詮達化學股份有限公司

CHANDA CHEMICAL CORP.

Devin Yen

公　　司　　簡　　介

Introduction of CHANDA

酯化產品的專家

An Expert of Esterification

Polyester Polyol, Ester-Ether Copolyol, Plasticizers, Di/Tri-amines Prepolymers, Polyurea….

誠信、品質、創新

Integrity Quality Innovation

A (PM)² COMPANY

Product Management x Product Marketing

Our International Business Partners:

- We provide our excellence products and solution to many famous international PU manufacturers.

公　　司　　簡　　介

Introduction of CHANDA

- 產能 **Capacity:**

  Synthetic Resin: 1,200MT/ Per Month

  Blending: 550MT/Per Month (OEM for GE TW)

- 創立 **Established: 2004**

- 資本額 **Capital: NT$100,500,000**

- 認證 **Certifications: ISO 9001/14001, OHSAS 18001, NSF**

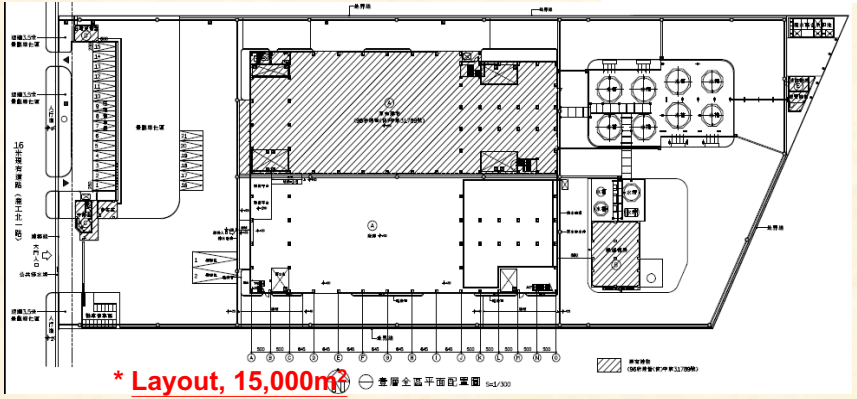
HQ Address:
F7, No.288, MingSheng W. Rd,
Taipei, Taiwan
Employees: 5

Factory Address:
No10, LuGong N1st. Road.
LuGang Town,
ZhangHua Coastal Industrial Park
Employees: 27

