

PBT Introduction

- ***1. Factory Outline***
- ***2. Development of CCP's PBT***
- ***3. PBT Process***
- ***4. Quality Assurance Introduction***
- ***5. Waste Management & EMS***
(Environmental Management System)
- ***6. Health and Safety Management***

Factory Outline

Factory History

- ❖ **Kaohsiung factory was established in 1972, located in the Jen-Wu Industries District of Kaohsiung county.**
- ❖ **Factory Area: 38,360 m².**
- ❖ **Employee: 270 persons.**

Regional Distribution of CCP Group

Taipei City
Chang Chun Head Office
Dairen, Chang Chiang, Tsu-Kong
Ji Lin Chemical
Sumitomo Batelite (Taiwan)
Rogers Chang Chun
Polyplastics Taiwan

Tai Hong Head Office

Triplex Chemical Corporation

CCP, Shin-Chu Factory, TOK(Taiwan)

Tai Hong Shin-Chu Factory

CCPC, Miao-Li Factory

Chang-Bin Industrial Zone

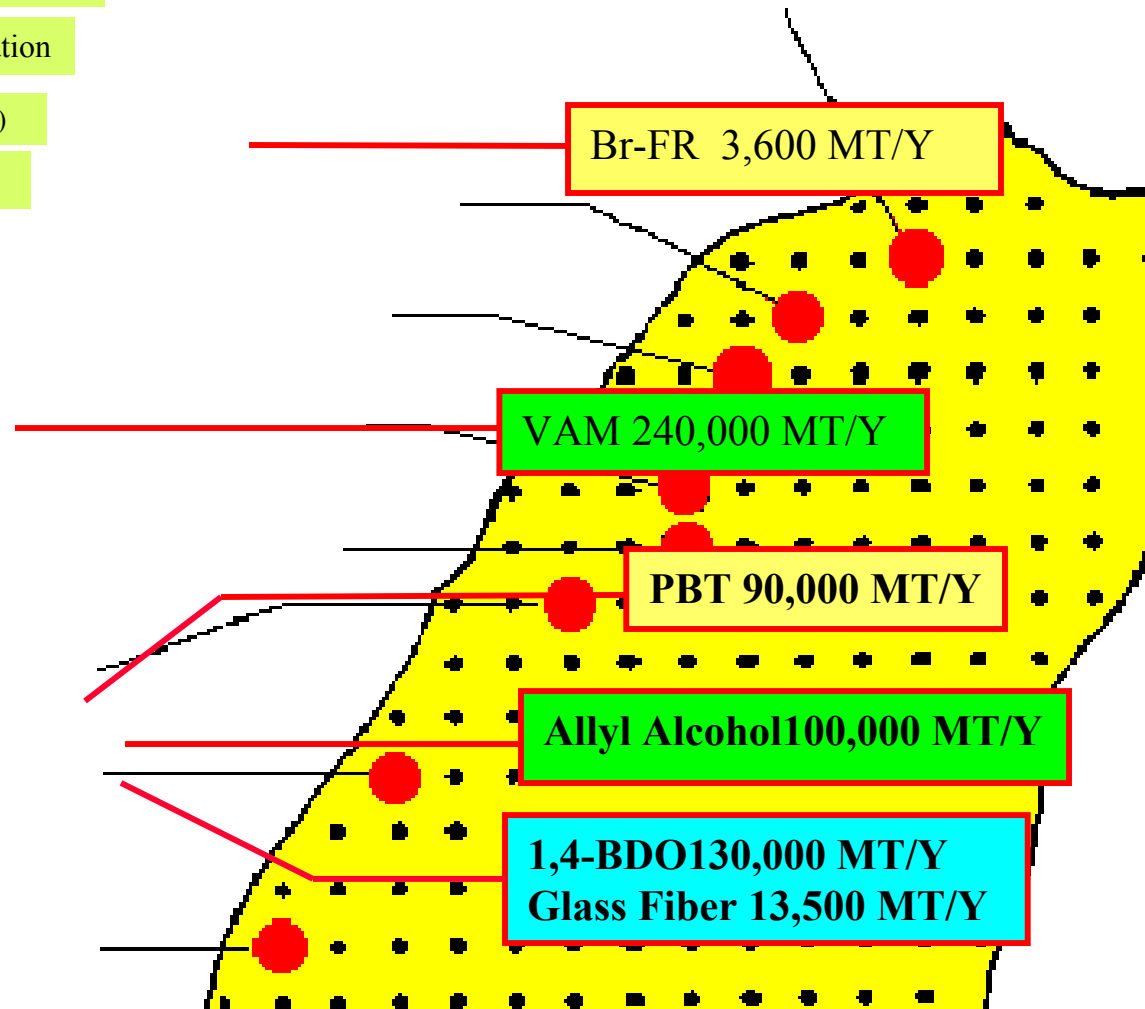
Mai-Liao Industrial Zone
(Plant Site For NC6)

