



# Material Requirement Planning



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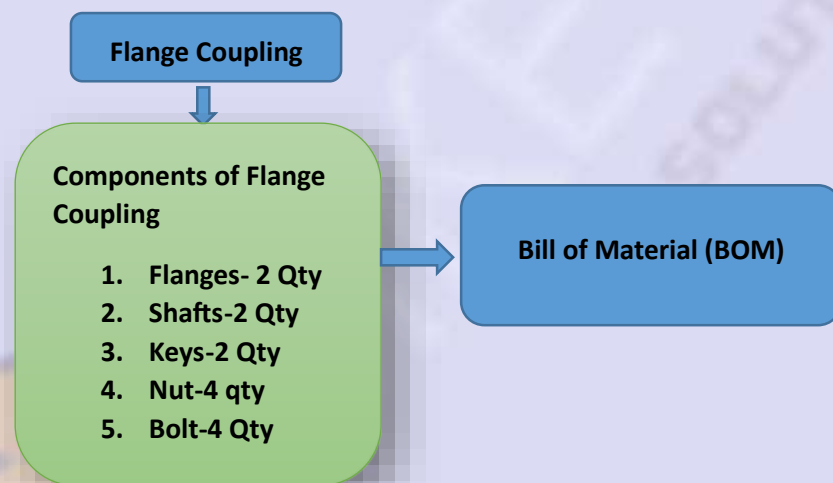
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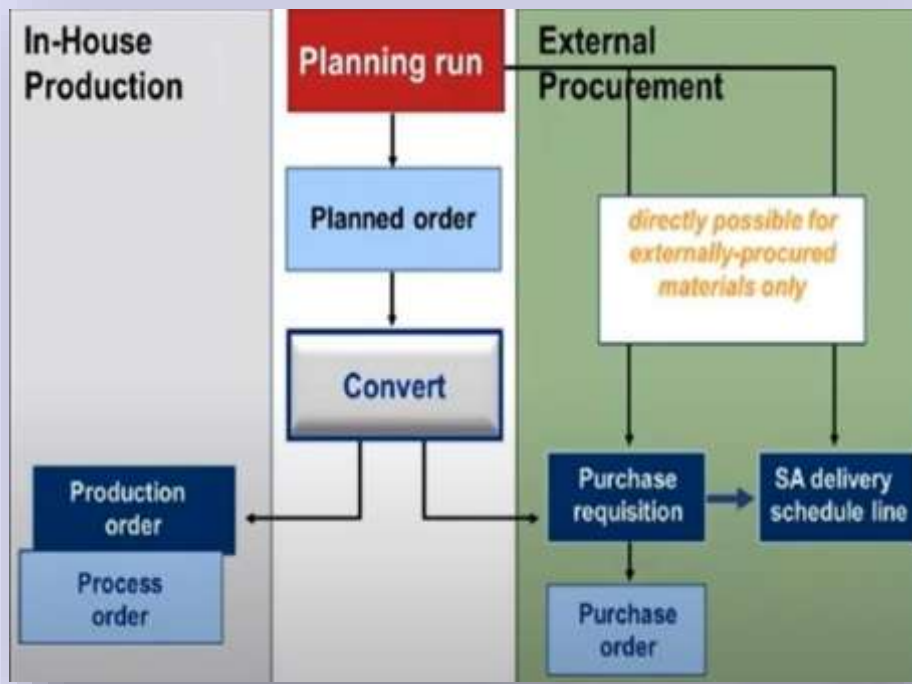
## Material Requirement Planning

- MRP stands for Material Requirement Planning
- Main Purpose of MRP is to guarantee Material Availability
- MRP determines mainly; what material is needed? What Quantity of the material is needed? And when it is required?
- MRP Basically uses BOM in PP.BOM Stands for Bill of Material. for example let say you want to manufacture finished product as flange coupling now the components of Flange coupling as shown in figure will be entered in Bill of Material.



