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Powder Coating Production Planning

- 2024

Problem Statement

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- Powder planning is currently a time-consuming activity & completely person dependent *(based on his experience, knowledge & batch history)*
- General amount of time spent by the production planner is as below
  - Make weekly plan – *1 day*
  - RM working & discussion – *2 hrs*
  - Release batch cards from SAP – *1 to 2 hrs daily*
  - Adhoc plan change/ sequencing – 2 hr per change

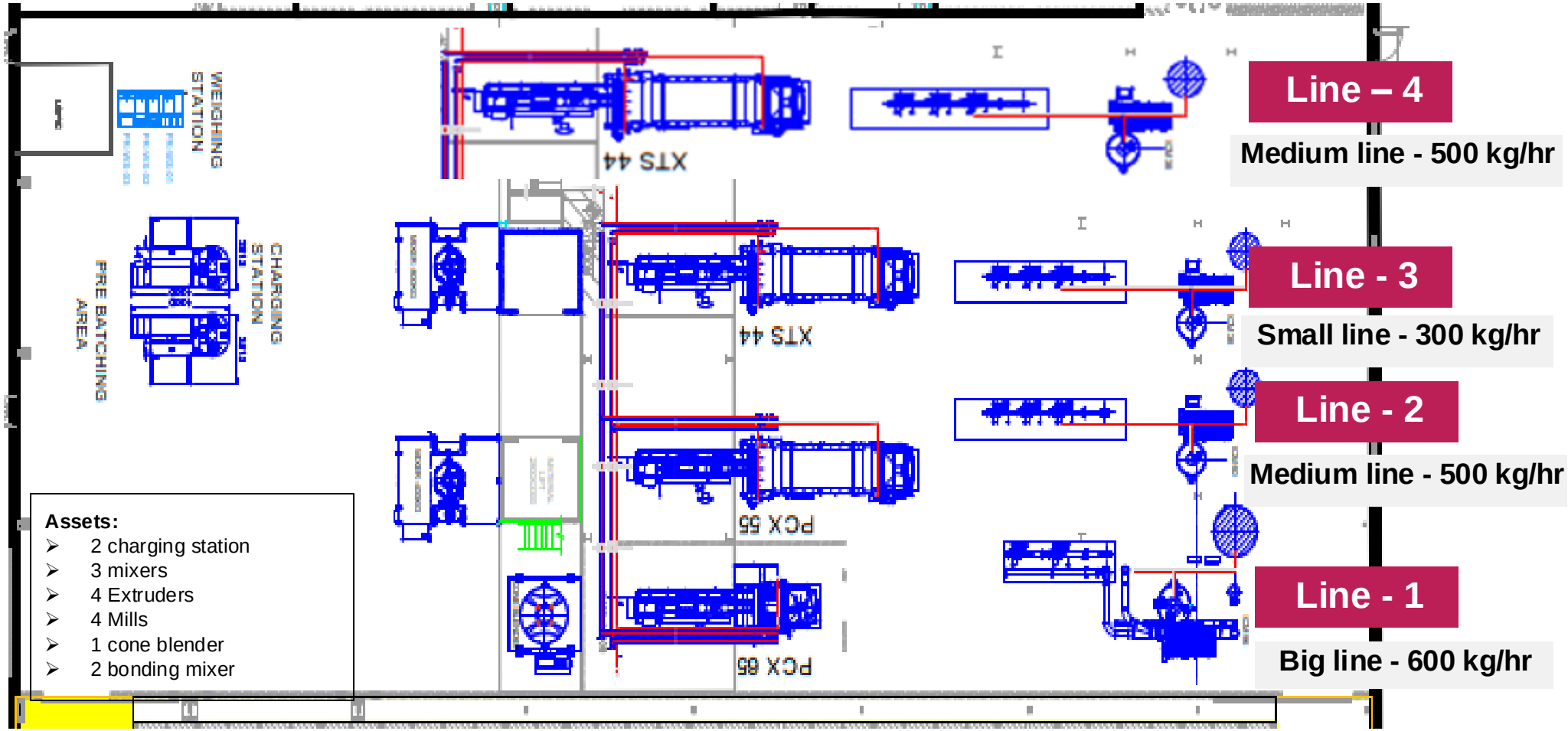
- Automation of this process will help us create a reliable system where we can get the right product sequence each time in a limited time frame with minimal human intervention & thus corresponding errors.