CCP, Tai-Nan Office

Kaohsiung City

CCP, Kaohsiung Factory
Dairen, Kaohsiung Factory

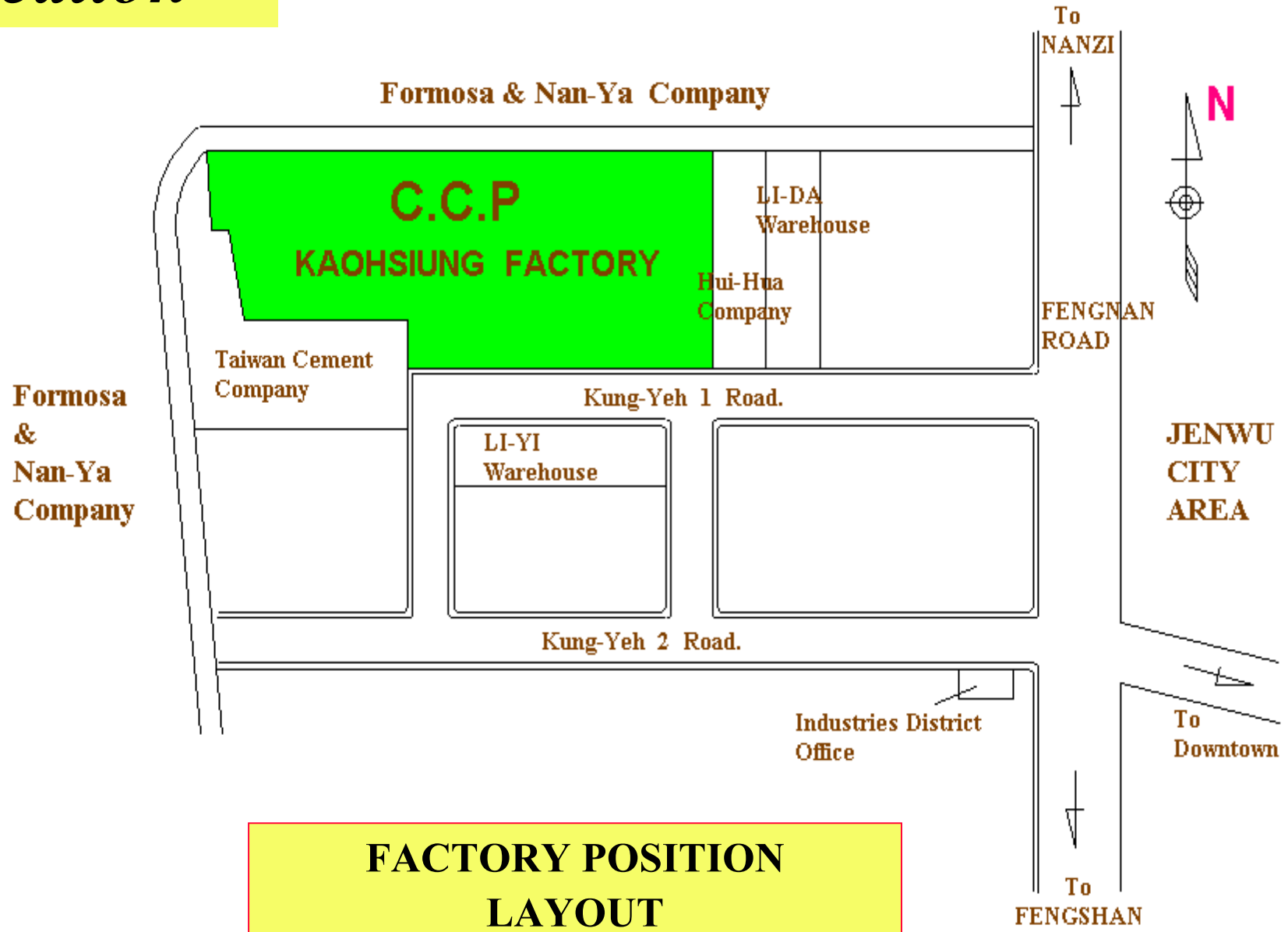
CCP & Dairen Ta-Fa Factory
Polyplastics Taiwan Factory



