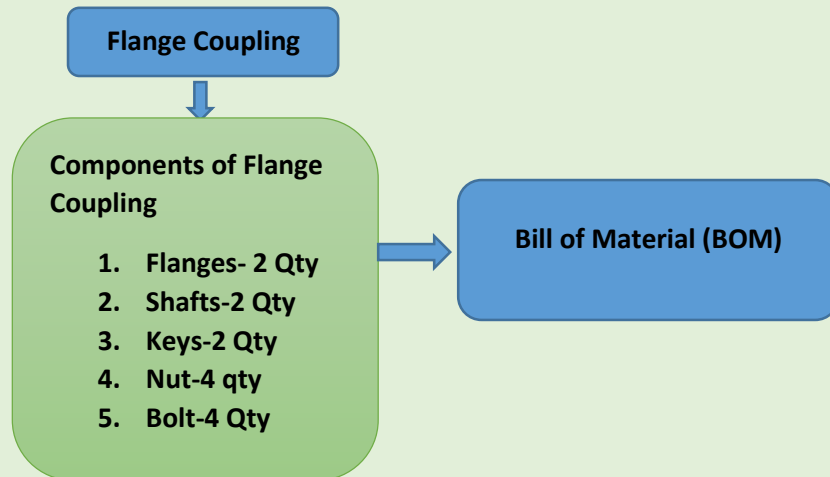


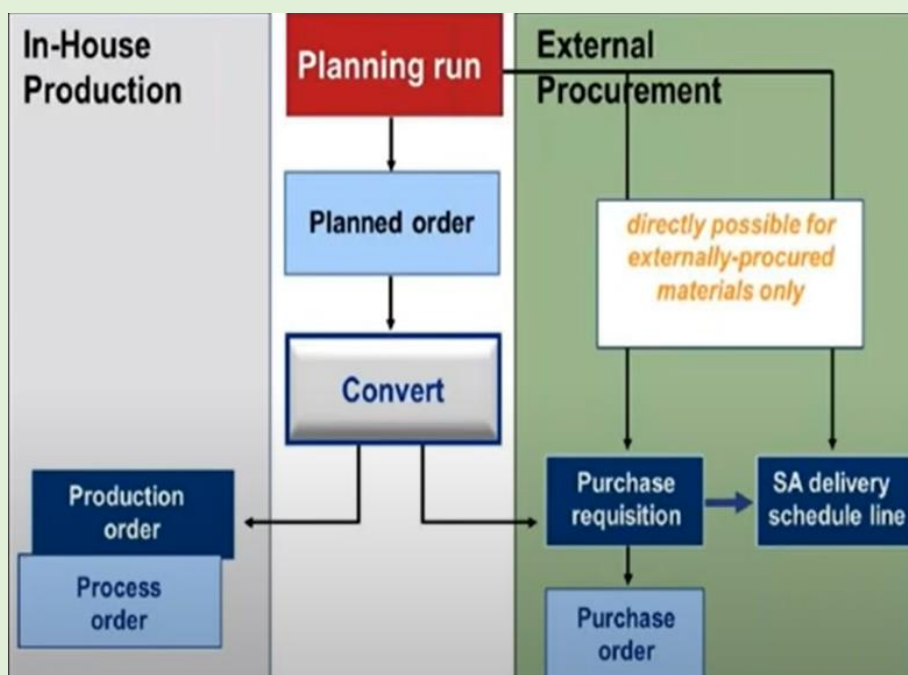
## Material Requirement Planning

- 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.



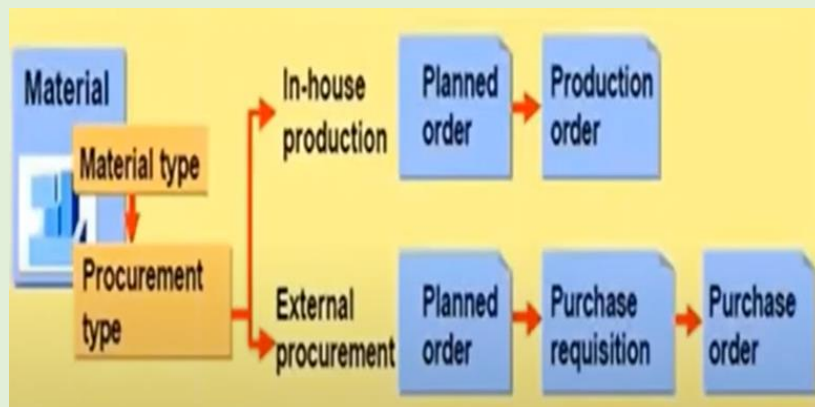
Now let us say you want to manufacture 1000 flange coupling, what system will do in this case if we run MRP for 1000 Flange coupling ?, system will calculate total quantity of components needed for manufacturing and will send information to the purchase department in the form of PR.