公　司　設　施

Main Equipments of CHANDA

* Advanced Analysis Equipments

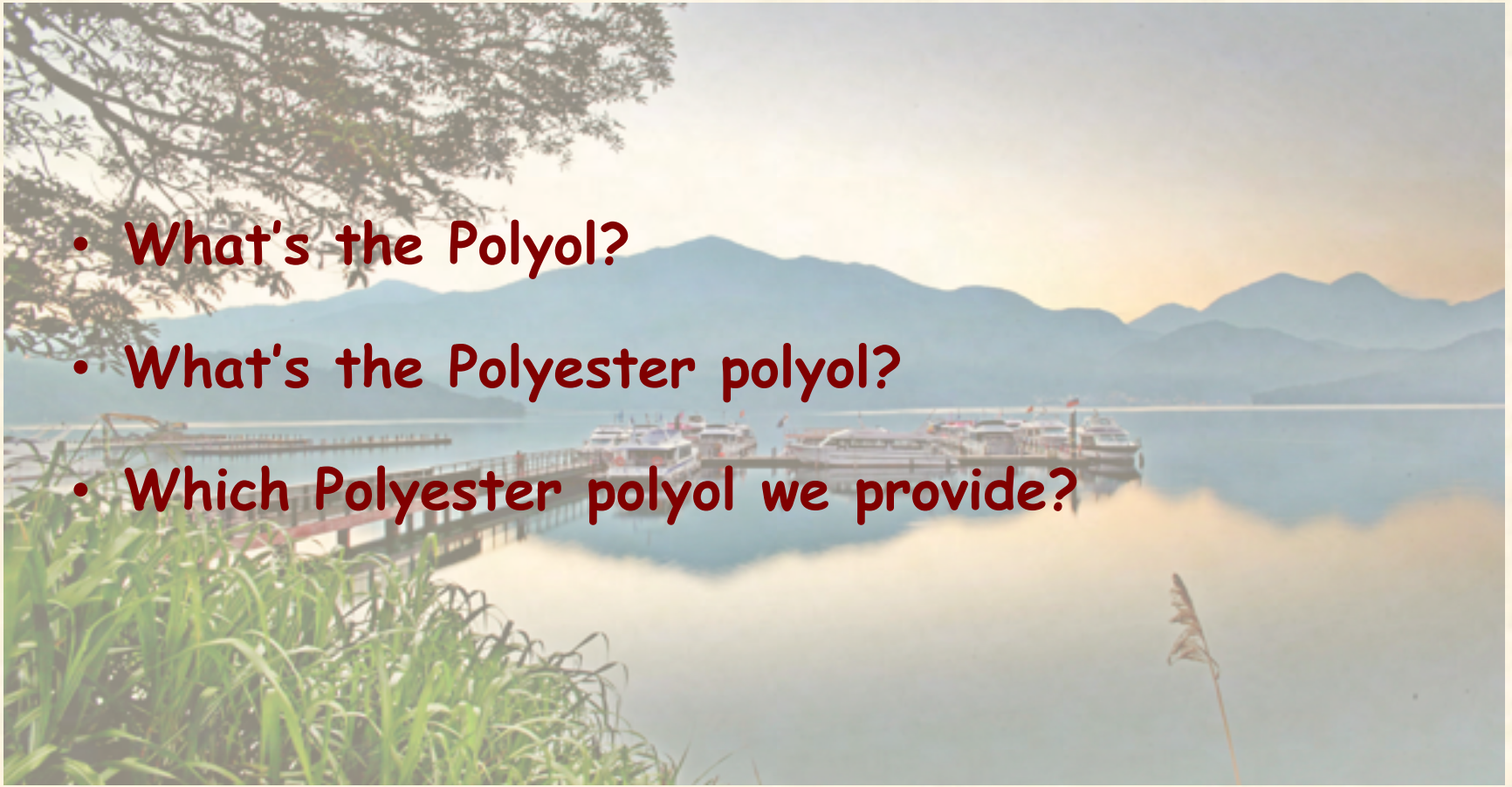


* Layout, 15,000m²

Chanda's Products

- Hi-Tech Polyester Polyol
- Ester-Ether Copolyol
- Di/Tri Amines Prepolymer
- Polyurea (in Developing)

• Hi-Tech Polyester Polyol



- What's the Polyol?
- What's the Polyester polyol?
- Which Polyester polyol we provide?

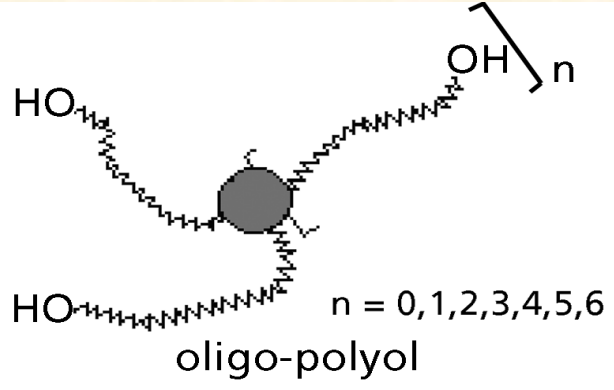
What is the Polyol?

- Polyester Polyol
- Polyether Polyol
- Others,

$$OH\,\# \frac{f \bullet 56100}{M_n} \Rightarrow M_n = \frac{f \bullet 56100}{OH\,\#}$$

OH value = ?mg KOH/g sample
KOH=56.1

Table 3.1 The oligo-polyols MW values function of the functionality (f)	
Oligo-polyol type	MW value
Diols (f = 2)	112200/OH#
Triols (f = 3)	168300/OH#
Tetraols (f = 4)	224400/OH#
Hexols (f = 6)	336600/OH#
Octols (f = 7)	448800/OH#



where:

= a chemical organic structure, aliphatic, cycloaliphatic, aromatic, heterocyclic etc.

= oligomeric chain (polyether chain, polyester chain, polyhydrocarbon chain, polysiloxane chain etc.)

OH = terminal hydroxyl group

n = the number of chains derived from one hydroxyl group

f = n + 2 (the total number of hydroxyl groups/mol=functionality)

What's Polyester Polyol?

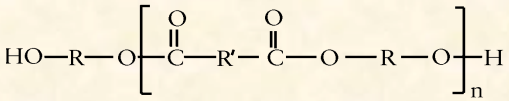


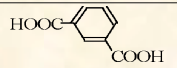
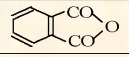
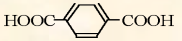
Table 8.1 The most important diols and triols used for polyester polyol synthesis

No.	Polyol	Formula	MW, daltons	Hydroxyl number, mg KOH/g
Diols				
1	Ethyleneglycol (EG)	$HOCH_2CH_2OH$	62.07	1807.6
2	Diethyleneglycol (DEG)	$(HOCH_2CH_2)_2O$	106.12	1057.2
3	1,2 Propyleneglycol (PG)	$HOCH_2CH(CH_3)OH$	76.10	1474.3
4	1,4 Butanediol (BD)	$HO–(CH_2)_4–OH$	90.12	1245.0
5	Neopentyl glycol (NPG)	$(CH_3)_2C(CH_2OH)_2$	104.0	1078.8
6	1,6 Hexanediol (HD)	$HO–(CH_2)_6–OH$	118.18	949.3
Triols				
1	Glycerol	$(HOCH_2)_2CHOH$	92.10	1827.3
2	Trimethylolpropane (TMP)	$(HOCH_2)_3CCH_2CH_3$	122	1379.5