Location of Taiwan

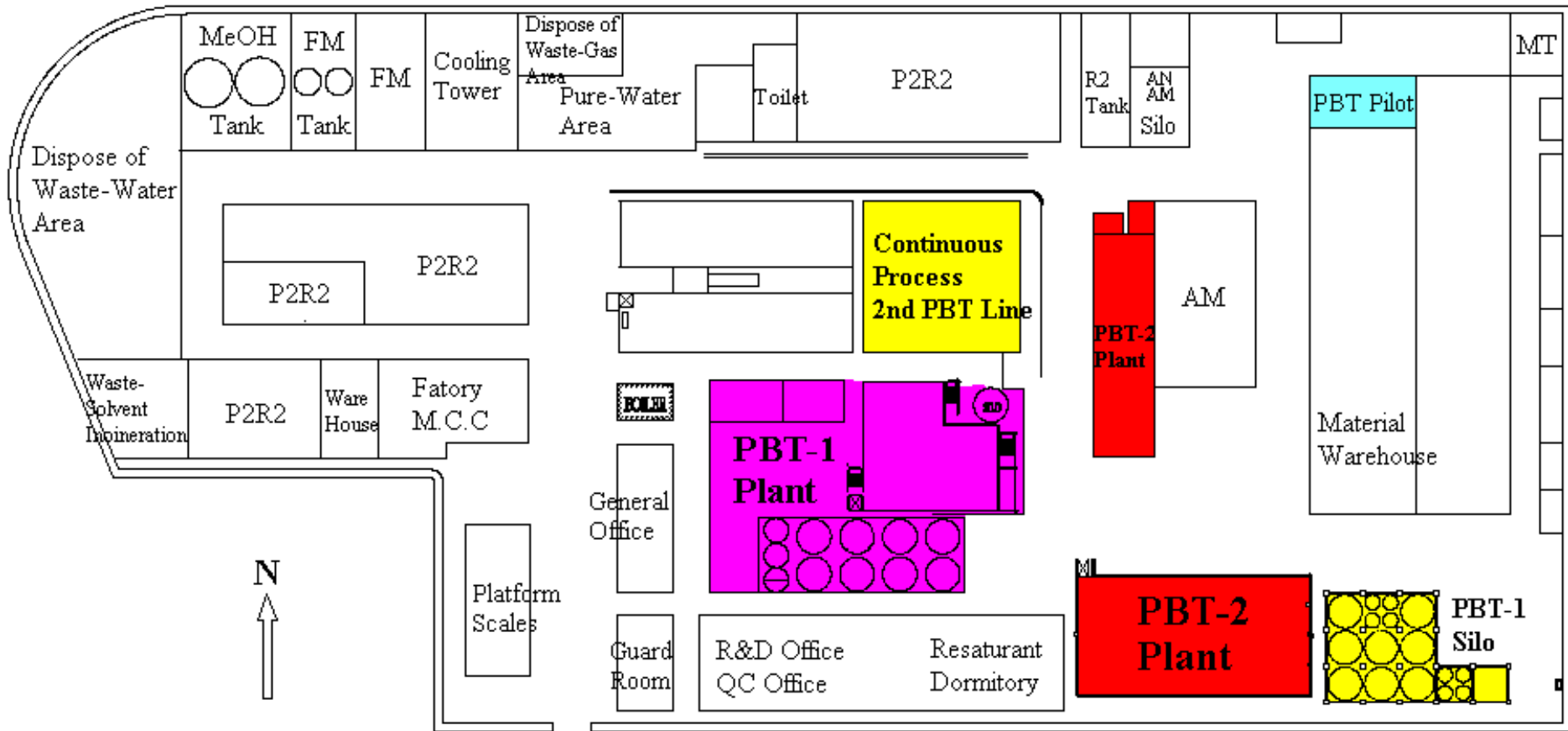


Location



FACTORY POSITION LAYOUT

Layout

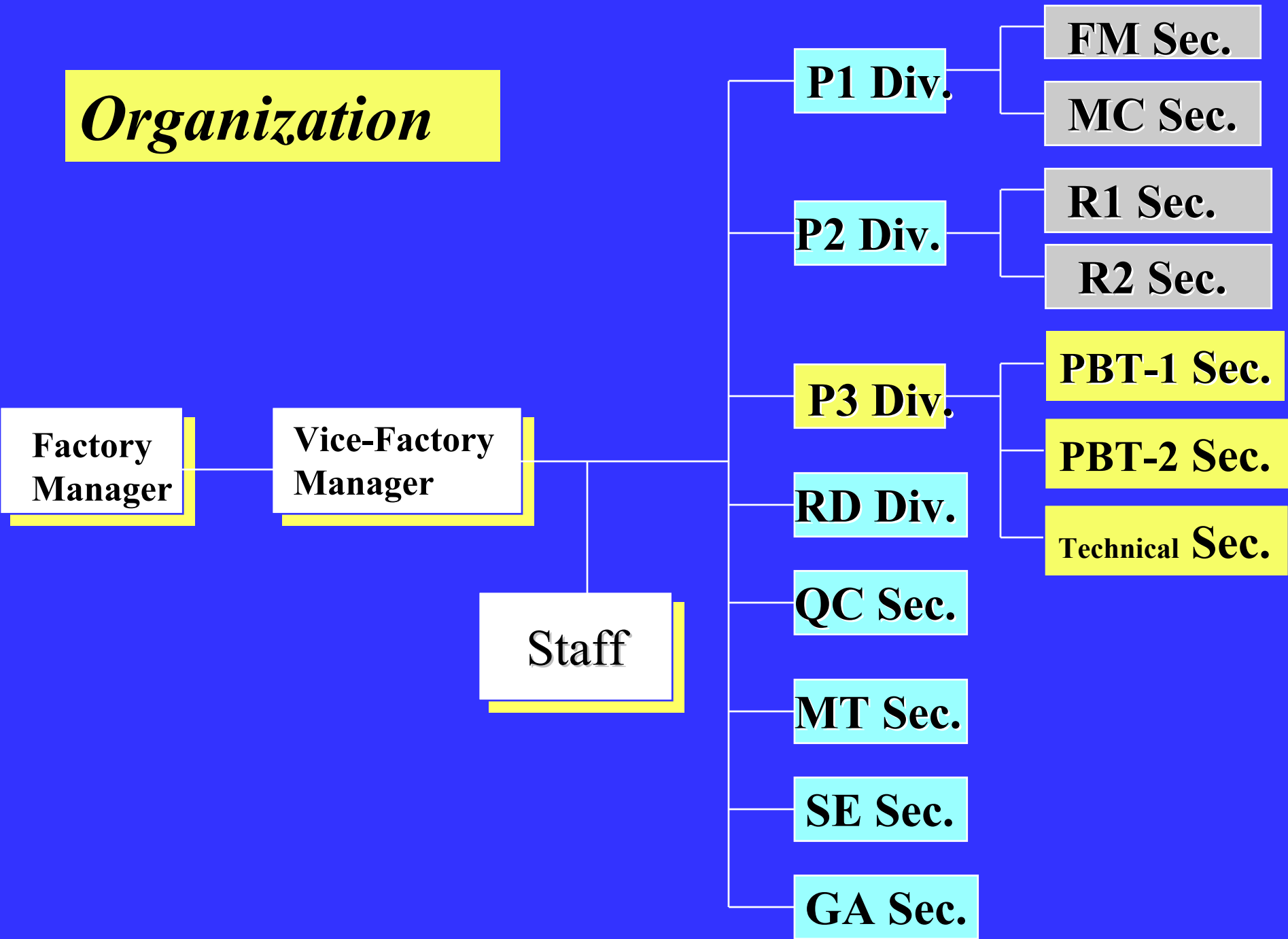


**CHANG-CHUNG Plastics Co., LTD.
KAOHSINUG FACTORY LAYOUT**

Main Products

- **PBT Resin**
- **PBT Compound**
- **Melamine Resin Molding Compound**
- **Urea Resin Molding Compound**
- **Melamine Resin Adhesive**
- **Urea Resin Adhesive**
- **Methylated amino Resin**
- **Polyester Resin for Powder Coating**
- **Furan Resin**
- **Amino Resin**
- **Paper Resin**
- **Polyester Plasticizer**
- **Epoxy diluent agent**
- **Epoxy Resin**
- **Textile Resin**
- **Acrylamide**
- **Mold Cleaner**
- **Formaldehyde**

Organization



Development of CCP's PBT

Major Developments of CCP's PBT

- ❑ 1971 : Kaoshiung factory built
- ❑ 1984 : **PBT bench scale test started**
- ❑ 1986 : Dairen Chemical started 1,4-BDO bench scale test
- ❑ 1987 : **PBT plant was under construction**
- ❑ 1988 : **PBT plant completed (resin 3,600MT/Y and compound 7,500MT/Y)**
- ❑ 1996 : **2nd line of PBT completed (resin 3,600MT/Y and compound 7,500MT/Y)**
- ❑ 1998 : **continuous process of PBT resin completed (30,000MT/Y)**