- Now when you run MRP there are generally two types of Materials in the organizations In-house 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.

**Create Material 60000423 (Raw material)**

Additional Data Org. Levels Check Screen Data

MRP 1 MRP 2 MRP 3 MRP 4 Forecasting Plant data / st...

Material 60000423 HERO HONDA BIKE

Plant 1000 Hamburg

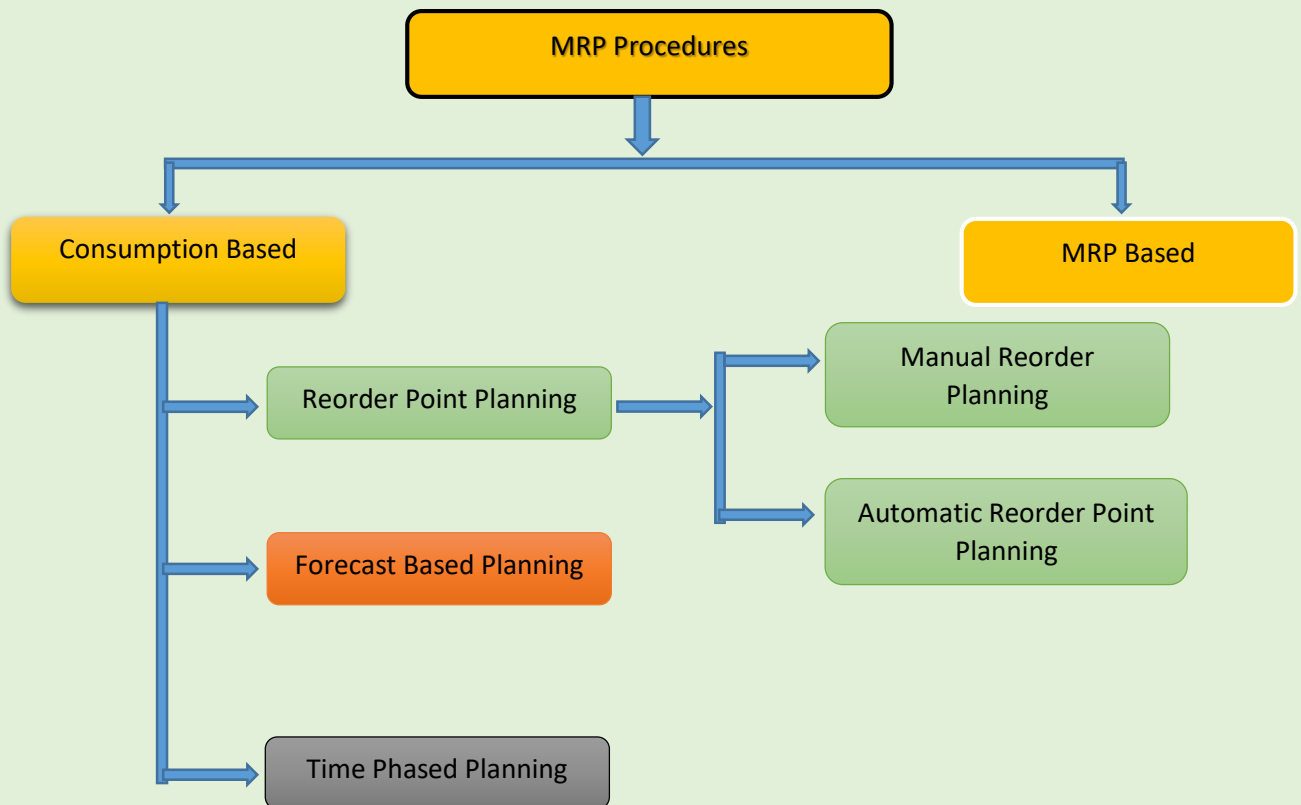
Procurement

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

## 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 'Hamburg'. The MRP1 view displays 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		
Reorder Point		Planning time fence	
Planning cycle		MRP Controller	000

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

MRP areas

☐ MRP area exists

MRP areas

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

**Create Material 60000451 (Raw material)**

Org. Levels Check Screen Data

MRP 2 MRP 3 MRP 4 Forecasting Plant data / stor. 1 Pl...