Powder Coatings Shopfloor Layout

- Manufacturing Shopfloor

Variables

- ✓ Shade
- ✓ Family
- ✓ Pattern
- ✓ Batch size
- ✓ Current sequence
- ✓ Past history



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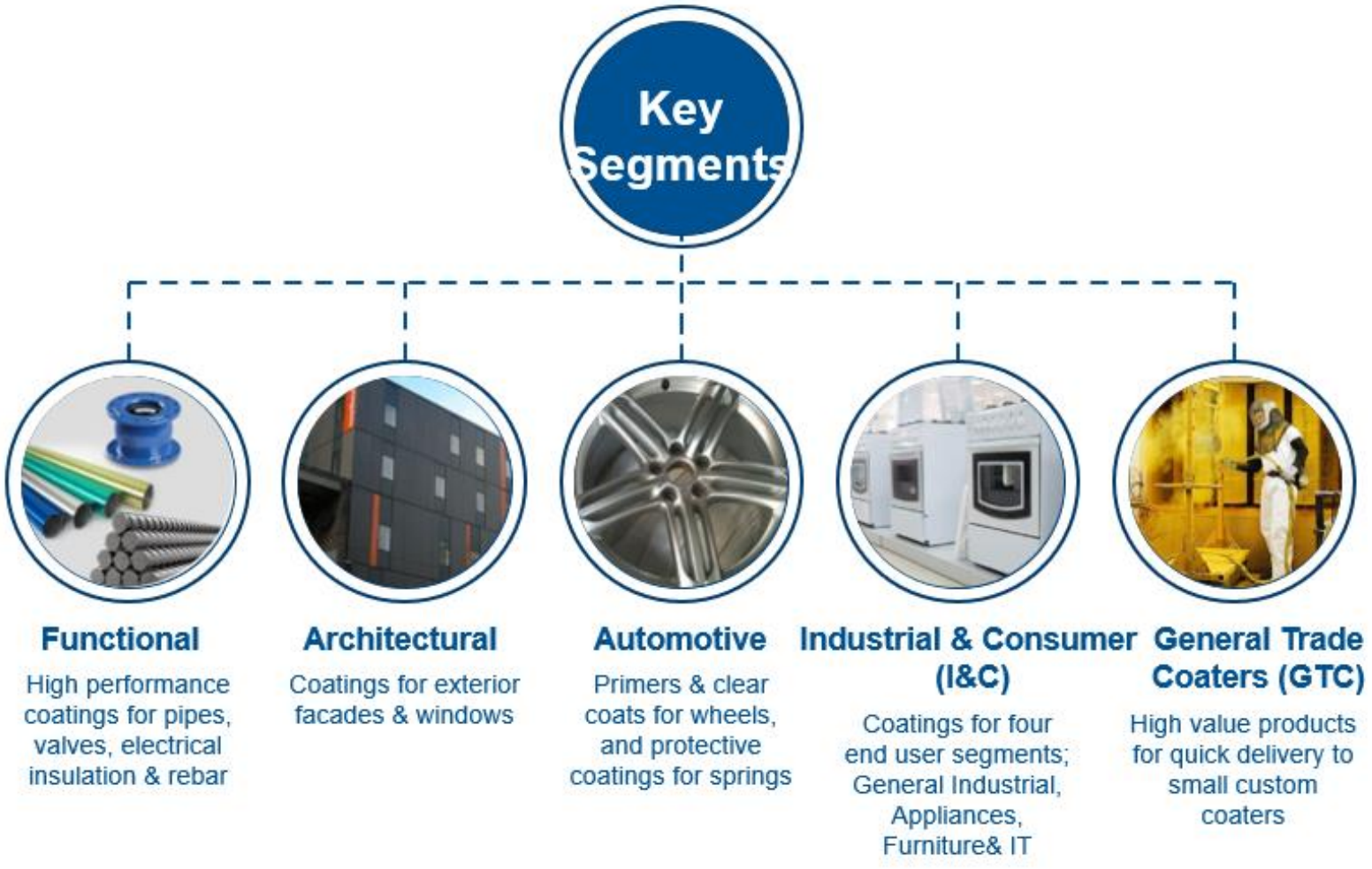
Overall Product Portfolio