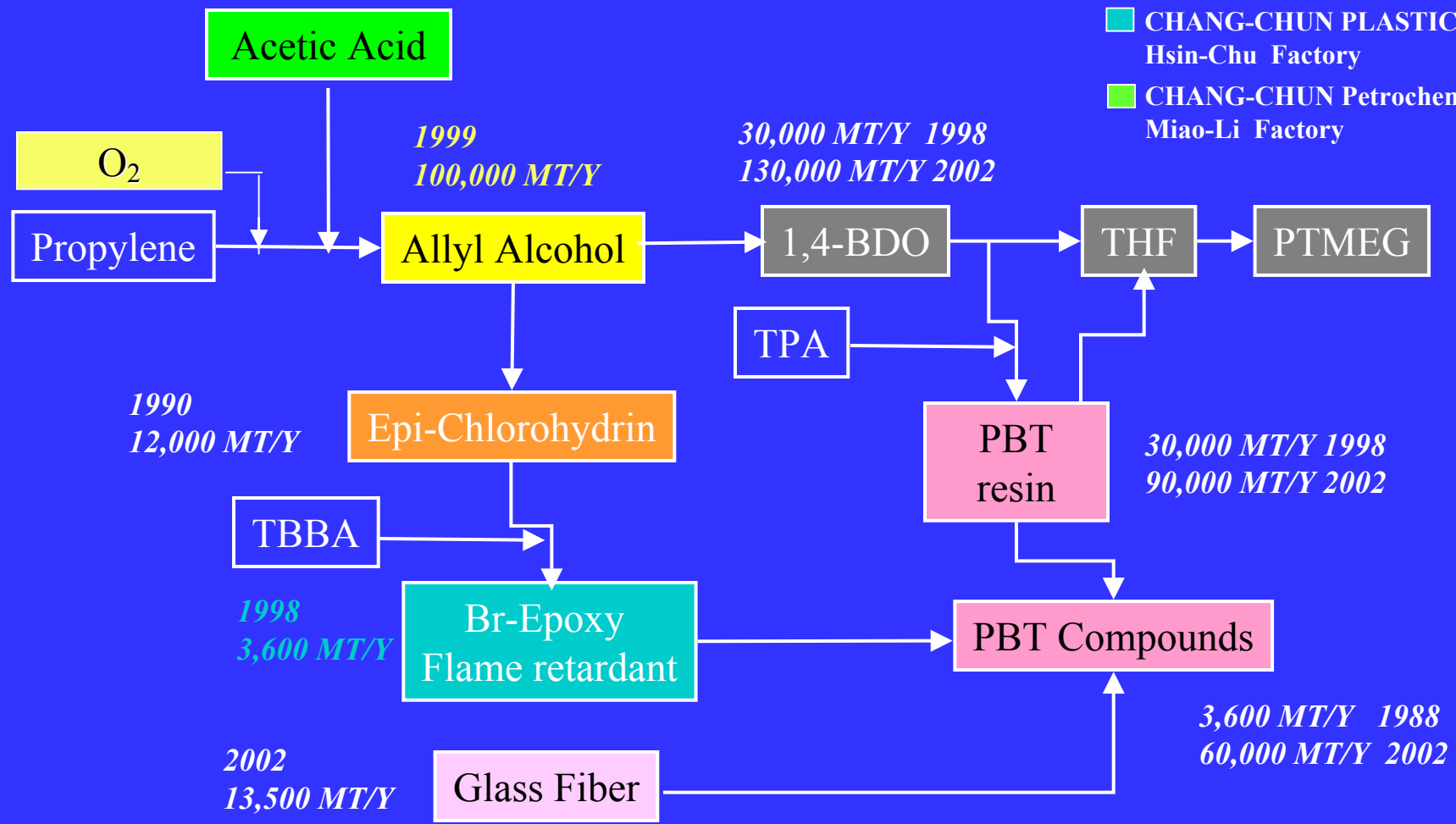
Major Developments of CCP's PBT

- ❑ **1998 : Dairen Chemical 1,4-Butanediol plant completed (30,000MT/Y)**
Brominated epoxy flame retardant at Hsin-Chu factory was completed (3,600MT/Y)
- ❑ **1999 : Dairen Chemical Allyl alcohol plant completed (100,000MT/Y)**
- ❑ **2000 : 3rd line of PBT compound completed (15,000MT/Y)**
- ❑ **2002 : 2nd continuous process of PBT resin will be completed (60,000MT/Y)**
4th & 5th line of PBT compound will be completed (30,000MT/Y)
2nd 1,4-Butanediol plant was completed in August, 2002 (100,000MT/Y)
Glass fiber plant at Ta-Fa is completed in September, 2002 (13,500MT/Y)

