material requirement. However, the Available To Promise calculation determines that enough stock will be available during its Cumulative Lead Time of 28 days. Because of Part AB automatically consumes stock quantities and enough will be available to satisfy this requirement, a pull quantity is generated for Part AB, and the MRP engine moves on to Part AC.

Part AC also automatically consumes stock quantities. You need a 525 quantity for this material. Just like before, inventory does not have enough on-hand quantity available. This time the Available to Promise calculation determines that not enough quantity will become available during its Cumulative Lead Time required for this subassembly. Because of this, a job is created for this subassembly and given the firm status.

Planning Time Fence

The Planning Time Fence modifier allows you to prevent changes to job suggestions, purchase suggestions, and unfirm jobs. This is a date value.

If a Due Date on an MRP generated record occurs on a date between the Scheduled Start Date (defined on the Process MRP program) plus this value, the MRP engine will not change the Quantity and Date values on these records.

New suggestions will not be made against these records.

Adjustments

You can change the Planning Time Fence modifier using the following options.

These are the adjustments you can do with this modifier:

- **Planning Time Fence (Part Maintenance)**- You can define this value on each part-site detail within a part record. This lets you define different Planning Time Fence values for each site producing a specific part. If this field is left blank on a part-site detail, the MRP engine uses the value entered on the Part Class linked to the part record.

- **Planning Time Fence (Part Class Maintenance)**- You can define this value on Part Class records. This lets you use a uniform value for all parts linked to the part class. As long as a Planning Time Fence value is not defined on the part-site detail, the MRP engine uses the part class value instead.

Where Located

You can access the Planning Time Fence functionality through the following locations.

- **Part Class Maintenance**- This value is defined on the site sheet. You locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.
- **Part Maintenance**- This value is located under the Parts tab on the sites - Detail sheet. This can be set for each site that is used on the part record. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Planning Time Fence functionality uses this logic to calculate its results.

- If the suggestion Due Date is the Scheduled Start Date + Planning Time Fence, then do not change this suggestion.

Example(s)

The following example(s) illustrate how you use the Planning Time Fence functionality.

Job 435 is an unfirm job that has a Due Date of 5/6; it is manufacturing Part 45T-874 at the Blue site. The Planning Time Fence value defined on this part-site detail is 5 days.

You enter a new sales order for Part 45T-874. You next decide to run the Process MRP program to see how this sales order will change your suggestions. You enter a Scheduled Start Date on 5/3. Because Job 435 has a Due Date that occurs within the Planning Time Fence date, it is not updated during this MRP engine run.

This is the demand that the MRP engine finds on 5/3:

Demand/Supply	End Date	Quantity
Existing Job 435	5/6	5
Existing SO 123	5/6	6
New SO 234	5/10	4

The MRP engine discovers that it needs another 5 quantity on 5/6. Because this job falls within the Planning Time Fence, however, it cannot increase the size of the job suggestion it calculates for

sales orders 123 and 234. Because of this, the MRP engine generates a job suggestion for a 5 quantity on 5/8.

Prevent Suggestions

The Prevent Suggestions modifier allows you to prevent MRP from creating job suggestions for a specified co-part.

Co-part functionality allows you to define a method of manufacturing that can produce multiple parts on a single job as co-parts.

> The Advanced Production module must be installed to enable co-part functionality and this modifier.

Adjustments

You can change the Prevent Suggestions modifier using the following options.

These are the adjustments you can do with this modifier:

- **Prevent Suggestions** - Select this check box to indicate that MRP should not create job suggestions for the specified co-part. This check box is not enabled for the parent part.

> It is imperative that you manage the job suggestions carefully as you could receive divergent suggestions that do not reflect your intent.

Where Located

You can access the Prevent Suggestions functionality through the following locations.

- **Job Entry** - The Prevent Suggestions check box is located on the Co-Parts > Detail sheet in this program. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the General Operations folder.
- **Part Maintenance** - The Prevent Suggestions check box is located on the Co-Parts > Detail sheet in this program. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the General Operations folder.
- **Engineering Workbench**- The Prevent Suggestions check box is located on the Co-Parts > Detail sheet in this program. You locate this program from the Main Menu by opening the Production Management folder, the Engineering folder, and the General Operations folder.

Logic/Algorithms

The Prevent Suggestions functionality uses the following logic to calculate its results.

Prevent Suggestions - Active

If this modifier is active, MRP does not create job suggestions for the specified co-part.

Prevent Suggestions - Inactive

If this modifier is inactive, MRP generates job suggestions to satisfy demand.

Example(s)

The following example illustrates how you use the Prevent Suggestions functionality.

You have received a sales order for a quantity of 15 of part A to be delivered by February 1. You see that part A has a co-part defined (part B).

You create a job consisting of the two parts; with part A as the primary part and part B as the co-part. For part A, you enter a quantity of 10 with a required date of February 1. For part B, you enter a quantity of 5.

You know that, if you do not select the Prevent Suggestions check box and MRP determines inventory is available for part A, MRP could create a job suggestion that increases the quantity of part A from 10 to 15, while canceling the quantity of co-part B since there is no demand for co-part B.

To avoid this situation, you select the Prevent Suggestions check box for co-part B to prevent MRP from issuing a cancel suggestion for this part.

Primary UOMs - Inventory

The Primary UOMs - Inventory modifier specifies the primary or base inventory UOM (Unit of Measure) code for a part (for example, Each, Feet, Inches). It designates the unit of measure in which inventory balances are stored in the Epicor application.

The Epicor application always performs MRP calculations using the base UOM code assigned to the part in this field. The base UOM usually the smallest UOM in which the a part is normally stocked, and is the default UOM code for most inventory related transactions in the Epicor application.This is always the case, regardless of the setting of the Track Multiple UOMs check box for the part in the Part Maintenance - Part - Detail sheet.

Where Located

You can access the Primary UOMs - Inventory functionality through the following locations.

- **Part Maintenance**- The Primary UOMs - Inventory drop-down list is located under the Parts tab on the Detail sheet.

Example(s)

The following example(s) illustrate how you use the Primary UOMs - Inventory functionality.

A part is stored and tracked in multiple units of measure.The base UOM for the part is set to Each in the Primary UOMs - Inventory field, and the part comes packed 10 each per box. If we receive two cases and five individual units of the part, the manner in which the resulting inventory quantities are displayed and reported is dependent on the setting of this check box.

- If the Track Multiple UOMs check box check box has been cleared (inventory quantities tracked in the base UOM only), an inventory report run after receipt would show that we have 25 Each in stock.
- If the Track Multiple UOMs check box has been selected (inventory quantities tracked in multiple UOMs), the inventory for the part is simultaneously stored in multiple units of measure. An inventory report run after receipt would show that we have two boxes and five Each in stock.

However, the Epicor application always uses the base UOM code assigned to the part in the Primary UOMs - Inventory field, regardless of the setting of the Track Multiple UOMs check box. In this case, it uses the on hand quantity of 25 Each in MRP calculations for the item, even if the Track Multiple UOMs check box has been selected and inventory balances are being tracked in multiple units of measure.

Primary Warehouse

The Primary Warehouse modifier defines the main warehouse to receive part quantities at a site. If the part record is for a stock part, this warehouse must be entered on each part-site detail.

This warehouse can receive both manufactured and purchased parts through an inventory transaction.

When the MRP engine is run against this part-site detail, it will locate the available On-Hand Quantity within this warehouse. It will then use this quantity to calculate the remaining quantity needed on each suggestion for this part record.

Note that the MRP engine does not actually add any quantity to the Primary Warehouse. It suggests the quantity required based on the Minimum On-Hand Quantity value. Inventory transactions must be created, however, to track that the quantity is received to stock.

Adjustments

You can change the Primary Warehouse modifier using the following options.

These are the adjustments you can do with this modifier:

- **Primary Warehouse**- Use this drop-down list to select the warehouse used on each part-site detail. This lets you select different warehouses for different sites manufacturing the part.

Where Located

You can access the Primary Warehouse functionality through the following locations.

- **Part Maintenance**- The Primary Warehouse drop-down list is located under the Part tab on the sites - Detail sheet. This can be set for each site that is used on the part record. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Primary Warehouse functionality uses this logic to calculate its results.

- When a stock part quantity is manufactured or received, place this quantity within the Primary Warehouse defined on the part-site detail within the part record.
- Warehouse On-Hand Quantity = Received Quantity + Existing On-Hand Quantity

Example(s)

The following example(s) illustrate how you use the Primary Warehouse functionality.

The MRP engine calculates that a 40 quantity of Part 4534-E has passed (Received By) inspection. It then checks the part-site detail for the Red site. It discovers that the Red Warehouse is the Primary Warehouse for this site.

Inventory transactions are then created to indicate that this quantity is received to the Red Warehouse. This 40 quantity is then added to the On-Hand Quantity value for this part at this warehouse. The MRP engine can then use this quantity in its future calculations.

Process MRP

The Process MRP modifier indicates that this part record will be evaluated when the MRP engine is run. You select this value on both purchased and manufactured parts.

If this option is not selected on this part record, the MRP engine does not calculate any demand requirements for this part.

Adjustments

You can change the Process MRP modifier using the following options.

These are the adjustments you can do with this modifier:

- **Process MRP**- To use MRP processing with a specific part, you must select the Process MRP check box.

Where Located

You can access the Process MRP functionality through the following locations.

- **Part Maintenance**- You can select the Process MRP check box on the Part sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Process MRP functionality uses this logic to calculate its results.

If the Process MRP check box is selected, then the MRP engine will evaluate demand against this part record.

Example(s)

The following example(s) illustrate how you use the Process MRP functionality.

You will soon start manufacturing Part 346-89Y at your Red site. As you enter the new part record, you select the Process MRP check box. Any time a new demand or an updated demand is placed against this part record, the MRP engine (run through the Process MRP program) generates suggestions or unfirm jobs to satisfy this part demand.

Production Preparation Buffer (or Time)

The Production Preparation Buffer/Time modifier indicates the number of days required to prepare and engineer a job before it can be released to your manufacturing center for production. The MRP engine uses this value to add an additional amount of preparation time to the Planned Action Date on job suggestions and unfirm jobs.

It helps make sure that the Planned Action Date values accurately reflect your typical production planning workflow within a specific site.

The Production Preparation Buffer/Time value can be used with the Kit Time modifier to accurately calculate how many days it will take to prepare for production on a job.

Adjustments

You can change the Production Preparation Buffer (or Time) modifier using the following options.

These are the adjustments you can do with this modifier:

- **Production Prep Buffer (Part Maintenance)**- You can define how many days it takes to prepare for a job on each part-site detail. If you use the Multi-Site module, however, you can leave this field blank on the part-site detail. The Production Prep Time value defined within site Maintenance is then used instead.
- **Kit Time (Part Maintenance)**- Use this modifier to define the number of days required to assemble a part within a specific site. This value can be added to the Production Prep Buffer to more accurately calculate the number of days required to prepare a job for this part-site detail.

- **Production Prep Time (site Maintenance)**- If you use the Multi-Site module, you can define the number of days required to prepare for a job on each site record. The MRP engine will then use a uniform value against all parts manufactured at this specific site.
- **Kit Time (site Maintenance)**- If you use the Multi-Site module, you can define the number of days required to assembly a part on each site record. The MRP engine will then use a uniform value against all parts that are manufactured at this specific site.
- **Use Production Prep Buffer (Process MRP)**- To indicates that the MRP engine must include preparation days during its calculations, select the Use Production Prep Buffer check box. It then calculates preparation periods before each job Start Date. This check box is found on the Process MRP program.

Where Located

You can access the Production Preparation Buffer (or Time) functionality through the following locations.

- **Part Maintenance** - You can define the Production Prep Buffer value on site details (Part - sites- Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Site Maintenance** - You can define the Production Prep Time (this is the same value as the Production Prep Buffer) value on the Detail > Planning sheet within site records. You can enter this value here if your company uses the Multi-Site module. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Process MRP** - Within the Process MRP program, you decide whether you will use Production Prep Buffer values during the MRP calculations. Select the Use Production Preparation Buffer check box to include these additional times during calculations. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Production Preparation Buffer (or Time) functionality uses this logic to calculate its results.

- Total Preparation Time Per site = Production Preparation Buffer + Kit Time
- If the Use Production Preparation Buffer is selected, use Production Preparation Buffer values during the MRP calculations.

Example(s)

The following example(s) illustrate how you use the Production Preparation Buffer (or Time) functionality.

Production Prep Buffer Example

A part assembly on a job method has a Start Date of August 15th. The Production Prep Buffer is set to 4 for this part-site detail. The MRP engine calculates that the Planned Action Date for this assembly is on August 11th., giving the job a four day preparation period.