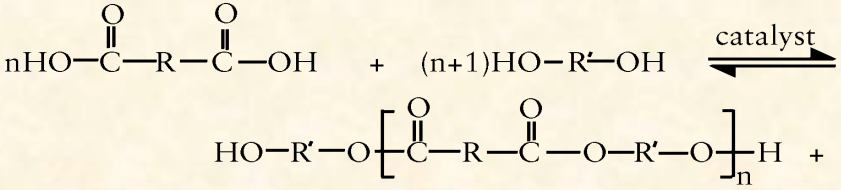
Table 8.2 Aliphatic dicarboxylic acids used for polyester polyol synthesis

No.	Dicarboxylic acid	Formula	MW, daltons	Acid number, mg KOH/g
1	Adipic acid (AA)	$HOOC(CH_2)_4COOH$	146.14	767.78
2	Glutaric acid	$HOOC(CH_2)_3COOH$	132.12	849.2
3	Succinic acid	$HOOC(CH_2)_2COOH$	118.09	950.1
4	Sebacic acid	$HOOC(CH_2)_8COOH$	202.0	555.4
4	Azelaic acid	$HOOC(CH_2)_7COOH$	186.0	603.2

Table 8.3 Aromatic dicarboxylic acids and derivatives used for polyester polyol synthesis

No.	Dicarboxylic acid	Formula	MW, daltons	Acid number, mg KOH/g
1	Isophthalic acid (IPA)		166.13	675.3
2	Phthalic anhydride		148.12	757.4
3	Terephthalic acid		166.13	675.3

(1)



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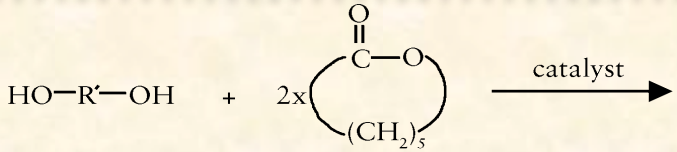

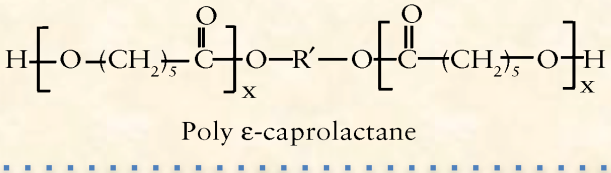

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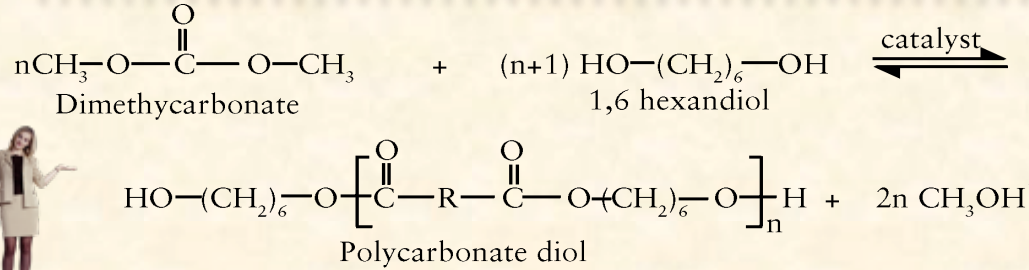
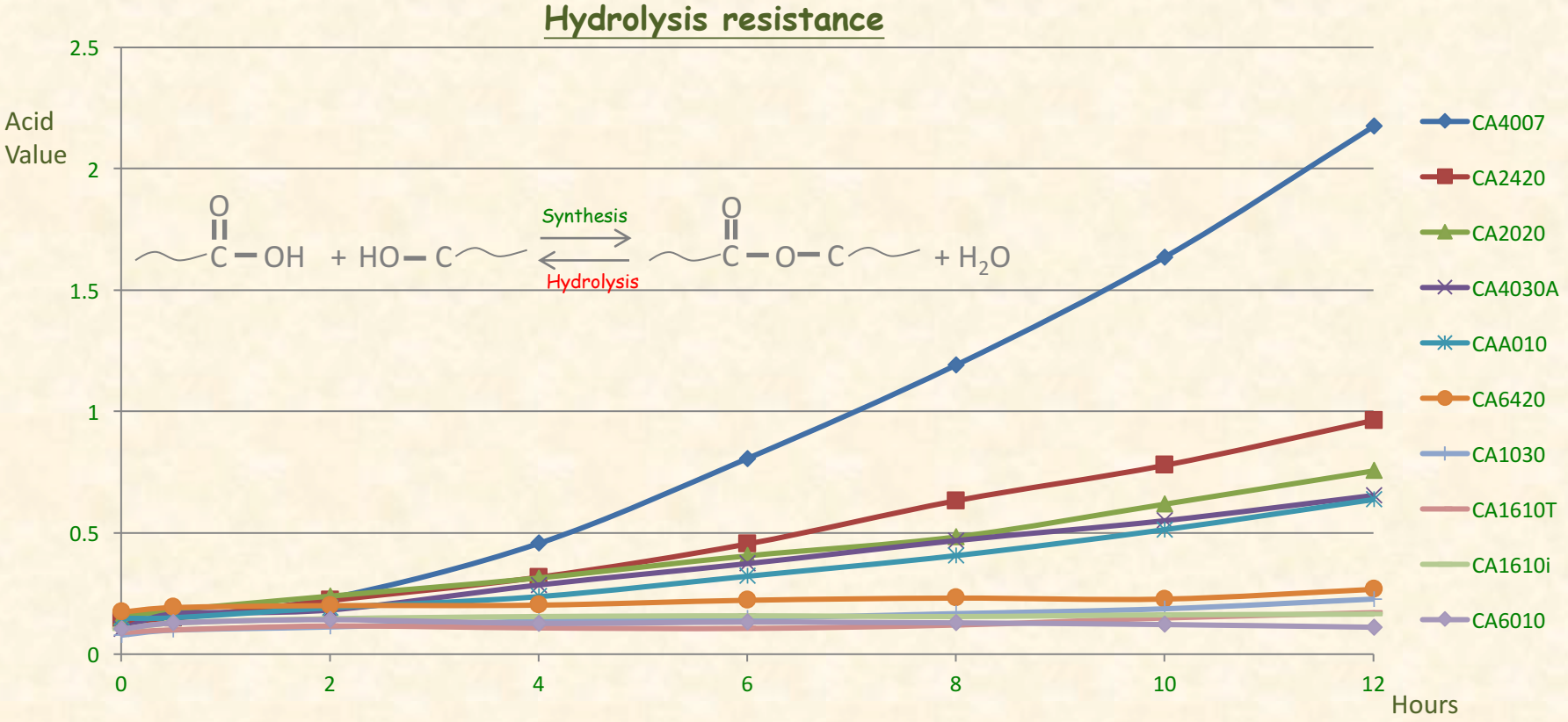