- **Plants in India**
  - Thane
  - Bangalore
  - Gwalior (Not active yet)
- **Thane SKUs – 900 +**
  - 103 – MTS items (Made to Stock)
  - Rest – MTO items (Made to Order)
- **Product categories**
  - Solid shades
  - Metallic blended products
  - Metallic bonded products

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Product Features

- Product is defined by three key features – Family, Chemistry, Shade

Family – Defined by the finish of the product

- Glossy
- Semi-Glossy
- Matt
- Texture
- Structure

Chemistry – Defined by the backbone of the product

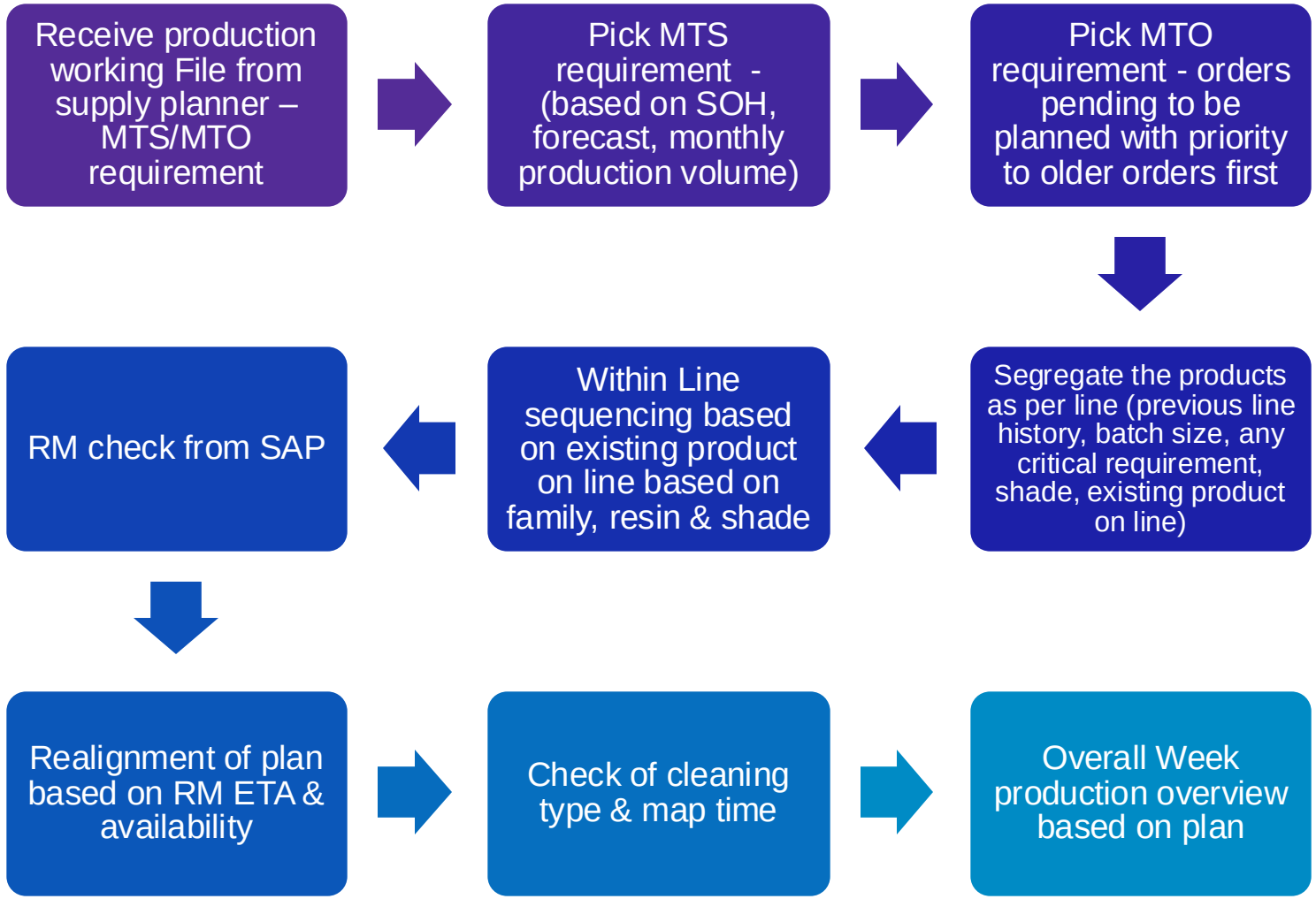
- Epoxy
- Epoxy Polyester
- Polyester – TGIC
- Polyester – Primid
- Architechural Polyester
- High durable polyester
- Functional Epoxy