Production Prep Buffer + Kit Time Example

The Blue site detail for Part 456-89K has a Kit Time of 5 and a Production Prep Buffer of 10. Because you have entered both values, the MRP engine adds the values to calculate the number of days required to a prepare for production on a job quantity at this site. In this case, it will take 15 days.

The MRP engine initially calculates that a job will start on August 15th. Because of the combined Production Prep Buffer and Kit Time values, the preparation period for this job begins on August 1st.

Production Yield Default

The Production Yield Default modifier lets you monitor quantity changes on unfirm jobs and job suggestions.

This function tracks the Production Yield Calculation value within the MRP engine. If the MRP engine changes a quantity on an unfirm job or a job suggestion, this value updates and Production Yield Default then activates. Depending on the options you select, some functions will run automatically.

Use the Production Yield Default to immediately adjust job quantities on job suggestion or unfirm job. You can also receive an email alert when a quantity changs on the job suggestion or unfirm job.

This functionality is defined on site records. These automatic functions run each time a quantity is changed on a part-site detail using this site record.

Adjustments

You can change the Production Yield Default modifier using the following options.

These are the adjustments you can do with this modifier:

- **Adjust Job Quantities**- Select this check box to automatically change the quantities required on the suggestions generated through this site.
- **Send Adjustment Alert**- Select this check box when you want the application to create an email message each time a quantity is changed on a suggestion.

Where Located

You can access the Production Yield Default functionality through the following locations.

- **site Configuration Control**- You can select the Production Yield Default check box on the Modules - Production Management sheet. You can then define the automatic functions you want to run. If you need, you can select both options. You can locate this program from the Main Menu by opening the System Management folder and the Company Maintenance folder.

Logic/Algorithms

The Production Yield Default functionality uses this logic to calculate its results.

- If the quantity changes on the job suggestion/unfirm job, then activate the Production Yield Default options.

Example(s)

The following example(s) illustrate how you use the Production Yield Default functionality.

You want to be notified when a production quantity changes on a job at the Blue site. You launch the site Configuration Control program and select the Production Yield Default check box. You then select both the Adjust Job Quantities and the Send Adjustment Alert check boxes.

Now whenever the MRP engine attempts to change a quantity on an unfirm job or a job suggestion at this site, the quantity change will automatically occur. You will also be sent an email message (global alert) each time the quantity value is changed.

Quantity Bearing

The Quantity Bearing modifier indicates whether a part record is tracked through the inventory functionality.

When inventory calculations are active, transactions to and from stock are used to calculate the On-Hand Quantity for this part.

The MRP engine uses the On-Hand Quantity to calculate the remaining production or purchase quantities after the On-Hand Quantity is subtracted from the demand quantity.

Typically you will not use this modifier on a non-stock part.

Adjustments

You can change the Quantity Bearing modifier using the following options.

These are the adjustments you can do with this modifier:

- **Quantity Bearing**- To use the Quantity Bearing calculations with a specific part, you select the Quantity Bearing check box.

Where Located

You can access the Quantity Bearing functionality through the following locations.

- **Part Maintenance**- Select the Quantity Bearing check box on the Part sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Quantity Bearing functionality uses this logic to calculate its results.

- If the Quantity Bearing check box is selected, then the MRP engine will calculate the On-Hand Quantity available for demand requirements placed against this part record.
- Suggestion Quantity (Stock Part = Demand Quantity- On-Hand Quantity

Example(s)

The following example(s) illustrate how you use the Quantity Bearing functionality.

You will soon start manufacturing Part 346-89Y at your Red site. As you enter the new part record, you select the Quantity Bearing check box. The application will calculate the On-Hand Quantity available for this part on each day demand is required.

The MRP engine uses this value to calculate the quantity needed to satisfy a demand requirement.

Receive Time

The Receive Time modifier defines any extra time required to complete the job or purchase order.

The MRP engine uses this value differently, depending on whether this is a manufactured or purchased part:

- **Manufactured Parts**- The Receive Time value indicates how many days required to move a manufactured part quantity either to stock or the next job. The MRP engine subtracts this value from the Required By Date on a job suggestion or unfirm job. This lets the MRP engine more accurately calculate when the manufactured part quantity will arrive at its next destination. An example where using Receive Time is important is in commercial airplane manufacturing. The airplane site will need additional days to transport a plane to another facility to either stock the plane or continue work on it. By entering a Receive Time value, the MRP engine can account for this additional transportation time.
- **Purchased Parts**- The Receive Time value indicates how many days required to unpack and inspect the part quantity at your site. This value is subtracted from the Due Date on the PO release to give your supplier the correct Supply Date you require for parts arrival. For example, it takes 2 days to unpack and inspect Part 567-93W at your site. When the MRP engine calculates the Due Date for these parts, it then subtracts 2 days to define the Supply Date. This is the date by which your supplier needs to ship the parts in order to meet your demand requirement.

Adjustments

You can change the Receive Time modifier using the following options.

These are the adjustments you can do with this modifier:

- If Receive Time is not needed, you can enter a 0 value.
- You can also leave this field blank on a part-site detail; the MRP engine will then use the Receive Time value defined within the Part Class record instead.

Where Located

You can access the Receive Time functionality through the following locations.

- **Part Maintenance**- This value is located under the Parts tab on the sites - Detail sheet. This can be set for each site used on the part record. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Part Class Maintenance**- This value is defined on the site sheet within this maintenance program. If the Receive Time value is left blank on a part-site detail, the MRP engine uses the value defined on the Part Class assigned to the part record. You locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.

Logic/Algorithms

The Receive Time functionality uses this logic to calculate its results.

Manufactured Parts

Due Date = Required By Date - Receive Time

Purchased Parts

PO Need By Date = Due Date - Receive Time

Example(s)

The following example(s) illustrate how you use the Receive Time functionality.

Manufactured Part Example

Job 4582 has a Required By Date of August 22nd. The part-site detail for this manufactured part has a Receive Time value of 4, indicating it takes 4 days for a part quantity to arrive at your warehouse. The MRP engine calculates that this unfirm job will have an End Date of August 18th.

Purchased Part Example

You need to receive Part Sheet Metal, a purchased part, by April 20th. The part-site detail for this purchased part has a Receive Time value of 2, which accounts for how long it takes to unpack and inspect the part quantity. The MRP engine calculates that this purchase suggestion requires a Supply Date value of April 18th. The supplier will need to ship the part quantity to your manufacturing center by this date.

Recycle MRP Jobs

Select this modifier to indicate the MRP process can recycle unfirm jobs that fall within a specific date range. This check box activates the Recycle Jobs calculation.

This calculation feature improves MRP processing performance by saving unfirm jobs that use active part revisions. Instead of deleting all unfirm jobs each time the MRP process is run, this calculation determines which unfirm jobs can be saved. When the MRP process begins generating unfirm jobs during the current process run, it uses these recycled jobs first to satisfy current demand.

A new job is only created when a valid recycled job cannot be found. Likewise, if any recycled jobs could not be linked to a new demand record, the recycled unfirm job is deleted.

Where Located

You can access the Recycle MRP Jobs functionality through the following locations.

- **Engineering Workbench** - You define the Effective date range on each part revision on the Revision - Detail sheet. Main Menu Path: Production Management>Engineering>General Operations>Engineering Workbench
- **Process MRP** -- This program launches the MRP engine. You indicate this process will recycle jobs by selecting the Recycle MRP Jobs check box. Main Menu Path: Production Management>Material Requirements Planning>General Operations>Process MRP
- **Update Recycle Thresholds** - Use this process to calculate the date ranges currently available for each active part revision. If you want to recycle jobs, you must run this process before you run MRP processing. Epicor recommends you add this process and the Process MRP program to the same process set to make sure you generate accurate results. Be sure the Update Recycle Thresholds program runs before MRP processing. Main Menu Path: Production Management>Material Requirements Planning>General Operations>Update Recycle Threshold

Logic/Algorithms

The Recycle MRP Jobs modifier activates the following MRP logic:

- Part Revision Threshold = Previous Revision's Effective Date - Effective Date
- If Recycle MRP Jobs = True, then run the following:
  - If original unfirm job Request Date and current demand Request Date falls within the Part Revision Threshold, recycle the unfirm job.
  - Update the recycled unfirm job quantity to reflect the new demand.
  - Update the unfirm job's target demand Sales Order Number, Job Number or Warehouse

Example(s)

The following example(s) illustrate how you use the Recycle MRP Parts functionality.

Part A's current active revision is A10. Its Effective Date is 1/15. The next revision, A11, has an Effective Date on 2/15. The MRP engine generates job MRP00011 for Part A, revision A10 on 1/16 for a 50 quantity.

The MRP engine is next run on 2/2, and it encounters a new demand record for a 55 quantity on Part A. Because the A10 revision is still active and the new demand quantity also falls within this revisions effective date range, the MRP engine recycles job MRP00011 and updates the quantity on the job to 105.

Re-Order to Max

The Re-Order to Max modifier indicates that the MRP engine will create inventory demand requirements using the Maximum On-Hand quantity. When the On-Hand Stock quantity is less than the Minimum On-Hand quantity, a job suggestion (or suggestions) is created using the Maximum On-Hand value for the inventory demand quantity.

The total inventory demand will equal the Maximum On-Hand quantity minus the current On-Hand Quantity.

The actual size of this quantity on each suggestion, however, depends on the Maximum Lot Size defined within either the MRP Planning or the Short Horizon Planning group boxes. If the total quantity from this inventory demand source is greater than the Maximum Lot Size value, then two or more suggestions are generated.

Adjustments

The Reschedule In Time Delta defines a date range during which the MRP engine will be prevented from rescheduling supply suggestions occurring in the future. Any supply record identified for change with an End Date less than or equal to the final date of this range, will not generate a new suggestion.

This value prevents suggestions from appearing that you cannot act upon.

Where Located

You can access the Re-Order to Max functionality through the following locations.

- **Part Maintenance**- You can select the Re-Order to Max check box on each site detail (Part - sites - Detail sheet) within part records. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Re-Order to Max functionality uses this logic to calculate its results.

- If the Re-Order to Max check box is selected, then use the Maximum On-Hand quantity for the demand quantity. If this quantity is larger than the Maximum Lot Size, then create multiple

suggestions until the demand quantity generated with the Maximum On-Hand quantity is consumed.

- Total Demand Quantity (Re-Order to Max) = Maximum On-Hand - On-Hand Quantity

Example(s)

The following example(s) illustrate how you use the Re-Order to Max functionality.

You manufacture Part 569-45R within the Blue site. The Maximum On-Hand is a 3,000 quantity, while the Minimum On-Hand is a 1,000 quantity. The Maximum Lot Size within MRP Planning is a 500 quantity.

Several sales orders are completed for Part 569-45R, and the On-Hand Quantity for this part at the Blue site drops to 500. You run the MRP engine, and it calculates that there is a total inventory demand for a 2,500 quantity. Because the Maximum Lost Size is set at 500, the MRP calculations generate 5 job suggestions for Part 569-45R, each for a 500 quantity.

Reschedule In Time Delta

The Reschedule In Time Delta defines a date range during which the MRP engine will be prevented from rescheduling supply suggestions occurring in the future. Any supply record identified for change with an End Date less than or equal to the final date of this range, will not generate a new suggestion.

This value prevents suggestions from appearing that you cannot act upon.

Adjustments

You can change the Reschedule In Time Delta modifier using the following options.

These are the adjustments you can do with this modifier:

- **Reschedule In Time Delta (Part Maintenance)**- You can define this value on each part-site detail within a part record. This lets you define different Reschedule In Time Delta values for each site producing a specific part. If this field is left blank on a part-site detail, the MRP engine will use the value entered on the Part Class linked to the part record.
- **Planning Time Fence (Part Class Maintenance)**- You can define this value on Part Class records. This lets you use a uniform Reschedule In Time value for all parts linked to the part class. As long as a Reschedule In Time Delta value is not defined on the part-site detail, the MRP engine will use the part class value instead.

Where Located

You can access the Reschedule In Time Delta functionality through the following locations.

- **Part Maintenance**- This value is located under the Parts tab on the sites - Detail sheet. This value can be set for each site that is used on the part record. You locate this program from the

Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

- **Part Class Maintenance**- This value is defined on the site sheet within this maintenance program. You locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.

Logic/Algorithms

The Reschedule In Time Delta functionality uses this logic to calculate its results.

- If the Suggestion Date needs to be changed to Date X and the (Suggested Date- Date X) Rescheduled In Delta, no expedite suggestion is created.

Example(s)

The following example(s) illustrate how you use the Reschedule In Time Delta functionality.

You have a job suggestion that is due on 7/31, but an expedite supply requirement is entered against this same part on 7/28. The Reschedule In Delta value is 5 days. Because this expedite supply requirement falls within this range, no suggestion is created.