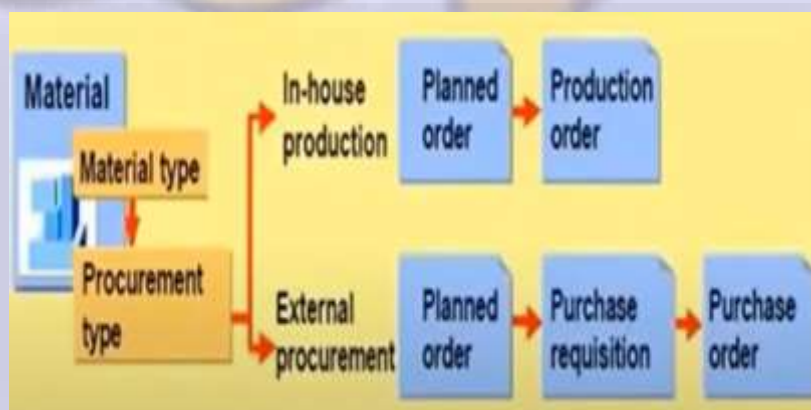
Now let us say you want to manufacture 1000 flange coupling, what system will do in this case if we run MRP for 1000 Flange coupling ?, system will calculate total quantity of components needed for manufacturing and will send information to the purchase department in the form of PR.

- Now when you run MRP there are generally two types of Materials in the organizations Inhouse Production (FERT ETC) and Externally Procured (ROH, ERSA etc.).



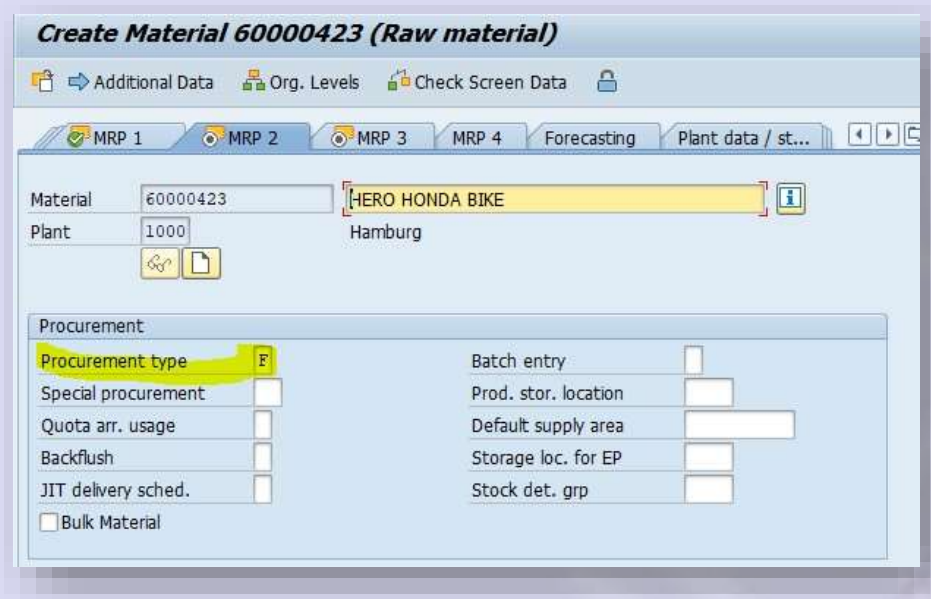
For the In-house material if you run MRP then system will generate planned order then that planned order can be converted into production order. This process comes under the scope of PP Module.

In case of externally procured material if you run MRP system will directly create PR and that PR can be converted to Purchase order. OR sometimes system will generates schedule lines. OR Sometimes it may possible to create planned order and that planned order can then be converted to PR and the PO as shown in figure below



Now where this procurement type (E or F) is maintained?