Material: 60000451 hc steel  
Plant: 1000 Hamburg

**MRP3**

**Forecast Requirements**

Period Indicator: M Fiscal Year Variant: Splitting indicator:

**Planning**

Strategy group: Consumption mode: Fwd consumption per.: Planning material: Plng conv. factor: Bwd consumption per.: Mixed MRP: Planning plant: Planning matl BUnit:

**Availability check**

Availability check: p1 Cross-project: Tot. repl. lead time: days

**Plant-specific configuration**

ConfigurableMaterial: Variant: Planning variant: Configure variant: Configure planning variant:

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

Material: 60000451 hc steel  
Plant: 1000 Hamburg

**Forecasting View**

**General data**

Base Unit of Measure: IO Forecast model: D Period Indicator: M Last forecast: RefMat: consumption Date to: Multiplier:

**Number of periods required**

Hist. periods: 10 Forecast periods: 10 Periods per season: Initialization pds: Fixed periods:

**Control data**

Initialization: X 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

**Create Material 60000451 (Raw material)**

Additional Data Org. Levels Check Screen Data

MRP 1 MRP 2 MRP 3 MRP 4 Forecasting Plant data ...

Material: 60000451 hc steel  
Plant: 1000 Hamburg

**MRP2**

**Procurement**

Procurement type: F Batch entry: Special procurement: Quota arr. usage: Backflush: JIT delivery sched.: Bulk Material: Prod. stor. location: Default supply area: Storage loc. for EP: Stock det. grp:

**Scheduling**

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

**Net requirements calculation**

Safety Stock: Service level (%): Min safety stock: Coverage profile: Safety time ind.: Safety time/act.cov.: STime period profile:

- 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

**Create Material 60000451 (Raw material)**

Internal comment Consumption

Material 60000451 hc steel  
Plant 1000 Hamburg

Base Unit of Measure TO Period Indicator M Fiscal Year Variant

**Consumption Values**

Period	Total consumption	Corrected value	Qutnt
08.2022			1,00
07.2022	1.000	1.000	1,00
06.2022	800	800	1,00
05.2022	700	700	1,00
04.2022	600	600	1,00
03.2022	900	900	1,00
02.2022	1.000	1.000	1,00
01.2022	1.000	1.000	1,00
12.2021	1.000	1.000	1,00
11.2021	1.000	1.000	1,00
10.2021	1.000	1.000	1,00

Unplnd consumption

**2. Execute Forecast (T Code: MP30) here you need to enter Material MRP area and Plant**

**Execute Forecast: Initial Screen**

Material 60000451  
MRP Area 1000  
Plant 1000

MP30

**Execute Forecast: Parameter Overview**

Forecast values Past Execute

Material 60000451 hc steel  
MRP Area 1000 Hamburg  
Plant 1000 Hamburg

**Basic data**

Last forecast  
Forecast model D  
Period Indicator M  
Forecast profile  
Basic value 0

Base Unit of Measure TO  
Service level (%) 0,0  
Safety Stock 0  
Reorder Point 0  
Trend value 0

**Control data**

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

**Number of values**

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

- If You click on past it will give you history 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"/>

Page 1 / 1

### 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  
Create Purchase Req.: 2  
SA Deliv. Sched. Lines: 3  
Create MRP List: 1  
Planning mode: 1  
Scheduling: 1