Reschedule Out Time Delta

The Reschedule Out Time Delta defines a date range during which the MRP engine will be prevented from rescheduling demand suggestions that occur in the future. Any demand record that is supposed to be changed, but has an End Date less than or equal to the final date of this range, will not generate a new suggestion.

This value prevents suggestions from appearing that you cannot act upon.

Adjustments

You can change the Reschedule Out Time Delta modifier using the following options.

These are the adjustments you can do with this modifier:

- **Planning Time Fence (Part Class Maintenance)**- You can define this value on Part Class records. This lets you use a uniform Reschedule Out Time value for all parts that are linked to the part class. As long as a Reschedule Out Time Delta value is not defined on the part-site detail, the MRP engine uses the part class value instead.
- **Reschedule Out Time Delta (Part Maintenance)**- You can define this value on each part-site detail within a part record. This lets you define different Reschedule Out Time Delta values for each site that produces a specific part. If this field is left blank on a part-site detail, however, the MRP engine uses the value entered on the Part Class that is linked to the part record.

Where Located

You can access the Reschedule Out Time Delta functionality through the following locations.

- **Part Maintenance**- This value is located under the Parts tab on the sites - Detail sheet. This value can be set for each site used on the part record. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Part Class Maintenance**- This value is defined on the site sheet within this maintenance program. You locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the Setup folder.

Logic/Algorithms

The Reschedule Out Time Delta functionality uses this logic to calculate its results.

If the Suggestion Date needs to be changed to Date Y and the (Suggested Date - Date Y) Rescheduled Out Delta, then no postpone suggestion is created.

Example(s)

The following example(s) illustrate how you use the Reschedule Out Time Delta functionality.

You have a job suggestion that is due on 7/31, but a postpone demand requirement is entered against this same part on 8/3. The Reschedule Out Delta value is 5 days. Because this new postpone demand requirement falls within this range, no suggestion is created.

Rough Cut Horizon

This value indicates the number of days from the Scheduled Start Date used for Rough Cut Scheduling. This scheduling option reduces the processing time needed to generate the overall schedule, but still generates a schedule that gives you a general idea about the production plan you may require in the future.

If an job or a job suggestion has a Required By Date greater than the Final Rough Cut Horizon date, it is calculated using Rough Cut Scheduling.

This calculation gathers the Need By Dates and Lead Time values on each material and operation in a part method. It then uses these values to calculate how much time is required for each job to finish its operations and gather its materials. The Rough Cut Scheduling calculation infinitely schedules these future jobs; it also schedules these jobs backwards from an End Date value. These jobs are then included in your schedule for review on the scheduling boards.

Adjustments

You can change the Rough Cut Horizon modifier using the following options.

- **Rough Cut Horizon**- This value indicates the number of days from the Scheduled Start Date that used for the horizon. If an job or a job suggestion has a Required By Date greater than the Final Rough Cut Horizon date, it is calculated using Rough Cut Scheduling.
- **Scheduled Start Date**- This value defines the specific date used to begin the Rough Cut Horizon.

Where Located

You can access the Rough Cut Horizon functionality through the following locations.

- **Site Maintenance** - You activate the Rough Cut Scheduling modifier on the Detail > Planning sheet. To do this, enter a number of days value within the Rough Cut Horizon field. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.
- **Process MRP** - You launch the MRP engine through the Process MRP program. You enter the Scheduled Start Date within this program. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Logic/Algorithms

The Rough Cut Horizon functionality uses this logic to calculate its results.

- Rough Cut Schedule Date = Current System Date + Rough Cut Horizon
- If job's End Date > Rough Cut Schedule Date, then use Rough Cut Scheduling
- Rough Cut Scheduling:
    - Uses Backwards Scheduling
    - Schedules Infinitely
    - Load is not placed against resource records

Example(s)

The following example(s) illustrate how you use the Rough Cut Scheduling functionality.

Run Finite Scheduling During MRP Calculation

The Run Finite Scheduling During MRP Calculation modifier indicates that you want the unfirm jobs and job suggestions to be finitely scheduled.

Finite Capacity Scheduling is a capacity calculation method that does not allow more load to be scheduled above the available capacity (supply of available production) within a resource. If a resource's capacity is fifteen hours per day, for example, only fifteen hours of load is assigned to this

resource. Finite scheduling also takes into account any required (constrained) materials that the operation needs; if these materials are not available at a point in the schedule, the operation will not be scheduled within an otherwise available amount of time.

The MRP engine leverages the scheduling engine to run this calculation. When you select this check box on the Process MRP program, most of the unfirm jobs and job suggestions generated by the MRP engine will be scheduled using the Finite Capacity calculation.

Note however, that if a suggestion or unfirm job has a Required By Date occurring outside a Finite Horizon date range, the record is infinitely scheduled. This means the job is scheduled without using any capacity limits, and its End Date is calculated by only using when the job needs to be complete.

The site that manufactures the part quantities defines the Finite Horizon value. This value, in days, is added to the Scheduled Start Date to determine the last date on which the Finite Capacity calculation will be used. Because capacity limits are less of an issue later in the schedule, infinite capacity scheduling is used to help you determine when an upcoming demand requirement needs to be satisfied.

Adjustments

You can change the Run Finite Scheduling During MRP Calculation modifier using the following options.

- **Run Finite Scheduling During MRP Calculation**- Select this check box within the Process MRP program to indicate that all job suggestions and unfirm jobs will be scheduled using finite capacity. If you do not select his check box, the MRP engine will schedule all unfirm jobs and job suggestions using the infinite capacity calculation.
- **Finite Horizon**- This value, defined within the site Maintenance program, indicates the limit in days at which the MRP engine will stop using the Finite Capacity calculation for unfirm jobs and job suggestions and then switch to the Infinite Capacity calculation. This value is added to the Scheduled Start Date defined on the Process MRP program to determine the last date on which the Finite Capacity calculation is used.

Where Located

You can access the Run Finite Scheduling During MRP Calculation functionality through the following locations.

- **Process MRP program**- Finite Capacity scheduling can be run during the MRP Process. You do this by selecting the Run Finite Scheduling During MRP Calculation check box. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.
- **site Maintenance**- You define the Finite Horizon date range for each site within the Detail sheet. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Run Finite Scheduling During MRP Calculation functionality uses this logic to calculate its results.

- If the unfirm job or job suggestion occurs within the Finite Horizon date range (Scheduled Start Date + Finite Horizon), the unfirm job or job suggestion is finitely scheduled.
- If the unfirm job or job suggestion occurs after the Finite Horizon date range (Scheduled Start Date + Finite Horizon), the unfirm job or job suggestion is infinitely scheduled.

Example(s)

The following example(s) illustrate how you use the Run Finite Scheduling During MRP Calculation functionality.

You have accurately set up your part engineering and your resource groups, so you are getting precise scheduling results. Because of this, you want the MRP engine to leverage this information while it is calculating its suggestions.

You decide to run the Process MRP program using a Scheduled Start Date of 8/15. You then select the Run Finite Scheduling During MRP Calculation check box. When the MRP engine processes the unfirm jobs, it calls the scheduling engine to finitely schedule these records by evaluating the operations on the part methods and the resources needed to start and complete each operation.

When the scheduling results are finished, each operation on the unfirm jobs has a Start Date and an End Date value that reflect how long the scheduling engine determined it would take the operation to run. Any materials that are required on a specific operation are also considered, which causes some operations to start late, as work cannot begin on the operation until the material arrives at the site.

At your Blue site, however, you have entered a Finite Horizon of 5 days. This means that any unfirm jobs with Required By Dates after 8/20 will be infinitely scheduled at this site. The limits of work hours, production quantity, and constrained materials are then ignored by the scheduling engine. The Start Date and End Date for each operation are calculated to see where within the schedule they need to be complete - in order to make each unfirm job's Required By Date.

This information is then sent back to the MRP engine. The Start Date and End Date values are used on each unfirm job. Notice that the MRP engine does not consider whether the job was finitely or infinitely scheduled. It just pulls and then uses this information from the scheduling engine for the unfirm jobs it generates.

Run Out

The Run Out modifier indicates that your company is discontinuing this part, but an On-Hand Quantity of it remains in stock. As long as this On-Hand Quantity is available, the MRP engine continues to calculate suggestions against this part record.

If another part or parts will eventually be used to satisfy demand against this part record, you define these parts on the Substitutions sheet. The MRP engine will not, however, mix quantities of these

parts on the same suggestion. Depending on how the run out part is used, the MRP engine will generate suggestions differently:

- **Co-Part**- If this run out part is one being produced on the job, it will only create a suggestion for the run out part. The substitute part is not included during this calculation.
- **Material Part**- If this run out part is used as a material on a method of manufacturing, the MRP engine will only generate suggestions against the substitute part. It ignores the run out part during this calculation.

Adjustments

You can change the Run Out modifier using the following options.

These are the adjustments you can do with this modifier:

- **Run Out**- Selecting a part record's Run Out check box indicates that your company will discontinue this part.
- **Substitutions**- You define which parts can be used as replacements for the original part on the Substitutions sheet.

Where Located

You can access the Run Out functionality through the following locations.

- **Part Maintenance**- The Run Out check box is located on the Part sheet. You enter substitute parts on the Substitutions sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Run Out functionality uses this logic to calculate its results.

- If a co-part is a Run Out part, generate suggestions against the run out part. The substitute part is ignored.
- If a material part is a Run Out part, then use the substitute part for the suggestions. The run out part is ignored.

Example(s)

The following example(s) illustrate how you use the Run Out functionality.

Co-Part Example

You are phasing out Part 120-78X. On the 120-78X part record, you indicate that this is now a Run Out part. You then indicate that Part 120-78Y is the substitute part for 120-78X.

You have a sales order for Part 120-78X that has a 100 quantity; there is an On-Hand Quantity of 12. The MRP engine will generate a job suggestion for an 88 quantity of Part 120-78X. Part 120-78Y is not included in this calculation.

Job Material Example

You are phasing out Part 67K, a material that you use on several methods of manufacturing. You indicate that Part 67K is now a Run Out part on its record. You then define that Part 67L is the substitute part for 67K. You have an On-Hand Quantity of 17 for Part 67K.

A new job uses Part 67K as a material within its method of manufacturing. To complete its production quantity, this job needs a 100 quantity of Part 67K.

Now the MRP engine will instead use the substitute part. It generates a job suggestion for a 100 quantity of Part 67L. Part 67K is not included in this calculation, so there is no demand placed against this part.

Run the Multi-Level Pegging Process

The Run the Multi-Level Pegging Process modifier indicates that you want the MRP engine to use the Multi-Level Pegging calculation. This causes the MRP engine to calculate additional supply and demand details.

Because of this calculation, each supply part quantity is directly linked, or pegged, to the specific demand record that created it. You can display this additional suggestion information on the Multi-Level Pegging Display dashboard. This information displays available inventory quantity, the jobs currently producing each part, the sales orders creating demand for the part, and so on.

You can view the multi-level pegging results by part, sales order, transfer order, job, and purchase order.

Adjustments

You can change the Run the Multi-Level Pegging Process modifier using the following options.

These are the adjustments you can do with this modifier:

- **Run the Multi-Level Pegging Process** - You activate this calculation before you run the MRP engine. To do this, select the Run the Multi-Level Pegging Process check box.

Where Located

You can access the Run the Multi-Level Pegging Process functionality through the following locations.

- **Process MRP Program**- Use this program to indicate that you want to use the Multi-Level Pegging calculation during the MRP engine run. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning

folder, and the General Operations folder.

- **Process Multi-Level Pegging** - Run this process after the MRP engine has processed the raw Multi-Level Pegging data. This lets you turn this detail in results you can then view within the Multi-Level Pegging Display program. This program is located under the Production Management directory located in the Material Requirements Planning folder in the General Operations section.
- **Multi-Level Pegging Display** - Use this program to display the Multi-Level Pegging results. This program is located under the Production Management directory located in the Material Requirements Planning folder in the General Operations section.

Logic/Algorithms

The Run the Multi-Level Pegging Process functionality uses this logic to calculate its results.

- If the Run Multi-Level Pegging Process check box is selected, directly link each demand quantity to each supply quantity that will satisfy it.

Example(s)

The following example(s) illustrate how you use the Run the Multi-Level Pegging Process functionality.

The Multi Level Pegging Display is especially useful in viewing the overall supply and demand for a top selling product. For example, if there is a part that is a high seller, use the Multi Level Pegging Display to see the supply and demand for all of the materials that make up the part. This helps you identify exactly what is required to fulfill the demand and what purchase orders or sales orders are tied to the materials needed to manufacture the product.

Scheduled Start Date

The Scheduled Start Date is the date used to start both the MRP and scheduling processes. This date is the first date from which the MRP engine runs, and is the base date used for all the MRP calculations.