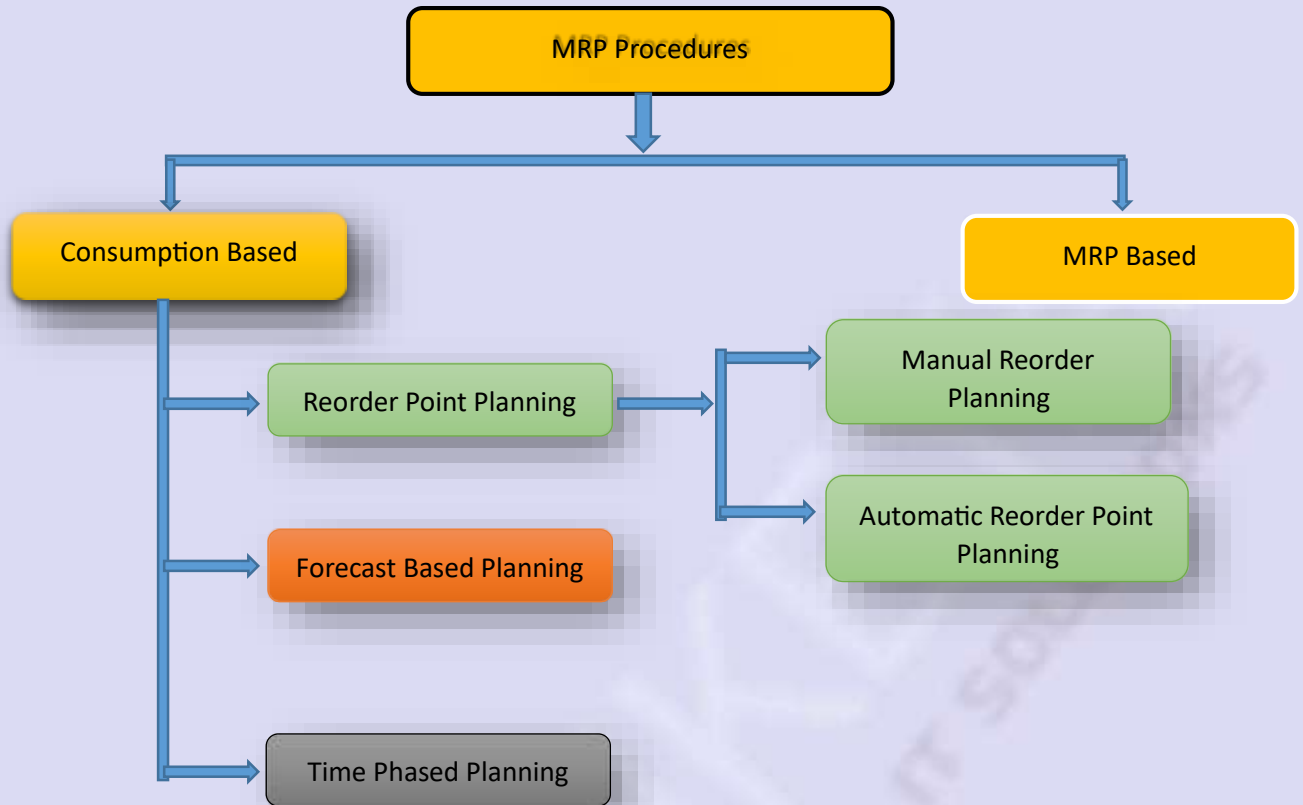
It is maintained in material master. It is maintained in MRP 2 view.



## MRP Procedures

Basically there are two types of MRP Procedures;

1. MRP Based Planning
2. Consumption based planning

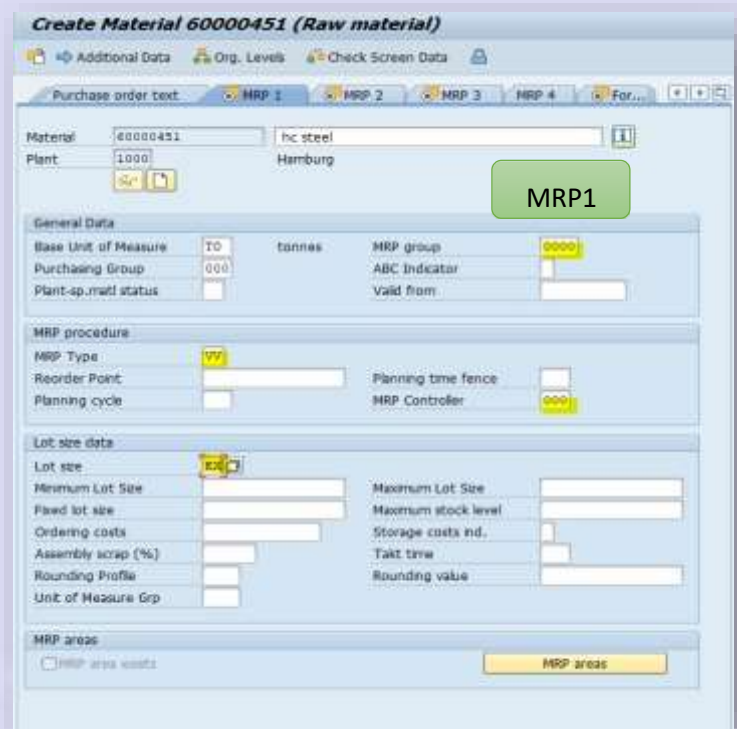


## Forecast Based Planning

Based on the values of previous consumption of the material we plan for the future planning.