**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	Runtime	Read	Net Calc.	Update
60000451	1000	1000	92	10	3	78

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

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

Show Overview Tree

Material: 60000451  
MRP area: 1000  
Plant: 1000

**MD04**

A.	Date	MRP ...	MRP element data	Reschedul...	E...	Receipt/Reqmt	Available Qty
03.08.2022	Stock						0
03.08.2022	ForReq	M 08/2022				880,448-	880,448-
16.08.2022	PurReq	0010048006/00010	03.08.2022	30		880,448	0
01.09.2022	PIOrd.	0000085842/ExtP				880,448	880,448
01.09.2022	ForReq	M 09/2022				880,448-	0
01.10.2022	PIOrd.	0000085843/ExtP				880,448	880,448
01.10.2022	ForReq	M 10/2022				880,448-	0
02.11.2022	PIOrd.	0000085844/ExtP				880,448	880,448
02.11.2022	ForReq	M 11/2022				880,448-	0
01.12.2022	PIOrd.	0000085845/ExtP				880,448	880,448
01.12.2022	ForReq	M 12/2022				880,448-	0
02.01.2023	PIOrd.	0000085846/ExtP				880,448	880,448
02.01.2023	ForReq	M 01/2023				880,448-	0
01.02.2023	PIOrd.	0000085847/ExtP				880,448	880,448
01.02.2023	ForReq	M 02/2023				880,448-	0
01.03.2023	PIOrd.	0000085848/ExtP				880,448	880,448
01.03.2023	ForReq	M 03/2023				880,448-	0
01.04.2023	PIOrd.	0000085849/ExtP				880,448	880,448
01.04.2023	ForReq	M 04/2023				880,448-	0
02.05.2023	PIOrd.	0000085850/ExtP				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 Plnnd Ord.to Pur Req: Complete Display

Material  hc steel

Plant  Hamburg

MRP ctrlr  DISPONENT 000

Base Unit

Convert Online

	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



Convert Planned Order into Purch. Req.: Details

Assign Source of Supply

Material 60000451

Creation of PR after Saving

Planned Order Data		Purchase Requisition Data	
Planned Order	85843 NB	Purchase Requisition	NB
Planned Order Qty	880,448 TO	Converted Quantity	880,448 TO
Procurement Type	F	Item Category	
Acc. Assignment Cat.		Acct Assignment Cat.	
BOM Explosion Number		BOM explosion number	
Firming	<input type="checkbox"/> Planned Order <input type="checkbox"/> Components	<input checked="" type="checkbox"/> Invoice Receipt	
		<input type="checkbox"/> Firming Indicator	
		<input checked="" type="checkbox"/> Goods Receipt	
MRP Area	1000	MRP Area	1000
Planning Plant	1000	Plant	1000
Storage Location		Storage Location	
Basic Finish Date	29.09.2022	Deliv. date(From/to)	29.09.2022
Basic Start Date	18.09.2022	Release Date	18.09.2022
GR processing time	2	GR Processing Time	2
		MRP Controller	000
		Purchasing Group	000
Procurement Options			
Agreement		Purch. Organization	
Central Contract		Supplying Plant	
Fixed Vendor			

Planned order 85842 converted to purchase requisition 10048007 00010

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   Lock

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

Material: 60000451   hc steel  

Plant: 1000   Hamburg

**MRP1**

**General Data**

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

**MRP procedure**

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

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="checkbox"/>
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

DPK(1)/800 Forecast: Model Selection

Periods

☒ Period intervals

Forecast From 08.2022 To 05.2023

Historical data From 10.2021 To 07.2022

☐ No. of periods

No. of forecast periods 10

No. of historical values 10

Forecast execution

☒ Constant models ☐ Seasonal models

☐ Trend models ☐ Season. trend models

☐ Aut. model selection ☐ Historical

Forecasting

Optimization level Alpha factor Beta factor Gamma factor Delta factor

Period Indicator M

Fiscal Year Variant

RefPlant:consumption

Multiplier

Periods per season

☒ Reset automatically

☐ Param.optimization

☐ Correction factors

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

Plant 1000 Hamburg

General data

Base Unit of Measure TO Forecast model D Period Indicator M

Last forecast

RefMat: DPK(1)/800 F...

Date to

Number

Hist. per forecast periods 10 Periods per season

Initializ

Control data

Initialization X 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

**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

DPK(1)/800 Forecast: Model Selection

Periods

DPK(1)/800 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

Optimization level

Alpha factor Beta factor

Gamma factor Delta factor

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

DPK(1)/800 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		
M 09.2022				143,014	143,014		
M 10.2022				143,014	143,014		
M 11.2022				143,014	143,014		
M 12.2022				143,014	143,014		
M 01.2023				143,014	143,014		
M 02.2023				143,014	143,014		

Check the forecast error messages

Gamma factor Delta factor

Execute forecast Forecast values Consumption vals


Automatic Reorder Point

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

<b>Single-Item, Multi-Level</b>		
Material	60000454	
MRP Area		
Plant	1000	
<b>Scope of Planning</b>		
<input type="checkbox"/> Product group		
<b>MRP Control Parameters</b>		
Processing Key	NEICH	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
<b>Process Control Parameters</b>		
<input type="checkbox"/> Also plan unchanged components		
<input type="checkbox"/> Display results before they are saved		
<input checked="" type="checkbox"/> Display material list		
<input type="checkbox"/> 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	LdTmeSched	
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