For example, if this date is two days in the future but the MRP engine is run now, then today and tomorrow are both considered in the past.

Because the MRP engine calls the scheduling engine, this Scheduled Start Date value affects how the engine forward schedules jobs. If a forward scheduled job has a Start Date occurring before this date, then this Start Date value is used as the Scheduled Start Date. The forward scheduling method uses a job record's Start Date to calculate when a job will end.

This value also affects how the scheduling engine backwards schedules jobs. If scheduling in the past is not allowed because the Allow Historical Dates check box is clear (another modifier on the Process MRP program), and a backward scheduled job will begin before the Scheduled Start Date,

the job will instead be forward scheduled using this date as its Start Date. The backward scheduling method uses a job record's End Date to calculate when a job will begin.

The MRP engine will continue to look for demand on all dates up to the Cut Off Date. When the MRP engine calculates all the demand required on this last date, the processing run is complete.

This value is also used for the MRP Recalculation Needed calculation method. This value is used in the same way within this calculation.

Adjustments

You can change the Scheduled Start Date modifier using the following options.

These are the adjustments you can do with this modifier:

- **Scheduled Start Date**- This value defines the date on which the MRP engine begins its calculations. This is the base value you enter on the Process MRP program. Note that if you want to automatically run the MRP engine, you can make the Scheduled Start Date a Dynamic value. This means that instead of using a specific date, the Process MRP program will launch the MRP engine on a recurring date like the First Day of the Week, First Day of the Month, and so on.
- **Allow Historical Dates**- Select the Allow Historical Dates modifier to allow scheduling of operations and purchasing before the Scheduled Start Date. The MRP process may then suggest Start Dates values for jobs and purchase orders that are earlier than the Scheduled Start Date. Note however, that only job and purchase suggestion Start Dates can be placed earlier in the schedule history. It will not place a job's Required By Date or a PO's Need By Date earlier than the Scheduled Start Date. If this occurs, these records will have their Start Date values placed on the Scheduled Start Date or later. If this check box is clear, the MRP engine will only schedule an operation on or after the Scheduled Start Date. All jobs or purchase orders will then be scheduled on or after this date.
- **Cut Off Date**- The date on which the MRP engine will stop looking for demand.

Where Located

You can access the Safety Stock functionality through the following locations.

- **Part Maintenance**- The Safety Stock check box is located on the Parts - site - Detail sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Scheduled Start Date functionality uses this logic to calculate its results.

- Each demand record's Required By Date must be greater than or equal to the Scheduled Start Date and the Cut Off Date.

Example(s)

The following example(s) illustrate how you use the Scheduled Start Date functionality.

It is July 28th, and you want to generate suggestions for the month of August. You launch the Process MRP program and enter August 1st for the Scheduled Start Date and August 31st and the Cut Off Date. The MRP engine calculates all demand requirements through August 31st.

It ignores any demand requirements, however, on forecasts and master production schedules that occur before August 1st.

Safety Stock

The Safety Stock modifier defines the additional inventory amount you want to stock for emergencies. It is used to make sure that there is sufficient quantity to ship or use if an unexpected demand occurs.

The MRP engine uses this value to generate additional inventory demands when the On-Hand Quantity is less than the Safety Stock value. It will generate a job suggestion, purchase suggestion, or unfirm job to satisfy this inventory demand.

The MRP engine only evaluates Safety Stock values defined on part-site details.

Adjustments

You can change the Safety Stock modifier using the following options.

These are the adjustments you can do with this modifier:

- **Safety Stock**- Enter the quantity you want on each part-site detail. This lets you define Safety Stock quantities for each site that manufactures the part.

Where Located

You can access the Safety Stock functionality through the following locations.

- **Part Maintenance**- The Safety Stock check box is located on the Parts - site - Detail sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Safety Stock functionality uses this logic to calculate its results.

- **If the On**-Hand Quantity is > the Safety Stock value, then create a job suggestion, purchase suggestion, or unfirm job.
- Suggestion Quantity = Minimum Lot Size + Safety Stock

Example(s)

The following example(s) illustrate how you use the Safety Stock functionality.

You want to make sure you have enough quantity available for Part 321-09C, one of your best selling parts. Because of this, you enter a Safety Stock value of 500. When this quantity is less than 500, the MRP engine creates unfirm jobs to restore the Safety Stock quantity.

Sort Level 0 MRP Parts by Requested Date

Specifies that while the MRP process generates jobs, it should delay starting the scheduling engine until all zero assembly level MRP jobs are created first. The scheduling engine then schedules the jobs in Requested Due Date order.

This option is available only if you use the finite scheduling calculation. Any MRP jobs generated for final assembly parts can be scheduled more accurately and with more complete PO suggestions without running a Global Schedule process. This option eliminates a potential problem in which jobs for parts with zero level assemblies are created first, taking all available capacity so jobs for parts with higher assembly numbers may be scheduled late compared to their Requested Due Date values.

Clear the check box if the MRP engine should process in part number order, create MRP job records, and start the scheduling engine using its default process. It creates MRP job records and then immediately calls the schedule engine to schedule the MRP jobs in the order in which they were created. It does not wait until all zero level MRP jobs are created first.

This option does not impact parts which have low level assemblies other than zero.

Things to Consider

It is possible that certain end parts do not process because they may not defined as zero level assemblies. This occurs when a part is used somewhere in an assembly but is sold as a spare part; the Epicor application does not consider it to be a level zero part. Because of this, the part is not included in this process run when you select this check box.

You may also experience slow performance if you select this check box. Finite scheduling cannot be started until all parts for level zero assemblies are processed by the MRP engine. This can cause a potential data bottleneck, because process threads must wait for the single finite process thread to complete.

Adjustments

You can change the Sort Level 0 MRP Parts by Requested Date modifier using the following options.

Here are the adjustments you can do with this modifier:

- **Sort 0 Level MRP Jobs by Requested Date**- Select this check box to activate this additional MRP calculation.

Where Located

You can access the Sort Level 0 MRP Parts by Requested Date functionality through the following locations.

- **Process MRP Program**- Use this program to indicate that you want to use this processing calculation during the MRP engine run. You can locate this program from the Main Menu by opening the Production Management folder, the Material Requirements Planning folder, and the General Operations folder.

Example(s)

The following example(s) illustrate how you use the Sort Level 0 MRP Parts by Requested Date functionality.

Dalton Manufacturing performs final assembly of trailers. By selecting this check box, they ensure that trailers with higher part numbers are scheduled on a timely basis because the scheduling engine does not start until MRP jobs have been created for all level zero parts. It then sorts all jobs in requested due date order, rather than in part number order, as would occur if they cleared the check box.

Start Minimum Lot Quantity

Use the Start Minimum Quantity modifier to define the conditions under which a demand quantity can be split into two jobs. When you have enough materials available to manufacture some, but not all, of a demand quantity, you can indicate that a specific amount of this quantity can be manufactured earlier on one job, while the remaining quantity will be manufactured later in the schedule.

This modifier only checks constrained materials required on the first operation of each subassembly.

When the MRP engine finds a part that has both a Minimum Start Quantity that falls within a defined buffer days range and a material constraint value, the process uses this quantity value to split the job. The MRP engine will split a job by first updating the original job to contain only the Minimum Start Quantity value and then creates a second job containing the remaining quantity left to manufacture.

In order for the MRP engine to use this modifier, however, you must run the Manufacturing Lead Time calculation to determine how long it takes to produce quantities of this part using the current revision. Be sure to run this calculation process every time you make changes to a part method; this makes sure your lead time values reflect the current methods. If you need, you can also manually adjust the Cumulative Lead Time and This Level Time values generated through this calculation process on each part-site record.

Adjustments

You can change the Start Minimum Lot Quantity modifier using the following options.

- **Lead Time** - This value indicates during how many future days from the current date fall within this buffer. Any demand records available from the current date plus this number of days will be included in this calculation. Material quantities on any demand records outside this date window are not split into two jobs.
- **Minimum Start Quantity** - This value defines the smallest quantity that the MRP engine can use to generate a new job. If the Minimum Start Quantity value is greater than the demand quantity, the demand record is not split. If the Minimum Start Quantity is less than the demand quantity, the quantity is split into two jobs.
- **Start Min Lot Qty** - Select this check box to activate the functionality for the current part record.

Where Located

You can access the Start Minimum Lot Quantity functionality through the following locations.

Part Maintenance

- You set up this functionality within this program. The Start Minimum Lot Quantity fields are available on the Part - sites - Planning sheet.

Logic/Algorithms

The Start Minimum Lot Quantity functionality uses the following logic to calculate its results.

- Start Minimum Lot Quantity Buffer Date Range = Current Date + Lead Time
- If Demand Date > Start Minimum Lot Quantity Buffer Date Range, then check for Minimum Start Quantity value.
- If Minimum Start Quantity value is available and it is less than the demand quantity, then subtract this quantity from the Demand Quantity and create an unfirm job.
- Generate a second unfirm job that contains the remaining Demand Quantity
- If the part record also has a Minimum Lot Quantity and it is less than the Minimum Start Quantity. create jobs using the Minimum Lot Quantity until the total quantity on these jobs equal the Minimum Start Quantity.

Example(s)

The following example(s) illustrate how you use the Start Minimum Lot Quantity functionality.

You are running the MRP process on April 10th. One of your products, Part 75YT, is having terrific sales, so you need to ship as many quantities as you can as early as you can. To do this, you use the start minimum lot quantity functionally. You first run the Manufacturing Lead Time process to generate the cumulative lead time you need for the part. You then launch Part Maintenance and navigate to the sites - Planning sheet to indicate this part uses a Lead Time value of 5 days and has a Minimum Start Quantity value of 10. A demand record for a 25 quantity is requested by a customer on April 17th.

When the MRP process runs, it calculates this demand falls less than five days in the future and can be included in the Start Minimum Lot Quantity calculation. It splits the original 25 quantity into two jobs, creating the first unfirm job with a 10 quantity and the second unfirm job with a 15 quantity.

Sub Level Code

The Sub Level Code modifier allows you to control the order in which co-parts are processed. This functionality is used in conjunction with Low Level Code to determine the order in which co-parts should be processed.

MRP uses the Sub Level Code to sort parts within a Low Level Code. All parts processed in Sub Level Code 0 must be completed before MRP moves on to parts specified as Sub Level Code 1. When all parts are processed within a Low Level Code grouping, MRP moves onto the next Low Level Code and starts at Sub Level Code 0 again.

The **Advanced Production** module must be installed to access co-part functionality.

Adjustments

You can change the Sub Level Code modifier using the following options.

- **Sub Level Code** - Use this field to enter a numeric value representing the order that the specified co-part should be processed. The default value is zero (0).

The larger the Sub Level Code number is, the more it impacts MRP performance. You should start with a low number and slowly increase the number one-by-one until you get the desired results.

Where Located

You can access the Sub Level Code functionality through the following locations.

- **Part Maintenance** - The Sub Level Code field is located on the Part > Detail sheet in this program. You locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Sub Level Code functionality uses the following logic to calculate its results.

Sub Level Code - Active

If this modifier is active, MRP uses the Sub Level Code to sort parts within a Low Level Code.

- Parts are processed first by their specified Low Level Code, with 0 representing the highest priority.

- Within a Low Level Code, all parts processed in Sub Level Code 0 must be completed before moving onto Sub Level Code 1.
- When all Sub Level Code parts are processed for a Low Level Code, MRP moves on to the next Low Level Code and starts at Sub Level Code 0 again.

Sub Level Code - Inactive

If this modifier is inactive, MRP sorts parts alphabetically within a Low Level Code.

Example(s)

The following example illustrates how you use the Sub Level Code functionality.

You have determined the order that you would like MRP to process six co-parts. You enter the Sub Level Codes representing the order that you want these parts to be processed within the Low Level Code grouping.

Part	Low Level Code	Sub Level Code
A	0	2
B	0	0
C	0	1
D	0	0
E	1	1
F	1	0

MRP processes the parts first by their specified Low Level Code, with 0 representing the highest priority. MRP then processes parts by Sub Level Code within the Low Level Code group before moving on to the next Low Level Code.

Thus, MRP processes the parts in the following order: Part B, Part D, Part C, Part A, Part F, and finally Part E. MRP first processes parts B and D, either concurrently or sequentially (depending upon available processors), as they share the highest priority levels (Low Level Code = 0, and Sub Level Code = 0). MRP waits until both parts are processed before starting Part C (Low Level Code = 0, Sub Level Code = 1). Part C must be done before MRP moves on to Part A. Part A must be done before moving onto Part F, and Part F must be processed before moving onto Part E.

Supplier (Modifier)

Suppliers define the organizations from whom you will purchase materials needed during the manufacturing process. These records contain information required for buying materials from each supplier, including the purchasing terms, purchase point locations, contacts, and so on.