### 1. Create a material Master MM01

- Maintain Views basic data, purchasing, MRP1, MRP2, MRP3 and forecast based planning.
- IN MRP1 maintain basic details as shown in figure
- IN MRP2 Maintain GR Processing Time, Planned Delivery time and Scheduled Margin



The screenshot shows the SAP 'Create Material 60000451 (Raw material)' MRP1 view. The material is 'hc steel' and the plant is '1000 Hamburg'. The MRP1 view is highlighted with a green box labeled 'MRP1'. The form contains the following data:

General Data			
Base Unit of Measure	TO	tonnes	MRP group
Purchasing Group	000		ABC Indicator
Plant-sp.matl status			Valid from

MRP procedure			
MRP Type	VV	Planning time fence	
Reorder Point		MRP Controller	000
Planning cycle			

Lot size data			
Lot size	EX	Maximum Lot Size	
Minimum Lot Size		Maximum stock level	
Fixed lot size		Storage costs ind.	
Ordering costs		Takt time	
Assembly scrap (%)		Rounding value	
Rounding Profile			
Unit of Measure Grp			

MRP areas:  MRP area costs

- In MRP 3 Maintain Period indicator and Availability Check as shown in figure
- 

**Create Material 60000451 (Raw material)**

Material: 60000451 | hc steel  
Plant: 1000 | Hamburg

**Forecast Requirements**

Period Indicator: **M** | Fiscal Year Variant:  | Splitting indicator:

**Availability check**

Availability check:  | Tot. repl. lead time:  days

**Create Material 60000451 (Raw material)**

Material: 60000451 | hc steel  
Plant: 1000 | Hamburg

**Scheduling**

Planned Deliv. Time: **10** days  
GR Processing Time: **1** days  
SchedMargin key: **000**

**Forecasting View**

Material: 60000451 | hc steel  
Plant: 1000 | Hamburg

**General data**

Base Unit of Measure: **T0** | Forecast model: **D** | Period Indicator: **M**

**Number of periods required**

Hist. periods: **10** | Forecast periods: **10**

**Control data**

Initialization:  | Tracking limit: 4,000 |  Reset automatically

- Next go to forecasting view Maintain Forecast model as Historical period (Previous consumption period), Forecast Periods ( Next Coming periods ) click on consumption values.
- Enter the Previous usage values of the Material.
- Go to Main Data
- Enter and maintain next views
- 60000451 Material is created

**Execute Forecast: Parameter Overview**

Forecast values **Past** **Execute**

Material: 60000451 hc steel  
 MRP Area: 1000 Hamburg  
 Plant: 1000 Hamburg

**Basic data**

Last forecast: [ ] Base Unit of Measure: 10  
 Forecast model: [ ] Service level (%): 0,0  
 Period Indicator: H Safety Stock: [ ]  
 Forecast profile: [ ] Reorder Point: 0  
 Basic value: 0 Trend value: 0

**Control data**

Initialization:  Tracking limit: 4,000  
 Model selection:  Selection procedure: 2  
 Param. optimization Optimization level: [ ]

**Number of values**

Historical periods: 10 Forecast periods: 10  
 Initialization pds: 0 Fixed periods: 0  
 Periods per season: 0

- If You click on past it will give you history<sup>2</sup> of previous consumption. Click on Execute, select the forecast date after that you can see forecast values for future period





**Execute Forecast: Forecast Values**

Past

Material: 60000451    hc steel  
 MRP Area: 1000    Hamburg  
 Plant: 1000    Hamburg  
 Last forecast: 01.08.2022    Base Unit of M  
 Forecast model:    Period Indicator

Forecast values  
for the future  
10 months

Period	Forecast val	Factor	Corrected value	Ex
08.2022	880,448	0,000	880,448	<input type="checkbox"/>
09.2022	880,448	0,000	880,448	<input type="checkbox"/>
10.2022	880,448	0,000	880,448	<input type="checkbox"/>
11.2022	880,448	0,000	880,448	<input type="checkbox"/>
12.2022	880,448	0,000	880,448	<input type="checkbox"/>
01.2023	880,448	0,000	880,448	<input type="checkbox"/>
02.2023	880,448	0,000	880,448	<input type="checkbox"/>
03.2023	880,448	0,000	880,448	<input type="checkbox"/>
04.2023	880,448	0,000	880,448	<input type="checkbox"/>
05.2023	880,448	0,000	880,448	<input type="checkbox"/>

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### 3. Convert Forecast values into Planned Order (MD02) OR MRP RUN

- Enter here Material, MRP Area and plant and select options as per requirement.
- You can click on display results before they are saved. It means it will show you how many orders are generated.