Which Polyester Polyol we provide?

(1) Quality Enhanced



Hot water degrade test within 12hrs @ 90˚C (10% Water +90% Polyol)

Which Polyester Polyol we provide?

(2) Design for The PU Applications: F C A S E

Foam

Rigid

CA2005P
CA5005P

CA1610i

T2205T

Semi-Rigid Foam Materials

CA6010

Flexible

Coating

CA16xx series
CA16xx-I series
Flexible package Ink

CA60xx series
CA30xx series
Solvent PU paint

Adhesive

CA4020
CA4030
PUD adhesive

CA4030
CA4040
PU - HMA

CA1035
CA1037D
PU - HMA Rapid PUR

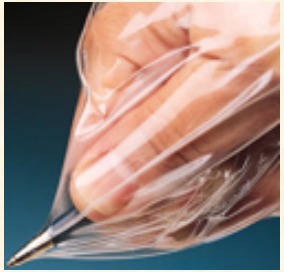
* And some new designs for Low Application Temperature PU HMA.

Sealant

No Suggestion

Elastomer

CA2410
CA2420
Injection Type

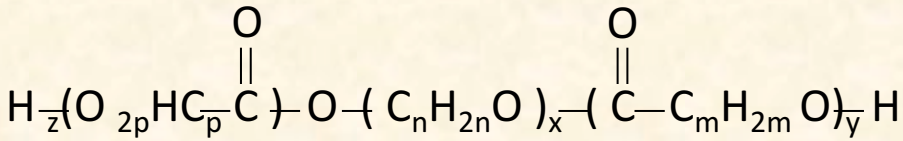


CA4010
CA4020
Film Type

• Ester-Ether Copolyol

What's the Ester-Ether copolyol?

(1) Chemical Structure:

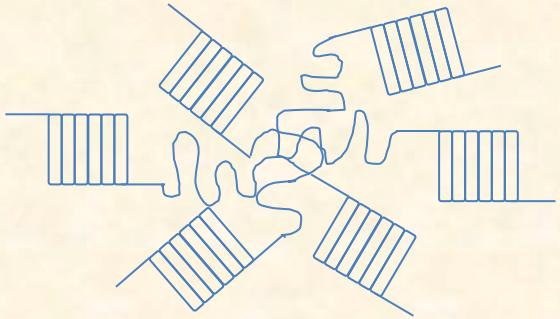


(2) Contents:

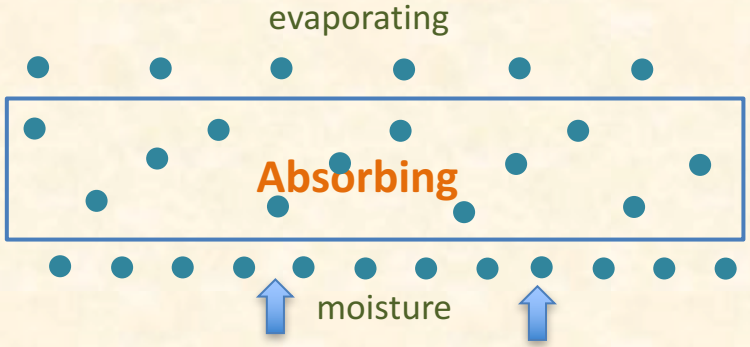
Core : Ether Prepolymer PEG/PPG/PTG, 2~3 Functions

Side Chains: Ester Prepolymer

(3) Crystalline + Amorphous



(4) Breathable

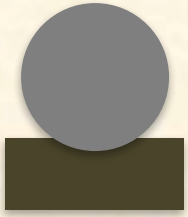


Why Ester-Ether copolyol?

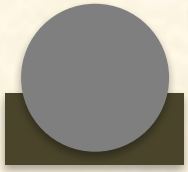
And design for the PU Foam:

Chanda

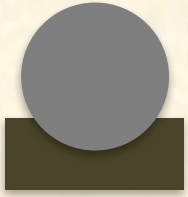
Dropping Ball



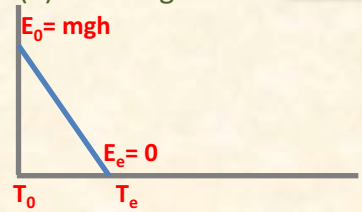
(1) Rigid Foam

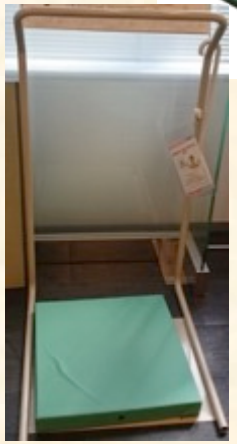


(2) Flexible Foam

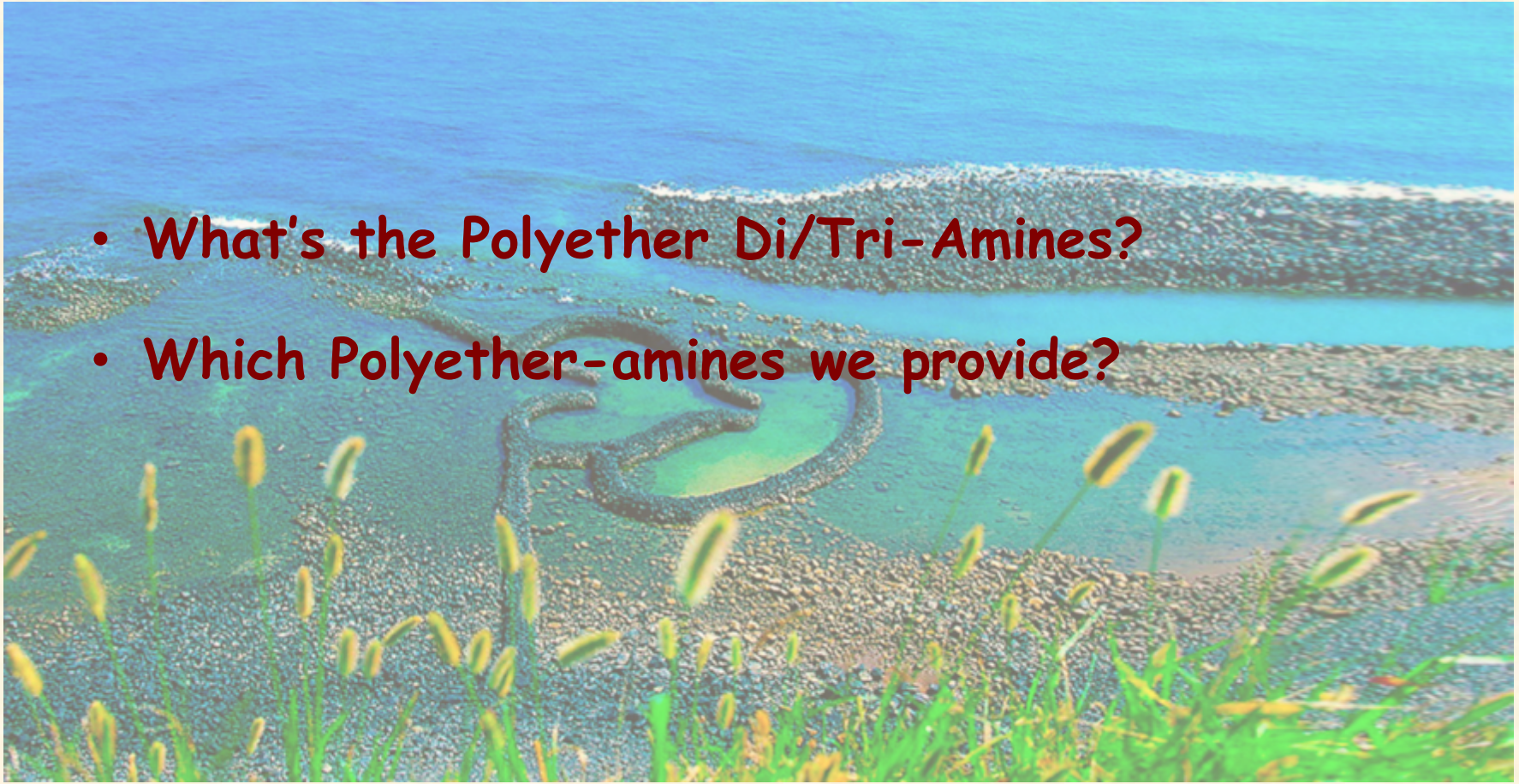


(3) Semi-Rigid Foam



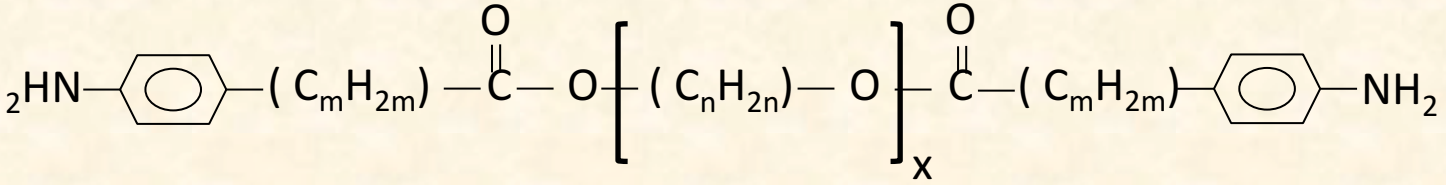


• Di/Tri Amines Prepolymer



What's the Polyether di/tri-amines?

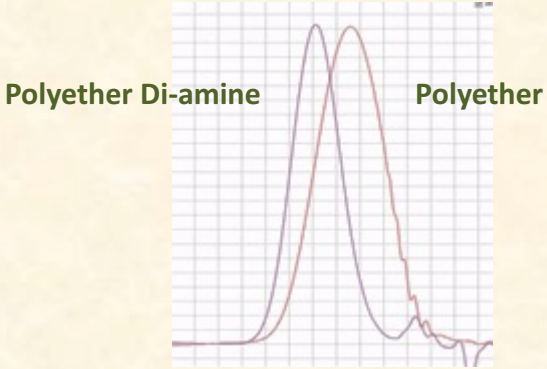
(1) Polyether Di-amine



(2) Polyether Tri-amine

If we used the tri-functional polyether in core, we can get polyether tri-amines.

1. One Component for PolyUrea Resin/Paint
2. One Component for Polyamide Resin/Plastic/Fiber
3. Curing agent for Epoxy resin



Which Polyether di/tri-amines we provide?

1. With PTG core, di-functional , Mw 250, 650, 1000, 2000
2. With PPG core, di/tri functional, Mw 300 ~ 5000

Products list

聚 酯 多 元 醇 產 品 表 列

Product List of Polyester Polyol

Crystal / Semi-Crystal Type

品名	Applications									Contents	Viscosity @ 80° C	Specfication			
	Coating		Adhesives			Elastomers						Hydroxyl	Acid	Mw	Color
	Ink	Paint	HMA	PUD	PUR	Pipe	Block	Roller	Wire			KOH mg/g	KOH mg/g	Ave.	Alpha,Max.
CA2420	✓	✓						✓	✓	AA+BDO+EG	400	56.1	<0.3	2,000	30
CA2430	✓	✓			✓			✓	✓	AA+BDO+EG	950	37.4	<0.3	3,000	30
CA4007	✓	✓					✓			AA+BDO	60	160.3	<0.3	700	30
CA4010	✓	✓				✓	✓	✓		AA+BDO	150	112.2	<0.3	1,000	30
CA4020				✓	✓	✓	✓	✓	✓	AA+BDO	550	56.1	<0.3	2,000	30
CA4030			✓	✓	✓					AA+BDO	1,200	37.4	<0.3	3,000	30
CA4040			✓	✓	✓					AA+BDO	2,500	28	<0.3	4,000	30
CA4050			✓	✓	✓					AA+BDO	6,000	22.4	<0.3	5,000	100
CA6440-N			✓	✓	✓					AA+BDO+MPO	1,800	28	<0.5	4,000	50
CA1030			✓	✓	✓					AA+HDO	800	37.4	<0.5	3,000	50
CA4030D			✓	✓	✓		✓		✓	Fatty Di-Acid+BDO	1,100	37.4	<0.5	3,000	100
CA1037D			✓	✓	✓					Fatty Di-Acid+HDO	2,000	30	<0.5	3,700	100
CT1010		✓		✓	✓	✓	✓	✓	✓	Copolyol	280 (60° C)	56.1	< 0.05	2,000	50

- We can provide more products and accept customer's designs (customization) for more detail please contact us by mail: devinyen@chanda.com.tw
- Above data for reference, please check from single product TDS for more detail spec.