You can select the default supplier and purchase point used on generated PO suggestions on purchased part records. Each part-site detail can have two default suppliers -- one supplier for normal purchases and other supplier for urgent planning. Most purchase orders use the default supplier defined for normal purchases, but if you activate the **Consume Minimum Quantities** calculation, the default supplier for urgent planning is used in some situations. When the On-Hand Minimum Quantity falls below the Safety Stock quantity or a 0 quantity, the PO suggestion uses the supplier selected for urgent planning.

You can also leave these values blank on part-site records. In this case, either the supplier selected on the supplier price list or the last purchase order is used on the PO suggestion. If this is a suggestion for a **Buy Direct** purchase order, the supplier defined on the demand record is automatically placed on the PO suggestion.

Adjustments

You adjust the Supplier modifier using the following options:

You select the default suppliers you need on part records.

- **Supplier (Purchasing)**-- Indicates the default supplier you use for typical PO suggestions. Any time the On-Hand Quantity falls below the Reorder Quantity (Minimum Quantity + Safety Stock Quantity) but is above the Safety Stock quantity, this default supplier is used on PO suggestions.
- **Supplier (Urgent Planning)** -- Indicates the default supplier you use for PO suggestions you want to generate quickly. This supplier record is available when the Consume Minimum Quantity calculation is active. When the On-Hand Quantity falls below Safety Stock Quantity or a 0 Quantity, this supplier is used on PO suggestions.

Where Located

You indicate which suppliers you use in the following location.

Part Maintenance

You select the Purchasing and Urgent Planning suppliers within Part Maintenance on the Part > sites > Detail sheet.

Menu Path

Navigate to this program from the Main Menu:

• Material Management > Inventory Management > Setup > Part

• Material Management > Purchase Contracts Management > Setup > Part

• Material Management > Purchase Management > Setup > Part

• Material Management > Supplier Relationship Management > Setup > Part

• Production Management > Engineering > Setup > Part

• Production Management > Job Management > Setup > Part

• Production Management > Material Requirements Planning > Setup > Part

• Production Management > Quality Assurance > Setup > Part

• Sales Management > Configurator Management > Setup > Part

• Sales Management > Demand Management > Setup > Part

• Sales Management > Order Management > Setup > Part

• Service Management > Field Service > Setup > Part

• Service Management > Field Service Integration > Setup > Part

Logic/Algorithms

The Supplier modifier uses this logic to calculate its results.

1. If the supplier is defined on the part-site record and the On-Hand Quantity < Reorder Quantity (Minimum Quantity + Safety Stock Quantity) and is > the Safety Stock Quantity, use the default supplier and purchase point in the Purchasing section.
2. If Use the supplier is defined on the part-site record and the On-Hand Quantity < Safety Stock Quantity and the Consume Minimum Quantity calculation is active, use the default supplier and purchase point in the Urgent Planning section.
3. If the Urgent Planning Supplier field is blank, use the Supplier on the part-site record defined in the Purchasing section instead.
4. If the Purchasing Supplier field is blank, either use the Supplier value on the last purchase order or the Supplier value on the supplier price list.
5. Override: if this is a Buy Direct PO suggestion, the Supplier value defined on the demand record is used; the Urgent Planning Supplier and Purchasing Supplier values are ignored.

Example(s)

The following example(s) illustrate how you use the Supplier modifier.

You are generating purchasing suggestions for Part 010-0112. The part-site record uses a Purchasing (Standard) Lead Time value of 10 days. You typically purchase this part from Global Supply, as they give you the best price breaks. This part-site record also has a 20 Safety Stock quantity.

However, Global Supply's turnaround time, 10 days lead time, can sometimes be problematic. In order to satisfy demand, you set up Urgent Planning values on this part-site record. When the MRP calculation detects that the On-Hand Quantity falls below the Safety Stock value, these Urgent Planning values are used instead to calculate the purchase changes. Another supplier Speed-E

Supply, can turn around a part quantity in 5 days lead time, so you use this supplier for emergency points in your schedule.

You set up the part-site record as the following:

Safety Stock: 20	Supplier	Lead Time	Min Order Qty	Mul Order Qty
Purchasing	Global Supply	10	100	N/A
Urgent Planning	Speed-E Supply	5	50	10

You generate MRP using a Scheduled Start Date of 8/12. The engine discovers that on 8/17, the available On-Hand Quantity will be 18, a two quantity below the Safety Stock quantity. Because this low quantity falls within the Standard Lead time window (in this case 8/12 - 8/22), this causes MRP to activate the Consume Minimum Quantity calculation. MRP generates a purchase change to create a PO for Speed-E Supply for part 0101-0112. The Purchase Quantity on this purchase order with be 50 and the Lead Time value will be 5 days. This purchase suggestion should then answer the increased demand needed for part 010-0112 at this point in the schedule.

This Level Time

This Level Time defines how much time is needed to manufacture part quantities for the subassembly in the method that requires this material part.

This value is generated through the Manufacturing Lead Time Calculation, and it displays within Part Maintenance on the Part-site-Planning sheet. The calculation arrives at its final value by using the values generated through the Rough Cut Scheduling calculation to determine how long it takes material quantities to arrive and production quantities to be produced. Additional factors can also be included in this calculation such as purchasing Lead Time, Receive Time, Kit Time, and so on; you indicate the additional time values you want to include on each site record.

The MRP engine does not directly use the manufacturing lead time values. The Cumulative Time and This Level Time values, however, are the main factors the MRP engine uses to determine if a demand record quantity can be split into two jobs using the Start Minimum Quantity functionality. Through this functionality, if the calculated manufacturing lead time falls within Start Minimum Quantity lead time, the demand quantity is divided into two or more jobs.

If you need, you can override the This Level Time generated by the Manufacturing Lead Time Calculation. To do this, click the Manual check box and enter the specific time, in days, that you want instead.

Adjustments

You adjust the This Level Time modifier using the following options:

- **Kit Time** - Select this check box to indicate the time it takes in days to assemble manufactured parts will be included during the manufacturing lead time calculation. Only used on manufactured parts, the MRP engine uses it to calculate the End Date for any materials within the parent part's assembly. This value is defined on site records and part records.
- **Lead Time** - Select this check box to indicate you want to include the purchasing Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes purchased part quantities to arrive at your site.
- **Manual** -- Select this check box to override the This Level Time value generated by the Manufacturing Lead Time Calculation for a specific part. This check box activates the manual column on the part record within the Part-site-Planning sheet. Enter the new value, in days, that you need.
- **Receive Time** - Select this check box to indicate you want to include the Receive Time values in this calculation. This value is defined on part records, and it indicates how long it takes, in days, to move purchased part quantities from the shipping dock to the resources that need them.
- **Rough Cut Parameters** - Select this check box to indicate any rough cut parameters defined on product groups or part revisions will be included in the manufacturing lead time calculation. These parameters add extra time for the setup, fixed, variable, and subcontract values used for generating the rough cut schedule. Each set of parameters is defined on a rough cut parameter code; you set up each code within Rough Cut Parameter Maintenance and then select these codes within Part Maintenance and/or Product Group Maintenance.
- **Transfer Lead Time** - Select this check box to indicate you want to include the Transfer Lead Time values in this calculation. This value is defined on part records, and it indicates how long in days it takes part quantities to arrive at your site from other locations within your organization.

Where Located

You can access and update the Cumulative Time modifier in the following locations.

- **Manufacturing Lead Time Calculation** - Use this process program to generate manufacturing lead times for a specific part, part group, and/or site. You can run this process whenever you need. You can also set up this process to run during an automatic recurring schedule you define. Main Menu Path: Production Management>Engineering>General Operations>Manufacturing Lead Time
- **Part Maintenance** - You can review and manually update the various lead time values (Receive Time, Kit Time, Lead Time, Transfer Lead Time) included in the manufacturing lead time calculation. You can also select the rough cut parameters code on each part revision; this overrides the rough cut parameters defined on the product group selected for the part. After the manufacturing lead time calculation is run, it displays both the Cumulative Time and the This Level Time values within the Part - sites - Planning sheet. If you select the Manual check box, you can update the Cumulative Time and the This Level Time values as you need. Main Menu Path: Production Management>Engineering>Setup>Part
- **site Maintenance** - You use this maintenance program to define what lead times will be included for the manufacturing lead times generated for the current site. You can also indicate

whether the rough cut parameters defined on part revisions and product groups will be included in the calculation. Main Menu Path: Production Management>Job Management>Setup>site

- **Product Group Maintenance** - Product groups classify the different part types you sell. You can define a rough cut parameter code on each product group. By default, parts assigned to this product group automatically use these parameters. However, each part revision can also have its own rough cut parameters; during MRP processing, these parameters override the rough cut parameters selected on the product group. Main Menu Path: Main Menu Path: Production Management>Job Management>Setup>Product Group

Logic/Algorithms

The This Level Time modifier uses this logic to calculate its results.

- This Level Time = Total Purchase Material Time + Total Manufacturing Part Quantity Time

Example(s)

The following example(s) illustrate how you use the This Level Time modifier.

The MRP engine is creating a job for Part A that contains assemblies AB and AC. The Manufacturing Lead Time Calculation is run, and it generates the following times for each level within the part method:

- Part A:
  - Cumulative Lead Time -- 51 Days
  - This Level Lead Time -- 2 Days
- Part AB (contains purchased parts P1 and P2):
  - Cumulative Lead Time -- 28 Days
  - This Level Lead Time -- 7 Days
  - P1 Lead Time -- 14 Days
  - P2 Lead Time -- 21 Days
- Part AC:
  - Cumulative Lead Time -- 49 Days
  - This Level Lead Time -- 14 Days

The Cumulative Lead Time values include the manufacturing time for the cost lot quantity of each level plus the critical path for any dependant assemblies. The This Level Lead Time values include the total manufacturing time in days to produce the costing lot size quantity of the parts.

Notice how the lead times are calculated using the three assembly levels in the method hierarchy:

- The Cumulative Lead Time for Part A (51 days) is the sum of the Cumulative Lead Time for Part AC (49 days) plus the This Level Lead Time for Part A (2 days).

- The Cumulative Lead Time for Part AC (49 days) is the sum of Part AB Cumulative Lead Time (28 days) and This Level Lead Time (7 days) and Part AC's This Level Lead Time (14 days).
- The Cumulative Lead Time for Part AB (28 days) and the This Level Lead Time (7 days) divides the total time it takes to receive purchase parts P1 and P2. P1 has a purchasing Lead Time of 14 days and P2 has a purchasing Lead Time of 21 days for a total of 35 days.

Track Multiple UOMs

The Track Multiple UOMs modifier specifies that inventory quantities for a part should be tracked in multiple units of measure. The Epicor application always performs MRP calculations using the base UOM code assigned to the part in the Primary UOMs - Inventory field.

The base UOM usually the smallest UOM in which the a part is normally stocked, and is the default UOM code for most inventory related transactions in the Epicor application.This is always the case, regardless of the setting of the Track Multiple UOMs check box for the part in the Part Maintenance - Part - Detail sheet..

Where Located

You can access the Track Multiple UOMs functionality through the following locations.

- **Part Maintenance**- The Track Multiple UOMs check box is located under the Parts tab on the Detail sheet.

Example(s)

The following example(s) illustrate how you use the Track Multiple UOMs functionality.

A part is stored and tracked in multiple units of measure.The base UOM for the part is set to Each in the Primary UOMs - Inventory field, and the part comes packed 10 each per box. If we receive two cases and five individual units of the part, the manner in which the resulting inventory quantities are displayed and reported is dependent on the setting of this check box.

- If the Track Multiple UOMs check box check box has been cleared (inventory quantities tracked in the base UOM only), an inventory report run after receipt would show that we have 25 Each in stock.
- If the Track Multiple UOMs check box has been selected (inventory quantities tracked in multiple UOMs), the inventory for the part is simultaneously stored in multiple units of measure. An inventory report run after receipt would show that we have two boxes and five Each in stock.

However, MRP engine always uses the base inventory unit of measure assigned to the part in the Primary UOMs - Inventory field when performing these calculations, regardless of the setting of the Track Multiple UOMs check box. If the Track Multiple UOMs check box has been selected for a part, it first converts quantities and units of measure entered into transactional programs to the base unit of measure for the part before performing MRP calculations and generating suggested jobs, transfers or purchase orders.

In this case, it uses the on hand quantity of 25 Each in MRP calculations for the item, even if the Track Multiple UOMs check box has been selected and inventory balances are being tracked in multiple units of measure.

Transfer Lead Time

The Transfer Lead Time modifier indicates how many days it will take for a part quantity from a transfer order to arrive from the source, or supply, site to the receiving site. Transfer orders are internal requests for parts that occur between sites within your organization.

This value is the default lead time value for each transfer order suggestion generated for a specific part-site record.