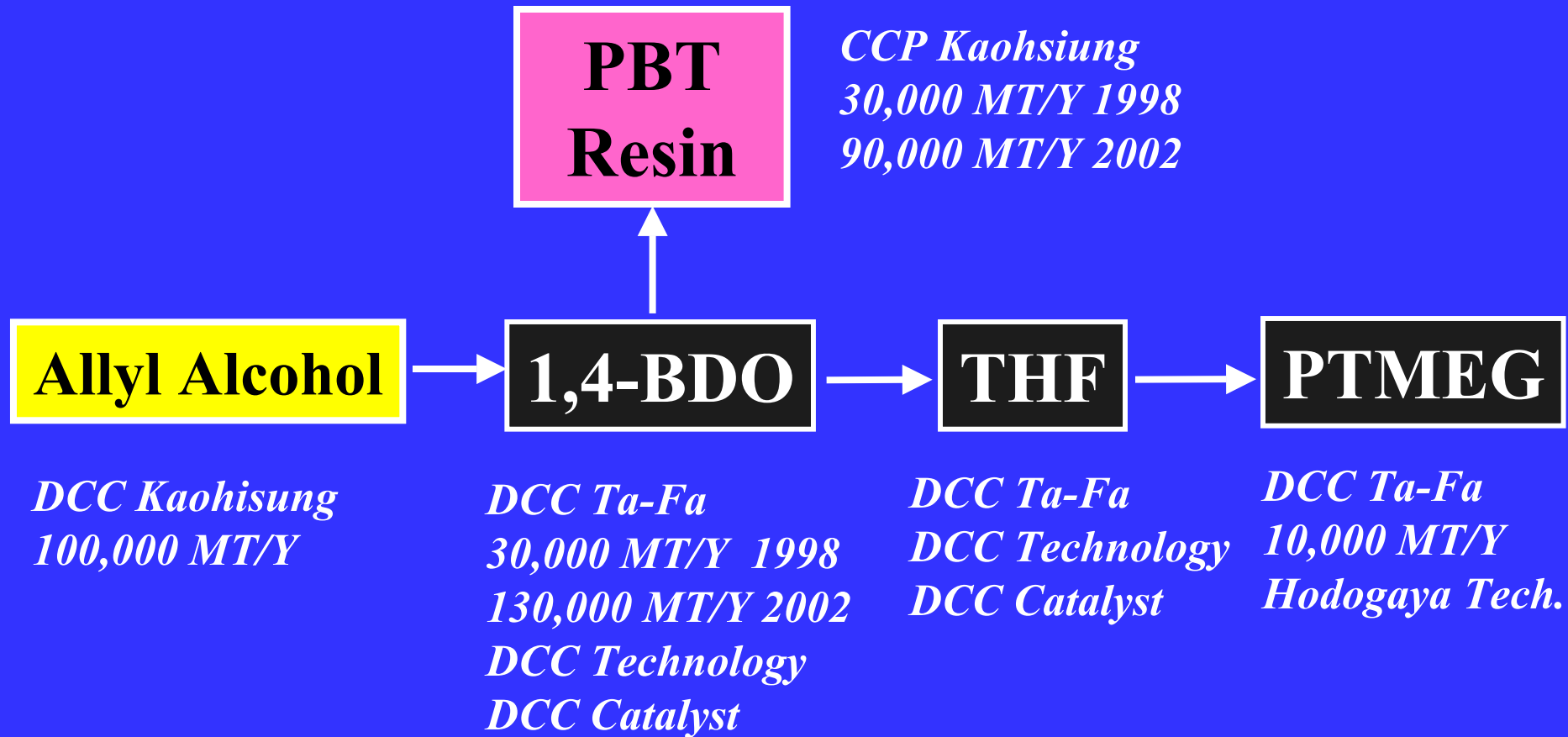
Related Product Flow Chart of PBT

- DCC ,Kaohsiung Factory
- DCC ,Ta-Fa Factory
- TRIPLEX CHEMICAL

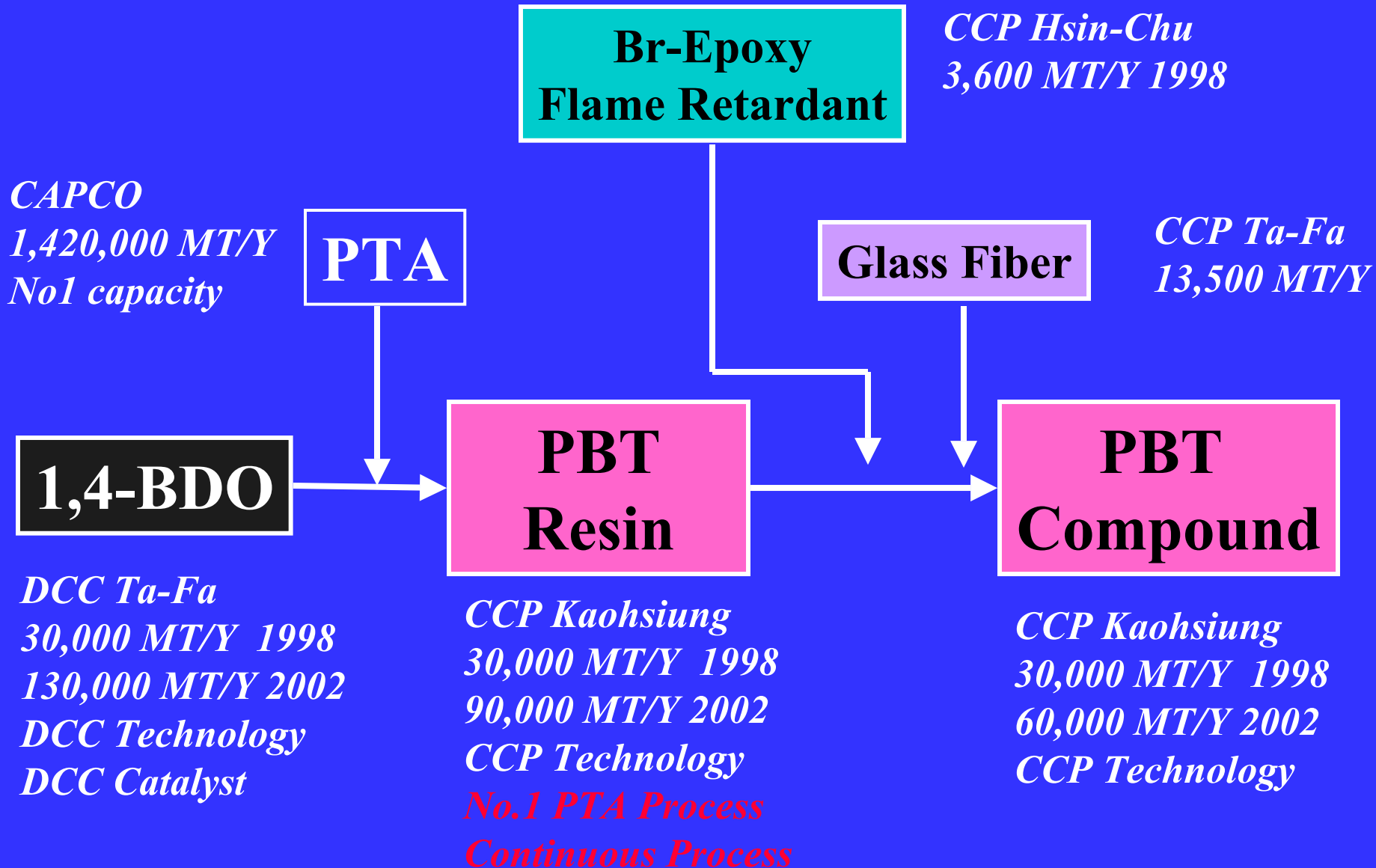
- CHANG-CHUN PLASTICS Ta-Fa Factory
- CHANG-CHUN PLASTICS Kaohsiung Factory
- CHANG-CHUN PLASTICS Hsin-Chu Factory
- CHANG-CHUN Petrochemical Miao-Li Factory



Development of 1,4-BDO



Development of PBT



Characteristics

- 1. Good flow ability*
- 2. Low static*
- 3. Good bonding strength*
- 4. Good strand integrity*
- 5. Low fuzz*
- 6. Excellent workability and properties*
- 7. Good dispersion in extruding*

Application

1. Reinforce of Plastics

PBT, PET, PA-6, PA-66,

ABS, PS, POM, LCP

2. Reinforce of Composite Material

SMC, BMC

3. Advantage of End Product in Electrical, Electronic and Automobile

**excellent durability*

**high mechanical properties*

Package

- *800 kg pallet with bottom discharge.*
- *25 kg paper bags with PE-lined.*

Co-Generation Plant at Ta-Fa Factory



PBT Capacity

	PBT Resins			PBT Compounds	
	Capacity	Start-up	Process	Capacity	Start-up
	3,600 MT/Y	1988	Batch	7,500 MT/Y	1988
	3,600 MT/Y	1996		7,500 MT/Y	1996
	30,000 MT/Y	1998	Continuous	15,000 MT/Y	2000
	60,000 MT/Y	2002		15,000 MT/Y	2002
				15,000 MT/Y	2002
Total	90,000 MT/Y	2002		60,000 MT/Y	2002

PBT Raw Materials Development (1)

	DCC Ta-Fa Factory		DCC Kaohiung Factory	
	1,4-Butanediol		Allyl Alcohol	
	Capacity	Start-up	Capacity	Start-up
	30,000 MT/Y	1998	100,000 MT/Y	1999
	100,000 MT/Y	2002		
Total	130,000 MT/Y	2002	100,000 MT/Y	

PBT Raw Materials Development (2)

	CCP Hsin-Chu Factory		CCP Ta-Fa Factory	
	Br-Epoxy Flame Retardant		Glass Fiber	
	Capacity	Start-up	Capacity	Start-up
	3,600 MT/Y	1998	13,500 MT/Y	2002
Total	3,600 MT/Y		13,500 MT/Y	

PBT Resin Advantages

- *Wide varieties of PBT from same plant
(including super low and super high viscosity grade)*
- *Backward integration of raw material*
- *Own developed technology*
- *Innovation R&D*
- *Captive use for PBT compound*

DMT/PTA

BDO

Catalyst

Paste Preparation

Esterification

Pre-Poly

Finisher

Polymer Filter

Pelletization

**PBT Chips
(low I.V.)**

***CP Plant
Flow Chart***



**PBT Chips
from CP Plant**



Dryer



Crystalizer



**Solid State
Polycondensation**



Screening & Cooling



PBT Chips (high I.V.)