Shade – Defined by the color (RAL code , LAB value, etc)

- Black, grey
- White, cream, ivory
- Orange, Red
- Blue
- Green
- Purple
- Yellow, Brown

Production Planning Process Flow Chart

- General overview



Documents Required

- MTS working file (sent by the supply planner – twice a week)
- Production planning file (for past history of planning & knowing the last product planned)
- SAP data (regarding products, RM stock, etc)
- Changeover matrix (to check cleaning type & corresponding time)

Step 1 – Pick MTS & MTO requirement

- From the MTS working file shared by supply planner

MTS Working File_24_06_2024

MTS items requirement

(Made to Stock)

- Moving Products with monthly forecast & regular consumption
- Production requirement depends on
  - Forecast
  - Sales
  - Stock on Hand (SOH)
  - Urgency
  - Sequence availability

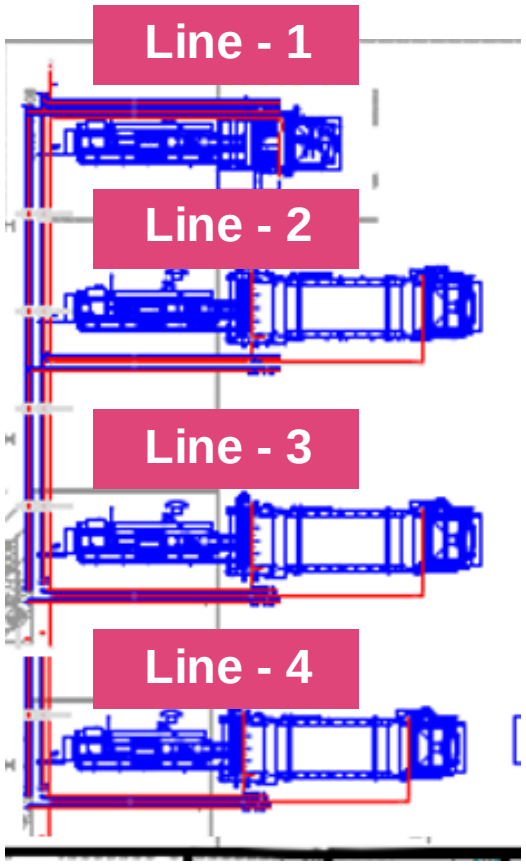
MTO items requirement

(Made to Order)

- Products made only when order is placed
- Production requirement depends on
  - Minimum Order Qty
  - Ageing (how old the order is)
  - Urgency
  - Sequence availability

Step 2 – Segregate the products into different Lines

- Based on specific criteria



Line – 1

- Throughput – 600 kg/hr
- Shade – Dark
- Screw – Semi-glossy, structure

Line – 2

- Throughput – 500 kg/hr
- Shade – Light
- Screw – glossy, structure

Line – 3

- Throughput – 300 kg/hr
- Shade – Multicolor
- Screw – universal

Line – 4

- Throughput – 500 kg/hr
- Shade – Dark, colours
- Screw – universal, coperion, structure

Products are segregated into lines based on below criteria

- Batch size (affects KPIs – OEE, KGMH, etc) – move smaller batches (<1 MT) into small line (Line – 3)
- Critical product specific requirement – *few products can only be made in a particular line due to machine related constraints*
- Running product - *family, chemistry & shade* & screw configuration
- Shade of the products planned – *move lights shades into light line & darks shades into dark line*

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Powder Naming Convention

- Family, Resin (Chemistry) & Shade

Coding Standard

Table 1: Interpon Product Coding System

1st Letter Product Type

A	Normal Reactivity	Epoxy
B	High Reactivity	Epoxy
C	Acrylics	
D	Normal Reactivity Architectural Polyester-TGIC	Satin/Matt
E	Normal Reactivity	Epoxy-Polyester
F	High Reactivity	Epoxy-Polyester
G	Normal Reactivity	Architectural Polyester TGIC-free
H	Functional Epoxy (Resicoat)	
I	Polyvalent	
J	Normal Reactivity	Polyester-TGIC
K	High Reactivity	Polyester-TGIC