The scheduling engine uses this value to calculate the Transfer Order Request Date for unfirm jobs that will be manufactured at the source site. This value is applied to the TFOrdDtl record.

You indicate that a part can be transferred to another site within Part Maintenance. To do this, the part record must be a manufactured or a purchased part. You then create two part-site details that use the transfer type value. One site detail is defined as the source for the transfer part quantity; the other site detail is set up to receive this transfer part quantity.

Adjustments

You can change the Transfer Lead Time modifier using the following options.

These are the adjustments you can do with this modifier:

- **Type**- This drop-down list activates the transfer order functionality. If this part-site detail will be used to handle transfer orders, select the Transfer option. This causes both the site and the Transfer Lead Time fields to be available.
- **site**- The source site from which the part quantity will be transferred. All the sites available within your application are displayed on this list; select the site that will manufacture this part quantity for the receiving site.
- **Transfer Lead Time**- Use this field to indicate how many days it will take for the part quantity to arrive from the source site to the receiving site.

Where Located

You can access the Transfer Lead Time functionality through the following locations.

- **Part Maintenance** - You indicate that a part will be used for transfer order transactions within its part record. You do this by creating two part-site details. One detail is the manufacturing source site for the part, while the other site is the receiving site for the part. You locate this program from the Main Menu by opening the Material Management folder, the Inventory Management folder, and the Setup folder.

Logic/Algorithms

The Transfer Lead Time functionality uses this logic to calculate its results.

Transfer Order Request Date = Transfer Order Need By Date - Transfer Lead Time

Example(s)

The following example(s) illustrate how you use the Transfer Lead Time functionality.

site Alpha needs to stock Part 567-89K, as it is a material needed for another part it manufactures. You manufacture Part 567-89K internally within site Beta. You launch the Part Maintenance program and create a part-site detail for site Beta, entering the MRP details you need for this part.

You then create another part-site detail for site Alpha. In the Type section, you indicate that this is a Transfer part. You then indicate that site Beta will be the source for Part 567-89K. Within the Transfer Lead Time field, you also define that it usually takes 3 days to receive part quantities from site Beta. You then enter a Minimum On-Hand Quantity value of 100.

When the On-Hand Quantity at site Alpha becomes 99 or less, the MRP engine will generate both a transfer order suggestion and an unfirm job for Part 567-89K.

Transfer Site

You use the Transfer Site value to define which site will be used as the source, or supply site for part quantities on transfer orders.

Transfer Orders are internal requests for parts that occur between sites within your organization.

You indicate that a part can be transferred to another site within Part Maintenance. To do this, the part record must be a manufactured or a purchased part. You then create two part-site details that use the transfer type value. One site detail is defined as the source for the transfer part quantity; the other site detail is set up to receive this transfer part quantity.

Adjustments

You can change the Transfer site modifier using the following options.

These are the adjustments you can do with this modifier:

- **Type**- This drop-down list activates the transfer order functionality. If this part-site detail will be used to handle transfer orders, select the Transfer option. This causes both the site and the Transfer Lead Time fields to be available.
- **Site**- The source site from which the part quantity will be transferred. All the sites available within your application are displayed on this list; select the site that will manufacture this part quantity for the receiving site.

- **Transfer Lead Time**- This modifier indicates how many days it will take for the part quantity to arrive from the source site to the receiving site. This value is the default lead time value for the transfer order suggestion. The scheduling engine uses this value to calculate the Transfer Order Request Date for unfirm jobs that will be manufactured at the source site. This value is applied to the TFOrdDtl record.

Where Located

You can access the Transfer site functionality through the following locations.

- **Part Maintenance** - You indicate that a part will be used for transfer order transactions within its part record. You do this by creating two part-site details. One detail is the manufacturing source site for the part, while the other site is the receiving site for the part. You locate this program from the Main Menu by opening the Material Management folder, the Inventory Management folder, and the Setup folder.

Logic/Algorithms

The Transfer site functionality uses this logic to calculate its results.

- **Manufactured Part** - Create both a transfer order suggestion and an unfirm job or job suggestion against the Source site.
- **Purchased Part** - Create both a transfer order suggestion and a purchase suggestion against the Source site.

Example(s)

The following example(s) illustrate how you use the Transfer site functionality.

site Alpha needs to stock Part 567-89K, as it is a material needed for another part it manufactures. You manufacture Part 567-89K internally within site Beta. You launch the Part Maintenance program and create a part-site detail for site Beta, entering the MRP details you need for this part.

You then create another part-site detail for site Alpha. In the Type section, you indicate that this is a Transfer part. You then indicate that site Beta will be the source for Part 567-89K. Within the Transfer Lead Time field, you also define that it usually takes 3 days to receive part quantities from site Beta. You then enter a Minimum On-Hand Quantity value of 100.

When the On-Hand Quantity at site Alpha becomes 99 or less, the MRP engine will generate both a transfer order suggestion and an unfirm job for Part 567-89K.

Transfer Type

You use the Transfer Type value to activate the transfer order functionality. Transfer Orders are internal requests for parts that occur between sites within your organization.

You indicate that a part can be transferred to another site within Part Maintenance. To do this, the part record must be a manufactured or a purchased part. You then create two part-site details that use the transfer type value. One site detail is defined as the source for the transfer part quantity; the other site detail is set up to receive this transfer part quantity.

Adjustments

You can change the Transfer Type modifier using the following options.

These are the adjustments you can do with this modifier:

- **Type**- This drop-down list activates the transfer order functionality. If this part-site detail will be used to handle transfer orders, select the Transfer option. This causes both the site and the Transfer Lead Time fields to be available.
- **site**- The source site from which the part quantity will be transferred. All the sites available within your application are displayed on this list; select the site that will manufacture this part quantity for the receiving site.
- **Transfer Lead Time**- This modifier indicates how many days it will take for the part quantity to arrive from the source site to the receiving site. This value is the default lead time value for the transfer order suggestion. The scheduling engine uses this value to calculate the Transfer Order Request Date for unfirm jobs that will be manufactured at the source site. This value is applied to the TFOrdDtl record.

Where Located

You can access the Transfer Type functionality through the following locations.

- **Part Maintenance**- You indicate that a part will be used for transfer order transactions within its part record. You do this by creating two part-site details. One detail is the manufacturing source site for the part, while the other site is the receiving site for the part. You locate this program from the Main Menu by opening the Material Management folder, the Inventory Management folder, and the Setup folder.

Logic/Algorithms

The Transfer Type functionality uses this logic to calculate its results.

If the Type = Transfer, then activate the MRP transfer order calculations.

Example(s)

The following example(s) illustrate how you use the Transfer Type functionality.

site Alpha needs to stock Part 567-89K, as it is a material needed for another part it manufactures. You manufacture Part 567-89K internally within site Beta. You launch the Part Maintenance program and create a part-site detail for site Beta, entering the MRP details you need for this part.

You then create another part-site detail for site Alpha. In the Type section, you indicate that this is a Transfer part. You then indicate that site Beta will be the source for Part 567-89K. Within the Transfer Lead Time field, you also define that it usually takes 3 days to receive part quantities from site Beta. You then enter a Minimum On-Hand Quantity value of 100.

When the On-Hand Quantity at site Alpha becomes 99 or less, the MRP engine will generate both a transfer order suggestion and an unfirm job for Part 567-89K.

Unfirm Job Prefix

This modifier is a prefix value automatically applied to unfirm jobs generated through the MRP engine. This prefix value is applied to job numbers on all job suggestions and unfirm jobs.

This value lets you track MRP created jobs under consideration for future production. The MRP engine will continue to update date and quantities values on these unfirm jobs as long as they have the Unfirm status. As soon as a planner clears this status, this prefix is removed and the Firm Job Prefix is used instead.

Note that you must define an Unfirm Job Prefix, but a Firm Job Prefix is not required. Only define this prefix value if you want a way to track firm jobs created by the MRP engine.

Adjustments

You can change the Unfirm Job Prefix modifier using the following options.

These are the adjustments you can do with this modifier:

- **Company Configuration**- If your company does not use the Multi-Site module, you define the Unfirm Job Prefix within this program. The Unfirm Job Prefix field is located on the Modules > Production > MRP sheet. Note that if your company does use the Multi-Site module, this field is not available within the Company Configuration program.
- **Site Configuration Control**- If your company uses the Multi-Site module, you must define the Unfirm Job Prefix value for each site by using the Site Configuration Control program. You define job number prefixes that indicate which site is producing the part on the part record. You enter this value on the Modules > Production Management sheet.

Where Located

You can access the Unfirm Job Prefix functionality through the following locations.

- **Job Entry**- Use the Unfirm Job Prefix value to find and select MRP generated jobs under consideration for production.

- **Job Tracker**- Use the Unfirm Job Prefix value to find and select MRP generated jobs under consideration for production.
- **Job Traveler**- Use the Unfirm Job Prefix value to find and select MRP generated jobs under consideration for production.

Logic/Algorithms

The Unfirm Job Prefix functionality uses this logic to calculate its results.

- As the MRP engine generates job suggestions and unfirm jobs, place the Unfirm Job Prefix in front of each generated job number.
- If the Unfirm check box is cleared on a job record and the record is saved, then remove the Unfirm Job Prefix value from the job number and replace it with the Firm Job Prefix value.

Example(s)

The following example(s) illustrate how you use the Unfirm Job Prefix functionality.

You want the ability to track unfirm MRP jobs that are being produced at the Blue site. You first create this site record within the site Maintenance program. Then you launch site Configuration Control and navigate to the Modules - Production Management sheet. You then enter UFMBLU in the Unfirm Job Prefix field.

You see the Unfirm Job Prefix in action when Bob McCoy, your planner, decides to produce a MRP generated job. This job uses the Unfirm Job Prefix on the job number (for example UFMBLU -945). After Bob clears the Unfirm check box and saves the record, however, this job switches to the Firm Job Prefix value and now uses MRPBLU - 148 for its job number.

Notice that the firm job uses both the Firm Job Prefix and a new job number.

Unfirm Series Horizon

Leverage the Unfirm Series Horizon modifier to define a date threshold for when the MRP engine switches from using the Firm Job Prefix to the Unfirm Job Prefix to generate job numbers.

Any jobs generated through the MRP process with Need By dates that occur on the current system date to the last date defined by this value will use the Firm Job Prefix on their job numbers. Any jobs with Need By dates that fall outside this horizon will use the Unfirm Job Prefix on their job numbers.

This modifier improves Job Firming performance, as this value causes the MRP engine to generate a series of unfirm jobs that use the Firm Job Prefix. When you change the status on these jobs to firm, the application does not have to replace the prefix, eliminating unnecessary processing time.

Adjustments

You can change the Unfirm Series Horizon modifier using the following options.

These are the adjustments you can make to this modifier:

- **Unfirm Series Horizon** - This value defines the date range for generating jobs using the Firm Job Prefix. Enter a value, in days, in this field.

Where Located

You can access the Unfirm Series Horizon functionality through the following locations.

- **Site Maintenance** - You define the Unfirm Series Horizon values on the Detail > Planning sheet.

Logic/Algorithms

The Unfirm Series Horizon functionality uses the following logic to calculate its results.

- Last Unfirm Series Horizon Date = Current Date + Unfirm Series Horizon
- If an unfirm job's Need By date occurs on or before the Last Unfirm Series Horizon Date, generate the job number using the Firm Job Prefix.

Use Part Revision

The Use Part Revision modifier indicates how you want the MRP engine to determine the revision level for non-stock parts. You define this value on each part record that is defined as a non-stock part.

Select or clear the check box to use this calculation. This is how the MRP engine uses this modifier:

- When this check box is selected, the MRP engine calculates the suggestions using the current revision of the part. The part number on the suggestions automatically displays the most current revision; the application calculates this by using the most recent Effective Date on an approved revision. Also note that if an unfirm job exists and a new revision is approved, the MRP engine creates the suggestions using the new revision.
- If this check box is clear, the MRP engine uses the revision level that is defined on the sales order that created the requirement. Thus, the MRP engine creates job suggestions based on the revision required for each customer.

If you do not use MRP, this check box is not available. This functionality is also not available for make to stock part quantities; it only runs if the Make Direct check box is selected on the order release.

Adjustments

You can change the Use Part Revision modifier using the following options.

Adjustments you can make with this modifier:

- **Use Part Revision**- This modifier is a check box that you select.

Where Located

You can access the Use Part Revision functionality through the following locations.

- **Part Maintenance**- This check box is found on the Part sheet. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.

Logic/Algorithms

The Use Part Revision functionality uses this logic to calculate its results.

Use Part Revision - Active

- If the Use Part Revision check box is selected, evaluate the Effective Date values on all approved revisions. Select the approved revision with the most recent Effective Date.