**Single-Item, Multi-Level**

Material: 60000451  
 MRP Area: 1000  
 Plant: 1000

**MD02**

Scope of Planning  
 Product group

MRP Control Parameters

Processing Key	NETCH	Net change for total horizon
Create Purchase Req.	1	Purchase requisitions in opening period
SA Deliv. Sched. Lines	3	Schedule lines
Create MRP List	1	MRP list
Planning mode	1	Adapt planning data (normal mode)
Scheduling	1	Basic dates will be determined for plan

Process Control Parameters

Also plan unchanged components

Display results before they are saved

Display material list

Simulation mode

**Single-Item, Multi-Level** **MD02**

Statistics	
Materials planned	1
Materials with New Exceptions	1
Materials with Termination MRP List	

Parameters	
MRP Area	1000
Plant	1000
Processing Key	NETCH
Create Purchase Requisition	2
SA Schedule Line	3
Create MRP List	1
Planning Mode	1
Scheduling	1

Database Statistics	
Planned orders created	9
Purchase requisitions created	1

Runtime Statistics	
Start of Planning Run	10:51:13
End of Planning Run	10:51:13

Ranking List of Materials with Highest CPU Times (in ms)						
Material	MRP Area		Plant		Update	
	Read	Net Calc.	BOM	LdTrnSched		
60000451	1000		1000			
	92	10	3	0	0	78

#### 4. Convert Planned Orders to Purchase requisition (T Code : MD04)

**Stock/Requirements List as of 01:25 hrs**

Show Overview Tree

Material: 0000451 hc steel  
 MRP area: 1000 Hamburg  
 Plant: 1000 MRP type: TV Material Type: BOM Unit: TO

MD04

A. Date	MRP ...	MRP element data	Reschedul...	E. Receipt/Reqmt	Available Qty
01.05.2022	Stock				0
01.08.2022	ForReq	M 08/2022		880,448-	880,448-
14.08.2022	PlnReq	0010048006/00010	03.08.2022	880,448	0
01.09.2022	PIOrd.	0000000062/ExcF		880,448	880,448
01.09.2022	ForReq	M 09/2022		880,448-	0
01.10.2022	PIOrd.	0000000063/ExcF		880,448	880,448
01.10.2022	ForReq	M 10/2022		880,448-	0
02.11.2022	PIOrd.	0000000064/ExcF		880,448	880,448
02.11.2022	ForReq	M 11/2022		880,448-	0
01.12.2022	PIOrd.	0000000065/ExcF		880,448	880,448
01.12.2022	ForReq	M 12/2022		880,448-	0
02.01.2023	PIOrd.	0000000066/ExcF		880,448	880,448
02.01.2023	ForReq	M 01/2023		880,448-	0
01.02.2023	PIOrd.	0000000067/ExcF		880,448	880,448
01.02.2023	ForReq	M 02/2023		880,448-	0
01.03.2023	PIOrd.	0000000068/ExcF		880,448	880,448
01.03.2023	ForReq	M 03/2023		880,448-	0
01.04.2023	PIOrd.	0000000069/ExcF		880,448	880,448
01.04.2023	ForReq	M 04/2023		880,448-	0
02.05.2023	PIOrd.	0000000070/ExcF		880,448	880,448
02.05.2023	ForReq	M 05/2023		880,448-	0

- Maintain Material, Plant and MRP area Enter

- Double click on planned order and convert it to purchase requisition.

Now this is for one planned order, where you can convert planned order to PR and after refreshing MD04 you can convert PR to PO

- Now collective conversion of Planned order to PR (T code MD15) Enter Plant select material enter

material

- Then in next screen select all rows and click on convert online
- Keep goin on save button you will observe on by one planned order is getting converted into PR