***SSP Plant
Flow Chart***

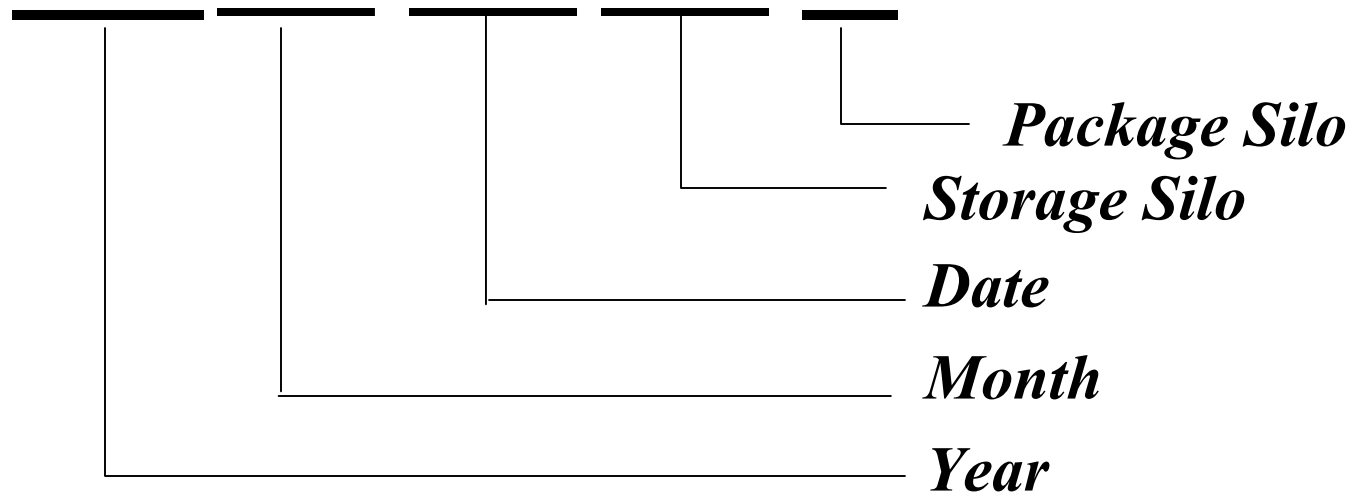
PBT Chip Package

- ✉ **850 KG PP Super Sack (moisture \leq 2000ppm)**
- ✉ **850 KG Aluminum foil laminate Super Sack (moisture \leq 500ppm)**
- ✉ **25 KG Paper Bag (moisture \leq 2000ppm)**
- ✉ **25KG Aluminum foil laminate Paper Bag (moisture \leq 500ppm)**
- ✉ **Customer request**

LOT NO.

- ***Definition : (Lot \leq 50 MT)***

0202280FJ



IT'S PACKAGE DATE, NOT PRODUCTION DATE

PBT Label (850kg)

CCP
LONGLITE PBT

GRADE

1100-211M

NET WT.

850 KGS

GROSS WT.

854 KGS

LOT NO.

0202280FJ

Serial No

011

QA

PBT Label (25 kg)

長  春

P B T

聚丁烯對苯二甲酸酯

GRADE : 1100
COLOR : 211M
LOT NO : 0202280FJ
NET.WT : 25 KGS

長春人造樹脂廠股份有限公司
高雄縣仁武鄉仁武村工業一路 14 號

PBT Compounds Flow Chart



Production Flow Chart of PBT Compound (2)

Production				Quality Item	Assurance	
No.	Sign	Flow Chart	Measurement Devices		PBT2	QC
	○	Blending			○	
	◆	QC Analysis	Analysis Devices	MI、Ash、Sp.Gr.、TS、 TE、FS、FM、Izod		○
	○	Package	Scale Automatic Packaging Machine	Weight	○	
	○	Sale		Analysis Report		○
	○	End				

Definition

P B T 4 1 30 - 104 F C

series

- 1.resin
- 2.flame retardant
- 3.reinforced
- 4.refinforced
flame retardant
- 5.non-halogen
- 6.low warpage

color

GFS content

15 = 15%

20 = 20%

30 = 30%

40 = 40%

94 V-0:

1:thickness=0.8mm

6:thickness=1.6mm

8:thickness=3.0mm

Lot. No Definition for PBT compounds:

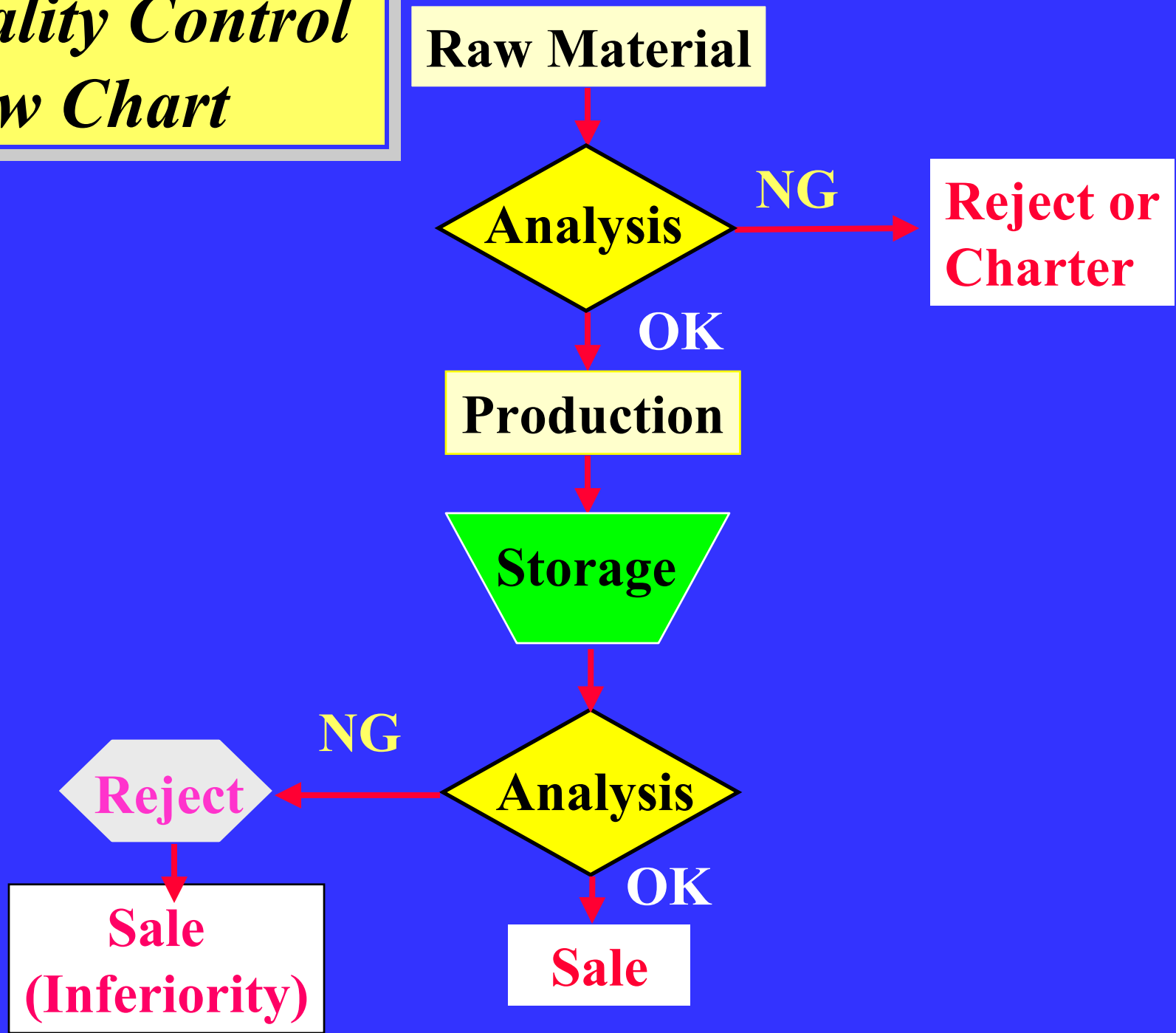
0 2 0 2 2 8 A 0 1
| | | |
Year **Month** **Date** **Mark**

Line : A=A line
 B=B line
 C=C line

Introduction for QC section

- *Raw material analysis & quality control*
- *Process analysis for PBT*
- *Final products analysis & quality assurance*
- *Planning & execution for ISO*

Quality Control Flow Chart



Quality Analysis of PBT Resin

Frequency /8 hr

- ❑ **I.V. (o-chlorophenol @35°C)**
- ❑ **COOH-end group (Titration)**

Frequency /3 MT

- ❖ **Color L、a、b (Colormeter)**
- ❖ **MeltFlow Index (235°C @2.16kg，ASTM D1238)**

Frequency /month /major grade or customer request

- **Specific Gravity (ASTM D792)**
- **Tensile Strength (ASTM D638)**
- **Elongation(ASTM D638)**
- **Izod Impact Strength(ASTM D256)**
- **MeltingPoint(DSC，10°C/min)**
- **Molecular Weight Distribution(GPC)**
- **Oligomer (Extraction)**
- **THF (Head Space GC 80°C @1hr)**

Quality Analysis of PBT Compounds

Frequency /Lot

- ❑ **Melt Flow Index (250°C @2.16kg , ASTM D1238)**
- ❑ **Ash (CCP method)**
- ❑ **Specific Gravity (ASTM D792)**
- ❑ **Tensile Strength (ASTM D638)**
- ❑ **Elongation (ASTM D638)**
- ❑ **Flexural Strength (ASTM D790)**
- ❑ **Flexural Modulus (ASTM D790)**
- ❑ **Izod Impact Strength (ASTM D256)**

Frequency /month /major grade or customer request

- ❖ **Volume/Surface Resistivity(ASTM D257)**
- ❖ **Dielectric Strength (ASTM D149)**
- ❖ **Shrinkage (ASTM D955)**
- ❖ **Gas content (CCP method)**



Certificate of UL

 *Certificate of UL on Apr 1991*

 *UL File No.: E59481*

Yellow Card of UL

QMFZ2

October 12, 2000

Plastics - Component

CHANG CHUN PLASTICS CO LTD

E59481

Material Dsg	color	Min thk mm	Flame Class	H W	H A	Elec.	RTI (°C)		H	D	C
							Imp	Mech Str	V	4	
PBT-1100	All	0.75	HB	3	0	75	75	75	-	-	-
		1.5	HB	3	0	75	75	75	-	-	-
		3.0	HB	2	0	75	75	75	0	6	2
PBT-1200	All	0.75	HB	3	0	75	75	75	-	-	-
		1.5	HB	3	0	75	75	75	-	-	-
		3.0	HB	2	0	75	75	75	0	5	2
PBT-4115(a)	All	0.75	V-0	4	0	120	120	140	-	-	-
		1.5	V-0	3	1	120	120	140	-	-	-
		3.0	V-0	1	0	120	120	140	1	6	3
PBT-4130(a)	All	0.74	V-0	4	0	120	120	140	-	-	-
		1.5	V-0	3	0	120	120	140	-	-	-
		3.0	V-0	2	0	120	120	140	4	7	2

5/10/2001

Underwriters Laboratories Inc.

Card 5 of 13

Certificate of ISO 9002

❖ *Kaohsiung factory promoted ISO 9000 (Quality system) in 1993, and got the first Certificate (PBT) on Jan. 1994. Then we continuously got the other products' Certificates, now 22 products passed this assessment.*

**Certificate of
ISO 9002,
from BSMI,
Taiwan**

QUALITY ASSURANCE
CERTIFICATE APPENDIX

BUREAU OF STANDARDS,
METROLOGY AND INSPECTION, (BSMI)
MINISTRY OF ECONOMIC AFFAIRS
TAIWAN, R.O.C.

Name of Firm : CHANG CHUN PLASTICS CO., LTD.
 : KAHSIUNG FACTORY

Address : NO. 14, KUNG YEH 1 ROAD, JEN-WU INDUSTRIES
 : DISTRICT, KAHSIUNG, TAIWAN, R.O.C.