Name Rule: CA- abcd

CA = Titanic Catalyst

a : 1=HDO, 2=EG, 4=BDO, 5=DEG, 6=MPO

b: 0= single diol, 1~6 same as "a"

cd=Mw; 10=Mw1,000 20=Mw2,000 ;;;;;

End-Mark= D or I or T… another Di-Acid complex

CB = Tin catalyst

CT = PET + PTMEG co-polyol

CP= PET + PPG co-polyol

CE = PET + PEG co-polyol

Contents:

AA = Adipic acid

EG = Ethylene Glycol

DEG = Diethylene glycol

BDO = 1,4-Butanediol

MPO = 2-METHYL-1,3-PROPANEDIOL

HDO = 1,6-Hexanediol

Applications:

HMA = Hot melt Adhesive

PUD = Water Base PU Distribution

PUR = Solvent base PU Resin

Block = Block type Plastic

ISO = pre-Polymer with isocyanate end

UV = Ester type acrylic oligomer

Flexible = Flexible / Soft Foam

聚 酯 多 元 醇 產 品 表 列

Product List of Polyester Polyol

Amorphous Type

品名	Applications								Contents	Viscosity @ 25° C	Specification			
	Coating		Adhesives				Sealants/Foaming				Hydroxyl	Acid	Mw	Color
	Ink	Paint	HMA	PUD	PUR	UV	ISO	Flexible			KOH mg/g	KOH mg/g	Ave.	Alpha,Max.
CA5010	✓	✓		✓		✓	✓		AA+DEG	1,600	112.2	<0.3	1,000	30
CA5020	✓	✓		✓			✓		AA+DEG	5,100	56.1	<0.3	2,000	30
CA6010	✓	✓		✓	✓	✓	✓		AA+MPO	3,000	112.2	<0.3	1,000	30
CA6020	✓	✓	✓	✓	✓		✓		AA+MPO	13,000	56.1	<0.3	2,000	30
CA6040	✓	✓		✓					AA+MPO	76,000	28	<0.5	4,000	100
CA6050	✓	✓		✓					AA+MPO	123,000	22.4	<0.5	5,000	100
CA6410	✓	✓			✓	✓		✓	AA+MPO+BDO	2,100	112.2	<0.3	1,000	30
CA6420			✓		✓				AA+MPO+BDO	10,000	56.1	<0.3	2,000	30
CA1610-i	✓	✓	✓	✓	✓	✓	✓	✓	Complex Content	1,900	112.2	<1.0	1,000	100
CA1620-i	✓	✓	✓	✓	✓	✓	✓	✓	Complex Content	9,300	56.1	<1.0	2,000	100
CA1640-i	✓	✓	✓	✓	✓				Complex Content	50,000	28	<1.0	4,000	100
CA1650-i	✓	✓	✓	✓	✓				Complex Content	94,000	22.4	<1.0	5,000	100

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End-Mark= D or I or T… another Di-Acid complex

Contents:

AA = Adipic acid

EG = Ethylene Glycol

DEG = Diethylene glycol

BDO = 1,4-Butanediol

MPO = 2-METHYL-1,3-PROPANEDIOL

HDO = 1,6-Hexanediol

Applications:

HMA = Hot melt Adhesive

PUD = Water Base PU Distribution

PUR = Solvent base PU Resin

Block = Block type Plastic

ISO = pre-Polymer with isocyanate end

UV = Ester type acrylic oligomer

Flexible = Flexible / Soft Foam

Viscosity Comparison (@ 25°C)

Composition / Mw	MPD Adipate	CA60xx		CA16xx-i	
1,000	1,500	CA6010	3,000	CA1610-i	1,900
2,000	5,700	CA6020	13,000	CA1620-i	9,300
3,000	13,800	CA6030	26,000	CA1630-i	20,500
4,000	28,000	CA6040	76,000	CA1640-i	50,000
5,000	47,000	CA6050	123,000	CA1650-i	94,000

1. There are no difference to compare with other specifications.
2. CA-60xx are MPO Adipate Polyols
3. We still try to reduce the viscosity in CA-16xx-new
4. MPD = 3-Methyl-1,5-pentanediol

MPD : $HO\text{-}CH_2\text{-}CH_2\text{-}CH(CH_3)\text{-}CH_2\text{-}CH_2\text{-}OH$