Use Part Revision - Inactive

- If the Use Part Revision check box is clear, use the revision of the part that is requested on the demand source.

Example(s)

The following example(s) illustrate how you use the Use Part Revision functionality.

Part 456-87A has a Revision A that is effective on 6/30. This part also has a Revision B that is effective on 12/3.

Sales Order 123 is entered on 8/1. Revision A appears on the sales order, but the user overrides the default and selects Revision B.

Now the sales order will be turned into a job. If the Use Part Revision check box is clear (not selected), the MRP engine uses the revision selected on the sales order, Revision B, on the job. However, if this check box is selected, the MRP engine first calculates the current revision level, which in this case is Revision A, and places this on the job instead.

Use Dynamic Days of Supply in Lead Time

You select this check box to activate the Use Dynamic Days calculation. This calculation more accurately generates material requirements when a new purchase suggestion may not satisfy demand at the correct point in the calendar.

The **Days of Supply** modifier defines how many days into the future the MRP engine looks to calculate the final quantity needed on a job suggestion, purchase suggestion, or unfirm job. Since this window of days is a fluid calculation that depends on when MRP generates based on its Start Date and on when demand quantities move based on record changes, MRP can calculate a reduce purchase suggestion in the lead time window (MRP Scheduled Start Date + Standard Lead Time),

followed by a new purchase suggestion generated outside this window using standard MRP logic. If this new purchase suggestion itself has a long lead time, you may not be able to act on this suggestion in time to satisfy demand at the correct point in the schedule.

To account for this situation, use the Dynamic Days of Supply calculation. When this calculation is active, the MRP engine checks for points when the Net On-Hand Quantity is either below or above the Reorder Quantity (Minimum Quantity + Safety Stock Quantity). If the MRP engine discovers one of these points, it first determines the End Date using the Days of Supply value. It then checks for the next available supply quantity after this End Date value. The date on this next supply quantity is now used instead as the new End Date, and the Days of Supply calendar range increases. All of the demand included in the new End Date is added to the On-Hand Quantity to determine the amount to increase or reduce on the purchase suggestion, job suggestion, or unfirm job.

This calculation continues to check for records that may cause the Net On-Hand Quantity to be either reduced by a material requirement or increased by a material supply later in the schedule. If a demand requirement increases or reduces the supply quantity again, a new End Date is recalculated and the additional increase or reduce demand and supply records are added to the expanded Days of Supply calendar range.

Adjustments

You can change the Use Dynamic Days of Supply in Lead Time modifier using the following options.

Adjustments you can make with this modifier:

- **Use Dynamic Days of Supply in Lead Time** -- Select this check box to activate the Dynamic Days of Supply calculation. When MRP generates for records assigned to this specific site, the Dynamic Days of Supply calculation can expand the End Date for the Days of Supply calendar range.

Where Located

You can access the Use Dynamic Days of Supply in Lead Time functionality in the following location.

Site Maintenance

You activate the Dynamic Days of Supply calculation on the Detail > Planning sheet.

Menu Path

Navigate to this program from the Main Menu:

- Financial Management > Multi-Site > Setup > Site Maintenance
- Material Management > Inventory Management > Setup > Site Maintenance
- Production Management > Job Management > Setup > Site Maintenance

- Service Management > Field Service Integration > Setup > Site Maintenance
- System Setup > Company/Site Maintenance > Site Maintenance

Logic/Algorithms

The Use Dynamic Days of Supply in Lead Time functionality uses this logic to calculate its results.

When the Net On-Hand Quantity does not equal the Reorder Point Quantity (Minimum Quantity + Safety Stock Quantity) for a specific date, do the following:

1. Use the Days of Supply value to determine the End Date.
2. Find the first supply record available after the End Date.
3. Pull the date from the supply record and use it as the new End Date.
4. Total all demand quantities required up to the new End Date.
5. Delete all PO suggestions that result in 0 quantities.
6. Evaluate the Net On Hand Quantities available during the expanded Days of Supply. When the Net On-Hand Quantity does not equal the Reorder Quantity for a specific date, repeat this logic.

Example(s)

The following example(s) illustrate how you use the Use Dynamic Days of Supply in Lead Time functionality.

Single Recalculation Example

The part-site record for Part A, a purchased part, has the following values:

- Days of Supply = 10
- Lead Time = 20

The MRP engine discovers the following supply and demand records during the month of May:

Purchase Order	Quantity = 100	PO Date = 5/1	Supply
Column one, row one	Column two, row one	Column three, row one	Column four, row one
Sales Order 2	Quantity = 20	Need By Date = 5/15	Demand
column one, row three	Column two, row three	Column three, row three	Column four, row three

The Days of Supply calendar range goes from May 1st to May 10th. Because of this, the second sales order falls outside this range. If you do not turn on the Dynamic Days of Supply calculation,

MRP creates a PO suggestion to reduce the purchase order quantity to 80 instead. Then a new PO suggestion is created for the second sales order, but because of the lead time, this quantity is calculated to arrive on 5/21, six days after the Need By date on the sales order.

However, if you activate the Dynamic Days of Supply calculation, the Days of Supply date range is extended to 20 to match the lead time required on the original purchase order suggestion. Because the next PO suggestion in this expanded Days of Supply would have a 0 quantity, no additional PO suggestion is created.

Multiple Recalculation Example

The part-site record for Part B, a purchased part, has the following values:

- Days of Supply = 10
- Lead Time = 60

The MRP engine discovers the following supply and demand records during the month of May (May 1st to June 1st):

Sales Order 1	Quantity = 50	Need ByDate = 5/1	Demand
Sales Order 2	Quantity = 25	Need By Date = 5/5	Demand
Purchase Order 1	Quantity = 100	PO Date = 5/15	Supply
Sales Order 3	Quantity = 25	Need By Date = 5/20	Demand
Purchase Order 2	Quantity = 30	PO Date = 6/1	Supply

This site uses the Dynamic Days of Supply calculation.

The Days of Supply calendar range goes from May 1st to May 11th. Because the next supply records falls outside this range, the Days of Supply range is extended 4 days to May 15th. However, because the first purchase order will have part of its supply used on 5/1, it technically no longer arrives on 5/15. Because of this, the Dynamic Days of Supply calculation extends the calender range 31 days to 6/1. Sales Order 3 and Purchase Order 2 will then be included in the calculated results as well.

Use Production Preparation Buffer

The Use Production Preparation Buffer modifier indicates whether you want the MRP engine to use additional preparation days during its calculations.

The Production Preparation Buffer/Time modifier indicates the number of days required to prepare and engineer a job before it can be released to your manufacturing center for production. The MRP engine uses this value to add an additional amount of preparation time to the Planned Action Date on job suggestions and unfirm jobs. It helps make sure that the Planned Action Date values accurately reflect your typical production planning workflow within a specific site.

The Production Preparation Buffer/Time value can be used with the Kit Time modifier to accurately calculate how many days it will take to prepare for production on a job.

Adjustments

You can change the Use Production Preparation Buffer modifier using the following options.

These are the adjustments you can make with this modifier:

- **Use Production Prep Buffer**- To indicate that the MRP engine will include preparation days during its calculations, you must select the Use Production Prep Buffer check box. This check box is located on the Process MRP program.
- **Production Preparation Buffer/Time**- Enter the number of days required to prepare and engineer a job. You can define this value on each part-site detail within Part Maintenance. If your company uses the Multi-Site module, you can leave this value blank on the part record and define a Production Prep Time within the site Maintenance program. The MRP engine will use the value you define within the site record.
- **Kit Time**- Enter the number of days required to assemble a job quantity. You can define this value on each part-site detail within Part Maintenance. If your company uses the Multi-Site module, you can leave this value blank on the part record and define a Kit Time value within the site Maintenance program. The MRP engine will use the value you define within the site record.

Where Located

You can access the Use Production Preparation Buffer functionality through the following locations.

- **Process MRP** -- This program launches the MRP engine. You select the Use Production Preparation Buffer check box within the Process MRP program.
- **Part Maintenance** - You can define both the Production Preparation Buffer and the Kit Time values within each part-site detail. Use this function to define different preparation times for each site that manufactures the part. You locate this program from the Main Menu by opening the Material Management folder, the Purchase Management folder, and the Setup folder.
- **Site Maintenance** - If you use the Multi-Site module, you can enter both the Production Preparation Time and the Kit Time values within each site record. This lets you define uniform values that will be used for each part that is manufactured at this specific site. You can locate this program from the Main Menu by opening the Production Management folder, the Job Management folder, and the Setup folder.

Logic/Algorithms

The Use Production Preparation Buffer functionality uses this logic to calculate its results.

- If the Use Production Preparation Buffer is selected, use Production Preparation Buffer during the MRP calculations.

Example(s)

The following example(s) illustrate how you use the Use Production Preparation Buffer functionality.

Production Prep Buffer Example

A part assembly on a job method has a Start Date of August 15th. The Production Prep Buffer is set to 4 on this part-site detail. The MRP engine calculates that the Planned Action Date for this assembly is on August 11th, which gives the job a four day preparation period.

Production Prep Buffer + Kit Time Example

The Blue site detail for Part 456-89K has a Kit Time of 5 and a Production Prep Buffer of 10. Because you define both values, the MRP engine adds the values to calculate the number of days required to a prepare for production on a job quantity at this site. In this case, it will take 15 days.

The MRP engine initially calculates that a job will start on August 15th. Because of the combined Production Prep Buffer and Kit Time values, the preparation period for this job begins on August 1st.

MRP Performance Tuning

The following tips can help you improve the performance of the Material Requirements Planning (MRP) process. By following these MRP tips, you will place less demand on your network and server resources. These tips can also help you receive more targeted unfirm jobs and suggestions. By following these best practice tips, you will place less demand on your network and server resources and generate the specific MRP suggestions you need.

Unless noted, most of these tips describe options on the **MRP Processing** window. Launch this program:

Menu Path: Production Management > Material Requirements Planning > General Operations > Process MRP

MRP Scheduled Times

Epicor recommends you do not run MRP processing during the work day. Schedule MRP processing during off peak hours. To set MRP Processing to run on a recurring schedule, access the MRP Processing window. First select a **Schedule** option and then click the **Recurring** check box.

You create the available schedule options within **System Agent Maintenance.**

Menu Path: System Setup > System Maintenance > System Agent

Moving Between Databases

Be sure to disable all schedules before you move from the training database to your live database. If you do not, two MRP processes run at the same time, slowing down performance.

Net Change Mode versus Regenerative Mode

You can run the MRP process using two calculation modes - Net Change and Regenerative. These calculation modes generate the unfirm jobs, job suggestions, and purchasing suggestions.

You should typically run MRP processing in **Net Change** mode as much as possible, as it reduces the number of calculations that must complete during the process. When MRP is run in Net Change mode, the process ignores all previously generated information and only updates suggestions for records changed since the date of the previous MRP run. This calculation mode keeps your records current, only generating items that reflect new or updated source requirements. It also reduces the resources required to run MRP on your server, generates the MRP results faster, and frees up your server for other purposes.

Only use **Regenerative** mode through a regular, periodic schedule. Generally you should process MRP in Regenerative mode once a week or once a month. This calculation mode deletes all previously generated MRP information. Because of this, Regenerative mode actually runs through two routines - a routine that deletes all of the unfirm jobs, job suggestions, and purchase orders, and then a second routine that generates and recreates all of the suggestions.

While it is important to run a full regeneration periodically to make sure you have a complete set of records that reflect the current state of your database, running MRP in Regenerative mode more frequently than once a week will negatively impact the performance of MRP and your server.

Finite Scheduling During MRP

Only activate the Run Finite Scheduling During MRP Calculation check box option if you require unfirm jobs and job suggestions to be finitely scheduled in the near future. This check box is located on the Process MRP window.

Finite Capacity Scheduling is a calculation mode that does not allow more load to be scheduled above the available capacity within a resource. The calculation also reviews any constrained materials involved in the selected MRP jobs, preventing unfirm jobs from generating if the constrained material is not available at specific points in the schedule. In order to run MRP processing in this mode, the scheduling functionality has to execute as well to calculate the available capacity in each resource. This additional scheduling process requires significant resources from your network to finite schedule the unfirm jobs and suggestions. Only jobs and suggestions that fall outside the **Finite Horizon** value, a value defined for each site record within site Maintenance, are scheduled infinitely (infinite scheduling places no limit on resource group capacity).

Epicor recommends you should only run MRP with this option when you need the generated unfirm jobs and suggestions to more closely reflect the realities of your upcoming production schedule.

Sort 0 Level MRP Jobs

If you select the Sort 0 Level MRP Jobs by Requested Date check box, you may reduce MRP performance.

This situation occurs because the MRP process does not send unfirm jobs for zero assembly parts to the scheduling engine until these jobs are completely processed by the MRP engine. This option improves the accuracy of the schedule, but it typically adds additional processing time for the MRP results to generate.