Certificate No: TNEY007-06

Originally registered : 1st February 1994

Valid until : 1st October 2002 Page: 1 of 3

Scope of Registration:

The production of:

PBT (POLYBUTYLENE TEREPHTHALATE)
MELAMINE MOLDING COMPOUNDS
FORMALDEHYDE
UREA RESINS ADHESIVES
MELAMINE RESINS ADHESIVES
UREA MOLDING COMPOUNDS
OTHER SYNTHETIC RESINS :

(Continued)

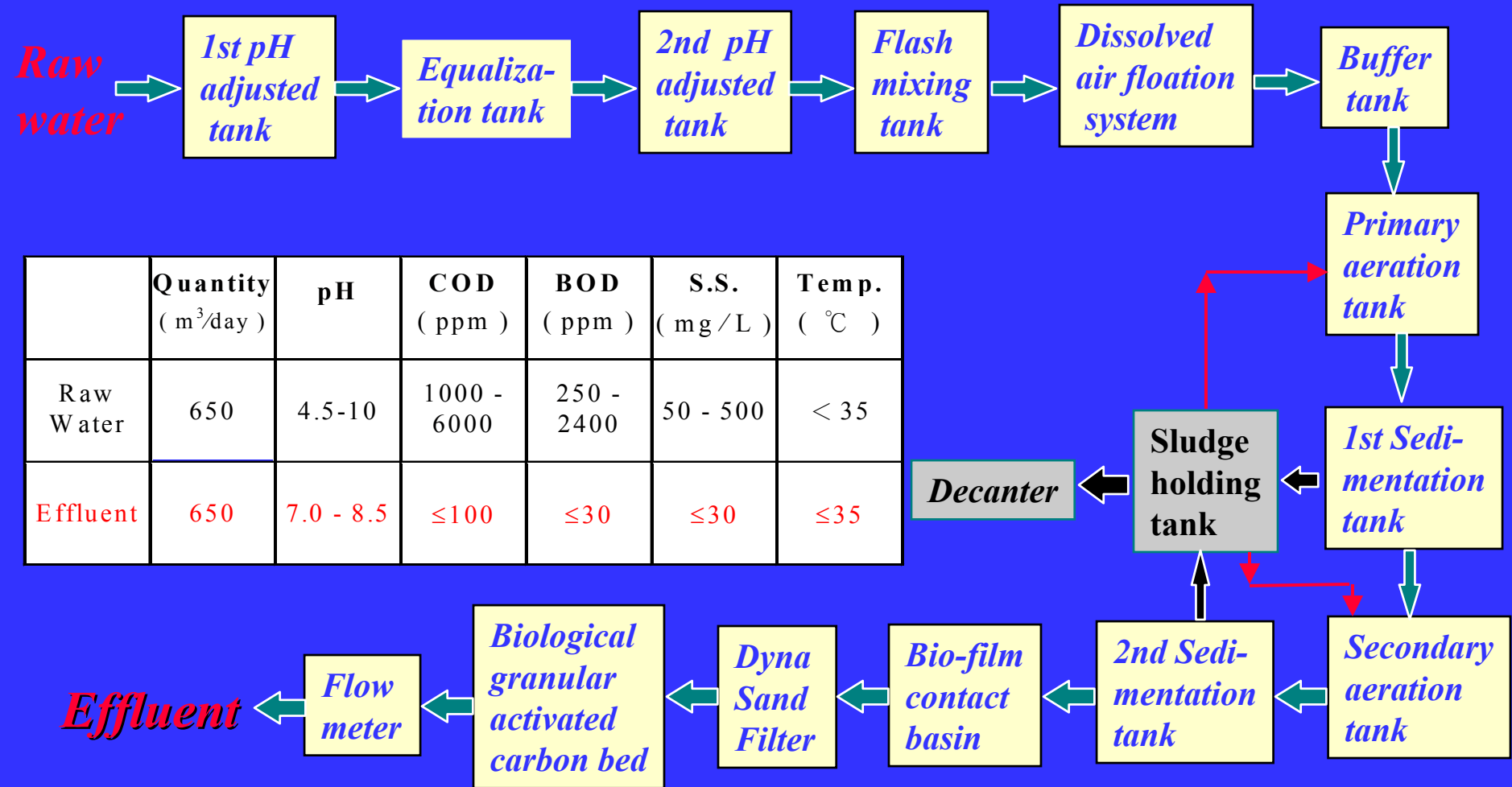
Chen Jao Chen

Director General

Date 1st October 1998



Waste water treatment



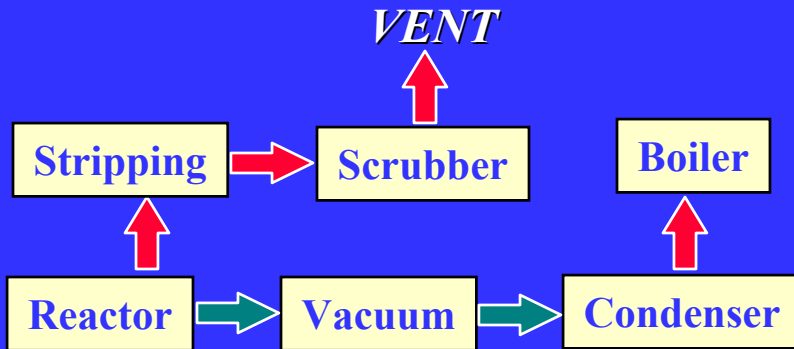
	Quantity (m ³ /day)	pH	COD (ppm)	BOD (ppm)	S.S. (mg / L)	Temp. (° C)
Raw Water	650	4.5-10	1000 - 6000	250 - 2400	50 - 500	< 35
Effluent	650	7.0 - 8.5	≤100	≤30	≤30	≤35

Waste water treatment plant



Air emission treatment

1. PBT Process :



2. Stack of boiler

	Standard	Detect value
Dust	314 mg/Nm ³	81 mg/Nm ³
SO _x	500 ppm	118 ppm
NO _x	250 ppm	152 ppm
CO	2000 ppm	32 ppm
VOC	150 ppm	14.5 ppm

The standard of emission :

	Standard	Detect value
VOC	150 ppm	140 ppm

Certificate of ISO 14001

- *We introduced ISO 14000 (EMS system) to our plant in 1996, and got the Certificate of ISO14001 on Oct.1996.*

Health and Safety Management

Health and Safety Management

- *Health and Safety (HS) Practice*
- *Health and Safety Executive(HSE) Organization*
- *Labor HS Committee*
- *Personal Protection Equipment Training*
- *Dangerous material Management*
- *Equipment Grounding*
- *Contractor Management*
- *Fire Fighting and Explosion Prevent*
- *Hot Work and Smoking Management*
- *Fire Protection Training*
- *Emergency Response Training*

.....**THE END**

THANKS