MPO : $HO\text{-}CH_2\text{-}CH(CH_3)\text{-}CH_2\text{-}OH$

Polyol/Copolyol for Applications of PU Foam

CHANDA Polyol for PU Foam							
Product Name	Type	Mw reference	OH value	Acid Value	Viscosity	Color(APHA)	Applications
CA5005P	Ester-Ether/Repeat	500	214.0-234.0	1 max	13000 cps @25℃ LVT-SP3	100 max	Rigid foam, thermal resistance
CA2420-N74	Ester	2,000	53.0-59.0	0.5 max	8400 cps @25℃ LVT-SP3	50 max	Roller, PU scraper
CA2510	Ester-Ether/Repeat	1,000	106.0-118.0	0.5 max	1900 cps @25℃ LVT-SP2	50 max	Shoe Sole
CA2520	Ester-Ether/Repeat	2,000	53.0-59.0	0.5 max	7700 cps @25℃ LVT-SP3	50 max	Shoe Sole
CA5010	Ester-Ether/Repeat	1,000	106.0-118.0	0.5 max	1600 cps @25℃ LVT-SP2	50 max	Shoe Sole
CA5020	Ester-Ether/Repeat	2,000	53.0-59.0	0.5 max	7200 cps @25℃ LVT-SP3	50 max	Shoe Sole
CA6010	Ester	1,000	106.0-118.0	0.5 max	3000 cps @25℃ LVT-SP2	50 max	Soft Foam
CA6020	Ester	2,000	53.0-59.0	0.5 max	13000 cps @25℃ LVT-SP3	50 max	Soft Foam
CA1610	Ester	1,000	106.0-118.0	0.5 max	1900 cps @25℃ LVT-SP2	50 max	Shoe Sole for High Hydroxy resistence
CA1620	Ester	2,000	53.0-59.0	0.5 max	7900 cps @25℃ LVT-SP3	50 max	Shoe Sole for High Hydroxy resistence
CA1610-i	Ester	1,000	106.0-118.0	0.5 max	2100 cps @25℃ LVT-SP2	50 max	Shoe Sole for High Hydroxy resistence
CA1620-i	Ester	2,000	53.0-59.0	0.5 max	9300 cps @25℃ LVT-SP3	50 max	Shoe Sole for High Hydroxy resistence
CA6830-F25	Ester	3,000	44.0-50.0	0.5 max	51500 cps @25℃ LVT-SP4	50 max	Semi-rigid Foam, 2.5 Fuctional group
CT1010	Ester-Ether/Block	2,000	54.0-58.0	0.05 max	280 cps @60℃ LVT-SP1	50 max	Semi-rigid Foam, Anti-shock
CT2020	Ester-Ether/Block	4,000	26.0-30.0	0.1 max	1100 cps @60℃ LVT-SP1	100 max	Semi-rigid Foam, Anti-shock
CP1515-F3	Ester-Ether/Block	3,000	54.0-58.0	0.3 max		50 max	Semi-rigid Foam, Triol type

Polyol/Copolyol for Applications of PU Adhesive

CHANDA Polyol for PUA/PUR							
Product Name	Type	Mw reference	OH value	Acid Value	Viscosity	Color(APHA)	Applications
CA4030	Ester	3,000	35 ~ 40	0.5 max	1200 cps @80℃ LVT-SP3	50 max	Normal Hot melt adhesive
CA4040	Ester	4,000	26 ~ 30	0.5 max	2500 cps @80℃ LVT-SP3	50 max	Normal Hot melt adhesive
CA4050	Ester	5,000	20 ~ 24	0.5 max	6000cps @80℃ LVT-SP2	100 max	Normal Hot melt adhesive
CA6440-N	Ester	4,000	26 ~ 30	0.5 max	1800 cps @80℃ LVT-SP3	50 max	Lower Tg
CA1035	Ester	3,500	30 ~ 34	0.5 max	1000 cps @80℃ LVT-SP2	50 max	High strength
CA4030D	Ester groups reduced	3,000	35 ~ 40	0.5 max	1100cps @80℃ LVT-SP3	100 max	High strength/ Fast setting
CA1037D	Ester groups reduced	3,700	28.5 ~ 32.5	0.5 max	2000 cps @80℃ LVT-SP2	100 max	High hydrolysis resistance, high strength / fast setting
CA1720	Tiny-Amorphous	2,000		0.5 max		100 max	PUR
CAC020	Cyclic Hydrocarbon	2,000		0.5 max		100 max	PUR / Toughness
CA7020PX	Aromatic Hybrid	2,000		2.0 max		300 max	Thermal resistant Adhesive
TX1117	Aromatic Hybrid	2,500		1.0 max		200 max	Thermal resistant Adhesive

For the PU Adhesive applications, we would like to suggest customers use our crystal or semi-crystal type Polyols and their Mw should be 3,000 ~ 5,000 or larger.

Above list for customers' reference, however we can design some difference in chemical structure for customers' unique design.

Those factors have to be considered:

(1) Operation Temperature (Tg, Tm, TS.....)

(2) Polarize / surface tension of matrix

(3) Film strength / Peeling force

(4) Reliability / Hydrolysis resistance