2nd Letter Colour

A, B & C	White
D	Cream
E	Yellow
F	Orange
G	Red
H	Purple
I	Grey
J	Blue
K	Green
L	Grey
M	Brown
N	Black

3rd Digit Gloss & Application

0	Corona Application 76-100% Gloss
1	Corona Application 40-75% Gloss
2	Corona Application 0-39% Gloss
3	Fine Texture (Corona)
4	Coarse Texture (Corona)
5	**Interpon AF/ Interpon AC**
6	Tribo Application 76-100% Gloss
7	Tribo Application 40-75% Gloss
8	Tribo Application 0-39% Gloss

4th-5th Digit Numbering Sequence

00-99 then

0A-9A through to 0Z-9Z then

AA-AZ through to ZA-ZZ then
A0-A9 through to Z0-Z9

6th-7th Letter Origin of Formulation

A	Australia
B	Brazil
C	China (Shenzhen)
D	Germany (Bensheim)
E	UK (Felling)
F	France (Dourdan)
G	Group Registered Powder
H	China (Suzhou)
I	Italy (Cernobbio)
J	Indonesia
K	Korea (Shihwa)
L	Spain
M	Italy (Argenta)

Powder Naming Convention

- Family, Resin (Chemistry) & Shade

Coding Standard

Example – EF300N

Chemistry Shade Family

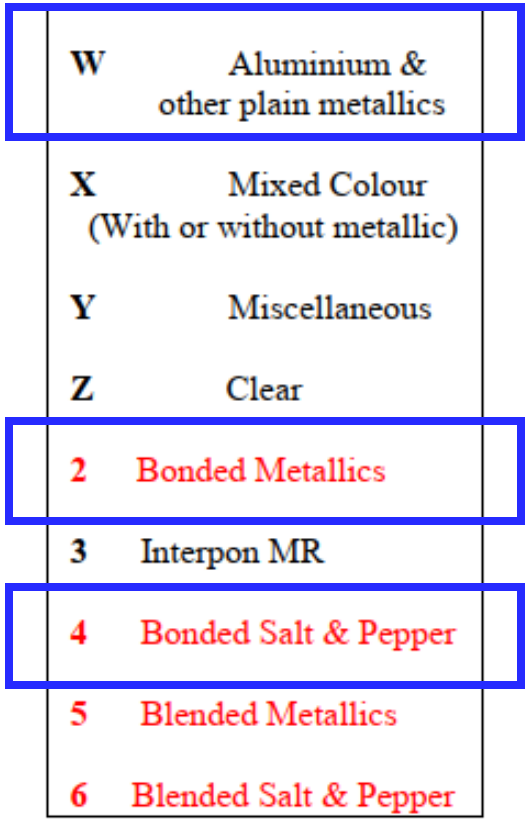
Table 1: Interpon Product Coding System

1st Letter Product Type			2nd Letter Colour		3rd Digit Gloss & Application		4th-5th Digit Numbering Sequence
A	Normal Reactivity	Epoxy	A, B & C	White	0	Corona Application 76-100% Gloss	00-99 then
B	High Reactivity	Epoxy	D	Cream	1	Corona Application 40-75% Gloss	0A-9A through to 0Z-9Z then
C	Acrylics		E	Yellow	2	Corona Application 0-39% Gloss	AA-AZ through to ZA-ZZ then A0-A9 through to Z0-Z9
D	Normal Reactivity Architectural Polyester-TGIC	Satin/Matt	F	Orange	3	Fine Texture (Corona)	**6th-7th Letter Origin of Formulation**
E	Normal Reactivity	Epoxy-Polyester	G	Red	4	Coarse Texture (Corona)	J Indonesia
F	High Reactivity	Epoxy-Polyester	H	Purple	5	**Interpon AF/ Interpon AC**	K Korea (Shihwa)
G	Normal Reactivity	Architectural Polyester TGIC-free	I	Grey	6	Tribo Application	L Spain
			J	Blue			M Italy (Argenta)
							N India
							O China (Beijing)
							P South Africa

Few products do not follow the naming convention & are exceptions. Eg; EP904N, ECB05N