### Collective Conversion of PlndOrd.to Pur Req.: Initial Screen

Plant

Search for planned orders by

MRP controller

Material

WBS element

From opening date

To opening date

Procurement Type

Purchase requisition parameters

"Fixed" Indicator

Source Determination

MD15

### Collect.Convers.of Plndd Ord.to Pur Req.: Complete Display

Material

Plant  Hamburg Base Unit

MRP ctrlr  DISPONENT 000

Plnd open.	OrderStart	Ord.finish	Order quantity	Fi...	P S	Planned or...	Or...	A Sales Order	Item	Sc...
19.08.2022	19.08.2022	30.08.2022	880,448	<input type="checkbox"/>	F	85842	NB		0	0
18.09.2022	18.09.2022	29.09.2022	880,448	<input type="checkbox"/>	F	85843	NB		0	0
19.10.2022	19.10.2022	30.10.2022	880,448	<input type="checkbox"/>	F	85844	NB		0	0
18.11.2022	18.11.2022	29.11.2022	880,448	<input type="checkbox"/>	F	85845	NB		0	0
19.12.2022	19.12.2022	30.12.2022	880,448	<input type="checkbox"/>	F	85846	NB		0	0
19.01.2023	19.01.2023	30.01.2023	880,448	<input type="checkbox"/>	F	85847	NB		0	0
16.02.2023	16.02.2023	27.02.2023	880,448	<input type="checkbox"/>	F	85848	NB		0	0
19.03.2023	19.03.2023	30.03.2023	880,448	<input type="checkbox"/>	F	85849	NB		0	0
18.04.2023	18.04.2023	29.04.2023	880,448	<input type="checkbox"/>	F	85850	NB		0	0

SOLUTIONS

**Convert Planned Order into Purch. Req.: Details**

Assign Source of Supply

Material: 60000451

**Planned Order Data**

Planned Order	85843	NB	MRP Area	1000
Planned Order Qty	880,448	TO	Planning Plant	1000
Procurement Type	F		Storage Location	
Acc. Assignment Cat.			Basic Finish Date	29.09.2023
BOM Explosion Number			Basic Start Date	18.09.2022
Firming	<input type="checkbox"/> Planned Order	<input type="checkbox"/> Components	GR processing time	2

**Purchase Requisition Data**

Purchase Requisition		NB	MRP Area	1000
Converted Quantity	880,448	TO	Plant	1000
Item Category			Storage Location	
Acct. Assignment Cat.			Deliv. date(From/to)	29.09.2023
BOM explosion number			Release Date	18.09.2022
<input checked="" type="checkbox"/> Invoice Receipt			GR Processing Time	2
<input type="checkbox"/> Firming Indicator			MRP Controller	000
<input checked="" type="checkbox"/> Goods Receipt			Purchasing Group	000

**Procurement Options**

Agreement			Purch. Organization	
Central Contract			Supplying Plant	
Fixed Vendor				

Planned order 85842 converted to purchase requisition 10048007 00010

Creation of PR after Saving

Now again go to MD04 and check there all planned orders are converted to PR. You can convert these PR to PO one by one by double clicking on the PR.

But you can create single PO for All PR also

Now How to convert all PR into Single PO?

You can go to ME21N and in document overview go to selection variant then put only plant and material you will get list of all PR just select now PR and click on adopt so that it will be added in line items of single PO.

After this you can go for Good receipt and Monitor again in MMBE

## Time phased Planning

It is also known as seasonal Planning. It is rarely used in industry, for time phased planning all the steps are same; only you need to change MRP views in Material Master.

**Change Material 60000451 (Raw material)**

Additional Data   Org. Levels   Check Screen Data

Purchase order text   **MRP 1**   MRP 2   MRP 3   MRP 4   For...

Material: 60000451   hc steel

Plant: 1000   Hamburg

---

**General Data**

Base Unit of Measure	TO	tonnes	MRP group	0000
Purchasing Group	000		ABC Indicator	
Plant-sp.matl status	<input type="checkbox"/>		Valid from	

---

**MRP procedure**

MRP Type	R1	Forecast-based planning	
Reorder Point		Planning time fence	<input type="checkbox"/>
Planning cycle	001	MRP Controller	000

---

**Lot size data**

Lot size	EX	Lot-for-lot order quantity	
Minimum Lot Size		Maximum Lot Size	
Fixed lot size		Maximum stock level	
Ordering costs		Storage costs ind.	<input type="checkbox"/>
Assembly scrap (%)		Takt time	
Rounding Profile		Rounding value	
Unit of Measure Grp			