Number of MRP Processes and Schedulers

While the MRP process runs, the server can generate multiple processing threads to complete the operation.

The more MRP processes you can run, the faster unfirm jobs and suggestions can execute and complete. You can also improve performance by increasing the number of schedulers that can run on your server; the more schedulers you can run, the faster the scheduling engine can schedule unfirm jobs. You modify the **Number of MRP Processes** and **Number of Schedulers** values on the Process MRP window.

However as you increase the number of MRP processors and schedulers, the performance boost you receive will eventually decline. This occurs because the server will run out of capacity to handle all of the multiple threads you attempt to run concurrently. Your server has limited capacity, so there will be a point when using multiple MRP processors and schedulers can slow down MRP performance as well.

To help you decide how many MRP processors and schedulers you can run at the same time, check your MRP log to review the performance results. Continue to increase the MRP processes and schedulers until you notice the MRP performance times begin to increase again. You should then be able to determine the optimal values for your server.

Most servers can handle two MRP processes and two schedulers at the same time, so you could start by entering a "2" value in both of these fields. As you run MRP, continue to monitor the MRP and Scheduling logs. If the schedulers are consistently waiting for the next job, you have some options. You can remove one scheduling thread to free up more CPU resources for the rest of the company. If you have CPU resources available, you can also add one more thread to the Number of MRP Processes field and keep the Number of Schedulers value the same. Likewise, if you notice times in the log where the MRP process threads are idle, they can also be used as scheduling threads.

For more information on processors and schedulers, review the MRP Logs section in the MRP Technical Reference Guide.

Planning Time Fence

The volume of suggestions generated by the MRP process can quickly become overwhelming. Too many suggestions are difficult and time-consuming to manage and can hamper your ability to efficiency leverage MRP.

You can receive more appropriate results, however, by defining the **Planning Time Fence** value within either Part Class Maintenance or Part Maintenance.

This value prevents changes to job suggestions, purchase suggestions, and unfirm jobs that occur within a specified date range. If a Due Date on an MRP generated record occurs on a date between the **Scheduled Start Date** (defined on the Process MRP program) plus the Planning Time Fence value, the MRP engine will not change the Quantity and Date values on these previously generated records. Because these records are not updated, you do not need to review these unfirm jobs and suggestions, reducing the number of results you need to verify.

Reschedule In and Out

Both Part Class Maintenance and Part Maintenance contain two other fields that can reduce the number of suggestions you need to review. The Reschedule In Time Delta and the Reschedule Out Time Delta values limit the number of new suggestions generated by an MRP process run.

The **Reschedule In Time Delta** value defines a date range during which the MRP engine is prevented from rescheduling supply suggestions that happen in the future. Any supply record identified for change with an End Date less than or equal to the final date of this range will not generate a new suggestion. The **Reschedule Out Time Delta** value functions in a similar way, but affects demand suggestions. This date range prevents the MRP engine from rescheduling demand suggestions that occur in the future. Any demand record that may need to be changed, but has an End Date less than or equal to the final date of this range, will not generate a new suggestion.

MRP Load Balancing

If you use a load balancer to improve performance, modify the system agent so it can find the main application server that handles load balancing.

You update the system agent using **System Agent Maintenance**.

Menu Path: System Setup > System Maintenance > System Agent

You enter the load balancing application server within the **Appserver URL** field. An optional field, enter the URL for this application server when you need to improve the performance of Material Requirements Planning (MRP) sub processing or other sub tasks. (As of this writing, only MRP currently runs as a sub task.)

Because sub tasks run inside the main application server, the task agent does not process them. When you define the load balanced AppServer URL, MRP sub-processing runs on this specific application server. Your other application servers now have more resources to handle other processes, improving the overall performance of your Epicor ERP application.

Example net.tcp://OurAppServer/ERP10/

MRP Stops Running

If MRP temporarily or complete freezes, your system may be running out of available memory to handle the process.

If this happens, you should contact Epicor Technical Support. They will determine what is causing the freeze and help you correct this issue. However before you call support, be sure to gather the following information:

Memory/Stack Trace

Use the Performance and Diagnostic Tool to record both a memory trace and a stack trace. This information will help Epicor Technical Support identify which part of memory is growing and whether the stack trace is active.

To generate these traces:

1. Launch the **MRP Process**.
2. Within the **Performance and Diagnostic Tool**, navigate to the **Live Memory Inspection** sheet.
3. In the **Process ID** field, select the MRP process. This drop-down list displays all the current w3wp processes with their application pool names as well as the names of any Epicor .exe processes. Typically you select the application pool that runs the slow application server to gather the performance results you need to review.
4. Select the **Memory Trace** check box.
5. Select the **Stack Trace** check box.
6. Click **Analyze**.
7. You are warned this action will freeze the Epicor ERP application. Select **Yes** to run the Memory/Stack Trace.

You should generate this memory trace and stack trace three - four times. By creating multiple trace files, Epicor Technical Support will have a good idea about how MRP runs on your system.

Memory Dump

If MRP freezes during your tests, capture a **Memory Dump**. This large file records how your system is using memory at the time of the freeze. The memory dump file is a separate trace from the memory trace and the stack trace. When you create a memory dump file, you record a snapshot of the memory and stack traces used by the selected process. To capture a memory dump:

1. When the MRP process freezes, return to the **Performance and Diagnostic Tool** and navigate to the Live **Memory Inspection** sheet.
2. From the **Process ID** drop-down list, verify the MRP process displays.
3. Select **Take Memory dump**.
4. Now select **Analyze**.
5. You are warned this action will freeze the Epicor ERP application. Select **Yes** to generate the memory dump file.

You now have both a series of memory/stack trace files and a memory dump file. When you place your call with Epicor Technical Support, send this files to them for further analysis. These files will help support more effectively determine what is causing MRP to freeze.

Calling MRP Using REST

In order to launch MRP via **REST** calls, an **AppServer URL** pointing to a **Windows** authentication binding or **Epicor user name/password** binding must be specified on the **System Agent Maintenance > Detail** sheet.

Note this value cannot be set to Azure AD authentication binding.

MRP in Action

The examples in this section show you how the MRP engine arrives at its suggested dates and quantities. If you compare these examples against your own MRP results, you will better understand the logic behind these calculations.

Case Study 1 - Sales Order Demand

This case study demonstrates how the MRP engine calculates existing supply against existing sales order demand to generate a series of unfirm jobs.

Part X uses the following MRP modifiers:

Planning Time Fence: 5	Maximum Lot Size: 90
Days of Supply: 20	Minimum Lot Size: 30
Unfirm Job Prefix: U	Multiple: 15

You launch the Process MRP program and enter a Scheduled Start Date of 11/7. First, it analyzes the current supply and demand that exists for Part X:

Record Type	Number	Date	Quantity	On-Hand Quantity
Sales Order	123	11/1	50	-50
Job	456	11/1	75	25
Sales Order	124	11/8	50	-25 1
Sales Order	125	11/15	50	-75 1
Sales Order	126	11/22	50	-125 1
Sales Order	127	11/29	50	-175

Next, the MRP engine calculates suggestions for Part X.

1 Notice that 11/8 is the first date on which On-Hand Quantity falls below the Minimum Lot Size. This means that the Days of Supply during this MRP run will be 11/8 - 11/28, which causes the MRP engine to calculate a total request of a 125 quantity.

Also notice that the MRP engine wants to create an unfirm job on 11/8 for a 150 quantity. This however, falls within the Planning Time Fence (11/7 + 5 = 11/12, the last date of Planning Time Fence). Because of this setting, an unfirm job will be created on 11/12.

The MRP engine now generates the unfirm jobs. The following table displays the demand and includes the unfirm jobs created against the demand:

Record Type	Number	Date	Quantity	On-Hand Quantity
Sales Order	123	11/1	50	-50
Job	456	11/1	75	25
Sales Order	124	11/8	50	-25 1
Job	U001	11/12	90 2	65
Job	U002	11/12	45 2	110
Sales Order	125	11/15	50	60
Sales Order	126	11/22	50	10
Sales Order	127	11/29	50	-40
Job	U003	11/29	45 3	5

[1] This negative On-Hand Quantity is valid because of the Planning Time Fence date range.

[2] The requested quantity for 125 and the lot sizes defined for Part X cause this split of 90 and 45 on Job U001 and Job U002.

[3] The required quantity at this point is 40. Because Part X has a Multiple value of 15, the quantity on Job U003 is 45.

Case Study 2 - Forecasts and Short Horizon Planning

This case study demonstrates how the MRP engine creates a series of unfirm jobs using a sales forecast and Short Horizon Planning.

Part Y uses the following MRP modifiers:

Short Horizon: 14

Short Horizon Maximum Lot Size: 2

Short Horizon Days of Supply: 7

MRP Planning Maximum Lot Size: 50

Days of Supply: 30

You launch the Process MRP program and enter a Scheduled Start Date of 4/1. Because of the start date, the Short Horizon date range ends on 4/14. It calculates the following demand requirements and suggestions for the records that fall within the Short Horizon:

Forecast	Date	Quantity	Unfirm Job	Date	Quantity
Ord 201	4/1	5 1	U001	4/1	2
Ord 202	4/7	5 1	U002	4/1	2
			U003	4/1	2
			U004	4/1	2
			U005	4/1	2
Ord 203	4/14	5 1	U006	4/14	2
Ord 204	4/21	5 1	U007	4/14	2
			U008	4/14	2
			U009	4/14	2
			U010	4/14	2

[1] This demand falls within the Short Horizon Days of Supply, so the additional quantity is also included in the MRP calculations.

Now the MRP engine calculates the unfirm jobs that are generated for the forecast quantities due outside of the Short Horizon. It uses the standard (MRP Planning) lot sizes to generate the unfirm jobs:

Forecast	Date	Quantity	Unfirm Job	Date	Quantity
Ord 205	4/28	5	U011	4/28	25
Ord 206	5/5	5			
Ord 207	5/12	5			
Ord 208	5/19	5			
Ord 209	5/26	5			
Ord 210	6/2	5	U012	6/2	25
Ord 211	6/9	5			

Forecast	Date	Quantity	Unfirm Job	Date	Quantity
Ord 212	6/16	5			
Ord 213	6/23	5			
Ord 214	6/30	5			

Case Study 3 - Transfer Orders

This case study demonstrates how the MRP engine works with transfer orders that move part quantities between two sites. site A manufactures Part Z, while site B is requesting Part Z.

These are the modifiers for both sites:

site A: Produces Part Z	site B: Requests Part Z
Days of Supply: 20	Transfer site: A
Lead Time: 14	Transfer Days: 2
Receive Time: 2	Days of Supply: 20

The Production Calendar for both sites has working days on Monday-Friday, and 9/3 is a scheduled holiday. This is the demand that the MRP engine calculates for site B:

Forecast	Date	Quantity
Transfer Order	8/10	12
Forecast	8/17	4
Forecast	8/24	4
Forecast	9/7	16
Forecast	10/5	16
Forecast	11/2	16
Forecast	12/7	16

These are the suggestions and the On-Hand Quantity values that the MRP engine calculates for site B:

Record Type	Date	Quantity	On-Hand Quantity
Transfer Order 22	8/10 1	12	12
Forecast	8/17	4	8
Forecast	8/24	4	4
Suggested Transfer Order 30	9/7 1	12	16
Forecast	9/7	16	0
Suggested Transfer Order 31	10/5 1	16	16
Forecast	10/5	16	0
Suggested Transfer Order 32	11/2 1	16	16
Forecast	11/2	16	0
Suggested Transfer Order 33	12/7 1	16	16
Forecast	12/7	16	0

[1] Please see the related note on the following table.

These are the suggestions and the On-Hand Quantity values that the MRP engine calculates for site A:

Record Type	Date	Quantity	On-Hand Quantity
Job 123	8/6	12	12
Transfer Order 22	8/8 1	12	0
Job U001	8/31 2	12	12
Suggested Transfer Order 30	9/5 1	12	0
Job U002	10/1 2	16	16
Suggested Transfer Order 31	10/3 1	16	0
Job U003	10/29 2	16	16
Suggested Transfer Order 32	10/31 1	16	0

Record Type	Date	Quantity	On-Hand Quantity
Job U004	12/3 2	16	16
Suggested Transfer Order 32	12/5 1	16	0

[1] Notice that the dates for the transfer orders are 2 days earlier on site A than they are in site B. This is because site B has a Transfer Days value of 2, which indicates it will take two days for site B to receive the parts from site A.

[2] Notice that the dates for the unfirm jobs all have dates that are two earlier than the transfer orders which generated them. This is because site A has a Receive Time value of 2, which indicates it will take two days for site A to unpack the part shipment from site B.