Additonal Info for Products

- Bonded & Blended metallic products



W	Aluminium & other plain metallics
X	Mixed Colour (With or without metallic)
Y	Miscellaneous
Z	Clear
2	Bonded Metallics
3	Interpon MR
4	Bonded Salt & Pepper
5	Blended Metallics
6	Blended Salt & Pepper

Blended / bonded powder

Bonded powder

Bonded stone finish powder – has multiple bases

Multiple base product

- Stone finish example - S4300N bonded powder base
  - SP321N
  - SN321N
  - SC321N
- This data is available in SAP/ BOM

Step 3 – Within Line Sequencing

- Based on family, resin & shade

Sequencing guidelines

- Check the family, resin (chemistry) & shade of the last product planned on that particular line
- Sequencing priority
  - 1st priority – Family (screw, finish)
  - 2nd priority – Resin (chemistry, compatibility)
  - 3rd priority – shade (light to dark, or dark to light)

Step 3 – Within Line Sequencing

- Based on family, resin & shade

Family matrix

Glossy	0
Semi-Glossy	1
Matt	2
Texture	3
Structure	4

	Family	To 0	To 1	To 2	To 3	To 4
From	0	OK	OK	OPS	OPS	OPS
From	1	OK	OK	OPS	OPS	OPS
From	2	TPS	TPS	OK	OK	OK
From	3	TPS	TPS	OK	OK	OK
From	4	NP	NP	NP	OK	OK

OK	Okay
OPS	1 Times PVC + screw c/o
TPS	2 Times PVC + screw c/o
NP	Not Possible

Resin matrix

A		Family	To A	To E	To J	To M	To S	To Y	To Q	To K	To F	To H	To L	To N
E	From	A	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
J	From	E	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
M	From	J	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
S	From	M	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Y	From	S	OK	NP	NP	OK	OK	OK	NP	OK	OK	OK	NP	OK
Q	From	Y	OK	NP	NP	OK	OK	OK	NP	OK	OK	OK	NP	OK
K	From	Q	OK	NP	NP	OK	OK	OK	OK	OK	OK	OK	NP	OK
F	From	K	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	NP	OK
H	From	F	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	NP	OK
L	From	H	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
N	From	L	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	From	N	OK	NP	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Step 3 – Within Line Sequencing

- Based on family, resin & shade

Products	Line	Family	Resin	RAL	Shade Color
EL445N	1	4	2	RAL7032	
EPB32N	1	4	2	RAL7035	
EL482N	1	4	2	RAL7035	
MI453N	1	4	5	RAL7035	
EP400N	1	4	2	RAL7035	
MP301N	1	3	5	RAL7047	
JC594N	1	3	3	RAL9003	
YPD78N	1	3	4	RAL9010	
YCB18N	1	1	4	RAL9016	
SC18AN	1	1	4	RAL9016	
SC17AN	1	1	4	RAL9016	
SC19AN	1	1	4	RAL9003	
YC087N	1	0	4	RAL9016	
YC087N	1	0	4	RAL9016	

Example of sequenced product with visual understanding of required shade transition

Step 4 – Check RM availability

- Via SAP

RM working

RM Check guideline

- Download the RM stock report
- Get the RM requirement for the plan using BOM (dump can be taken from SAP)
- Map the stock against requirement & assess the shortage RM/gap
- Check with RM planner the ETA & availability for shortage RMs & realign the plan

			273,264	612,031	74,117	539,906	-	112,527
RM GRACO	RM SAP	Category	P Reqt	Q0CP UP	Q0CP Reserve	Free SOH	Alt FSOH	P. GAP
RP4959	130554	RESIN	39,740	23,360	12,474	10,887	-	28,853
RP0839	130498	RESIN	20,648	6,765	8,681	-	-	20,648
FB6040	129682	EXTENDERS	19,536	271	-	271	-	19,265
ZC0032	2134796	PM	13,262	5,452	-	5,452	-	7,810
RE1626	130412	RESIN	12,709	5,834	-	5,834	-	6,875
RP3412	130516	RESIN	11,557	11,665	4,625	7,040	-	4,517
RE2810	130420	RESIN	12,709	8,459	-	8,459	-	4,250
RP4966	133589	RESIN	4,227	219	-	219	-	4,008
FB0878	129672	EXTENDERS	8,512	5,052	371	4,681	-	3,831
RE3523	130425	RESIN	3,247	-	-	-	-	3,247