---

**MRP areas**

MRP area exists   **MRP areas**

**MRP1**

Procurement	
Procurement type	F
Special procurement	<input type="checkbox"/>
Quota arr. usage	<input type="checkbox"/>
Backflush	<input type="checkbox"/>
JIT delivery sched.	<input type="checkbox"/>
<input type="checkbox"/> Bulk Material	
Batch entry	<input type="checkbox"/>
Prod. stor. location	<input type="text"/>
Default supply area	<input type="text"/>
Storage loc. for EP	<input type="text"/>
Stock det. grp	<input type="text"/>

**MRP2**

Scheduling	
GR Processing Time	2 days
SchedMargin key	000
Planned Deliv. Time	10 days
Planning calendar	001

Net requirements calculation	
Safety Stock	<input type="text"/>
Min safety stock	<input type="text"/>
Safety time ind.	<input type="text"/>
STime period profile	<input type="text"/>
Service level (%)	<input type="text"/>
Coverage profile	<input type="text"/>
Safety time/act.cov.	<input type="text"/> days

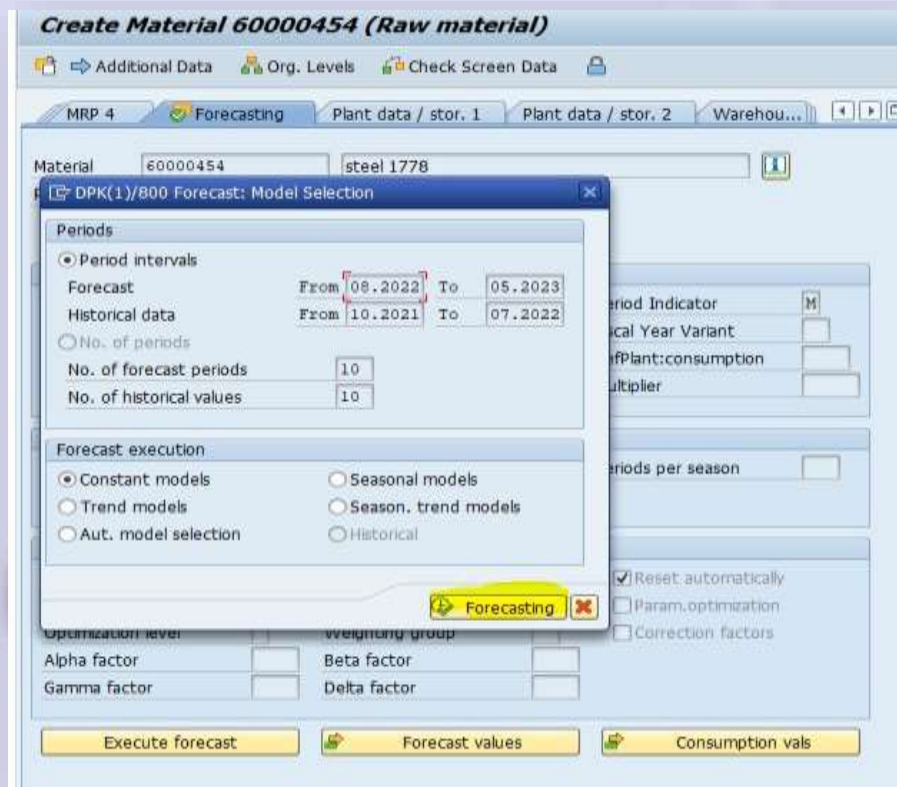
Remaining MRP3, Forecasting Parameters remains the same .Only the planning will take place as per your planning calendar.

### Reorder Point Planning

Reordering point planning involves calculating when stock levels hit a point at which it's the right time to reorder. This often involves taking into account demand forecasts, current stock levels and lead times.

1. Create Material Master (MM01)
  - Maintain MRP1, MRP2, MRP 3 and forecasting view.

- IN MRP 1 Maintain MRP View AS VB(For Manual Reorder Point) and VM (Automatic reorder Point),MRP Controller and lots
- In MRP 2 view, you can maintain Procurement type, GR Processing time, Lead time and safety stock.
- MRP 3 Maintain Availability check
- In forecasting maintain forecast model as D, Define history period AND FORECAST PERIOD and go to consumption values. Maintain all consumptions of previous period's com to main data and click on execute forecast. Select forecast month and enter.
- Click on forecasting and enter.
- Again select and click on forecasting





### Create Material 60000454 (Raw material)

Additional Data   Org. Levels   Check Screen Data

MRP 4   Forecasting   Plant data / stor. 1   Plant data / stor. 2   Warehou...

Material: 60000454   steel 1778

Plant: 1000   Hamburg

---

**General data**

Base Unit of Measure: TO   Forecast model: D   Period Indicator: M

Last forecast:   Fiscal Year Variant:   RefPlant:consumption:   Multiplier:   RefMat:   Date to:   M 08.2022   M 09.2022

---

**Number**

Hist. per:   forecast periods: 10   Periods per season:   Initializat:   locked periods:   [OK] [Cancel]

---

**Control data**

Initialization:    Tracking limit: 4,000    Reset automatically

Model selection:   Selection procedure: 2    Param. optimization

Optimization level:   Weighting group:    Correction factors

Alpha factor:   Beta factor:   Gamma factor:   Delta factor:

---

Execute forecast   Forecast values   Consumption vals



IT SOLUTIONS

### Create Material 60000454 (Raw material)

Additional Data | Org. Levels | Check Screen Data

MRP 4 | Forecasting | Plant data / stor. 1 | Plant data / stor. 2 | Warehou...

Material: 60000454 steel 1778

Forecast: Model Selection

Forecast: Constant Model Parameters

- First-order exponential smoothing
  - Alpha factor: 0,20
- 1st order exp.smoothing w.constant alpha optimization
- Moving average
  - Historical values: 10
- Weighted moving average
  - Weighting group: 01

Forecasting

Execute forecast | Forecast values | Consumption vals

### Create Material 60000454 (Raw material)

Additional Data | Org. Levels | Check Screen Data

MRP 4 | Forecasting | Plant data / stor. 1 | Plant data / stor. 2 | Warehou...

Material: 60000454 steel 1778

Forecast: Results

Basic value	143,014	Trend value	
MAD	39,369	Error total	-184,931
Safety Stock		Reorder Point	61,973

Forecast results

Period	Orig. HV	Corr. HV	Ex-post FV	Orig. FV	Corr. FV	Season	F C
M 08.2022				143,014	143,014		<input type="checkbox"/>
M 09.2022				143,014	143,014		<input type="checkbox"/>
M 10.2022				143,014	143,014		<input type="checkbox"/>
M 11.2022				143,014	143,014		<input type="checkbox"/>
M 12.2022				143,014	143,014		<input type="checkbox"/>
M 01.2023				143,014	143,014		<input type="checkbox"/>
M 02.2023				143,014	143,014		<input type="checkbox"/>

Automatic Reorder Point

Execute forecast | Forecast values | Consumption vals

Material 60000454 is created. You can again observe the same reorder point in MRP1 view of the material.

2. Maintain stock of the material by maintaining PO (ME21N) and GR.(MIGO)
3. Stock maintained is 100 monitor by mmbe
4. Create GI to cost centre (MB1A/201)
5. We created GI of 40 quantities
6. Monitor stock at mmbe now our reorder point is 61.973 and available stock is 60 means available stock is less than reorder point
7. MRP RUN MD02



### Single-Item, Multi-Level

Material	60000454
MRP Area	
Plant	1000

#### Scope of Planning

Product group

#### MRP Control Parameters

Processing Key	NETCH	Net change for total horizon
Create Purchase Req.	3	Purchase requisitions in opening period
SA Deliv. Sched. Lines	3	Schedule lines
Create MRP List	1	MRP list
Planning mode	1	Adapt planning data (normal mode)
Scheduling	1	Basic dates will be determined for plann

#### Process Control Parameters

- Also plan unchanged components
- Display results before they are saved
- Display material list
- Simulation mode

## Single-Item, Multi-Level

### Materials

#### Statistics

Materials planned	1
Materials with New Exceptions	1
Materials with Termination MRP List	

#### Parameters

MRP Area	1000
Plnt	1000
Processing Key	NETCH
Create Purchase Requisition	3
SA Schedule Line	3
Create MRP List	1
Planning Mode	1
Scheduling	1

#### Database Statistics

Planned orders created	1
------------------------	---

#### Runtime Statistics

Start of Planning Run	14:12:23
End of Planning Run	14:12:23

#### Ranking List of Materials with Highest CPU Times (in ms)

Material	MRP Area		Plnt			Update
	Read	Net Calc.	BOM	LdTimeSched		
60000454	1000		1000			
	58	24	3	0	0	30

8. Planned orders are created
9. Planned order can be converted into PR by using MD04
10. You can observe reorder point is 61.973
11. Convert Planned order into Purchase Requisition
12. Convert PR into PO
13. MIGO

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