*Battery **POUCH for Secondary Battery (Li-Polymer)***

CONTENTS

Battery POUCH for Secondary Battery (Li-Polymer)

Manufacturer

- The manufactirer is leading new paradigm of the society,culture,environment in 21th century, and pursuing the product for customer's health and happiness and the perfection in any change. The manufacturer has been leading the spearhead of the packaging industry through innovative technological development and aggressive investment on plant facilities since the establishment in 1973

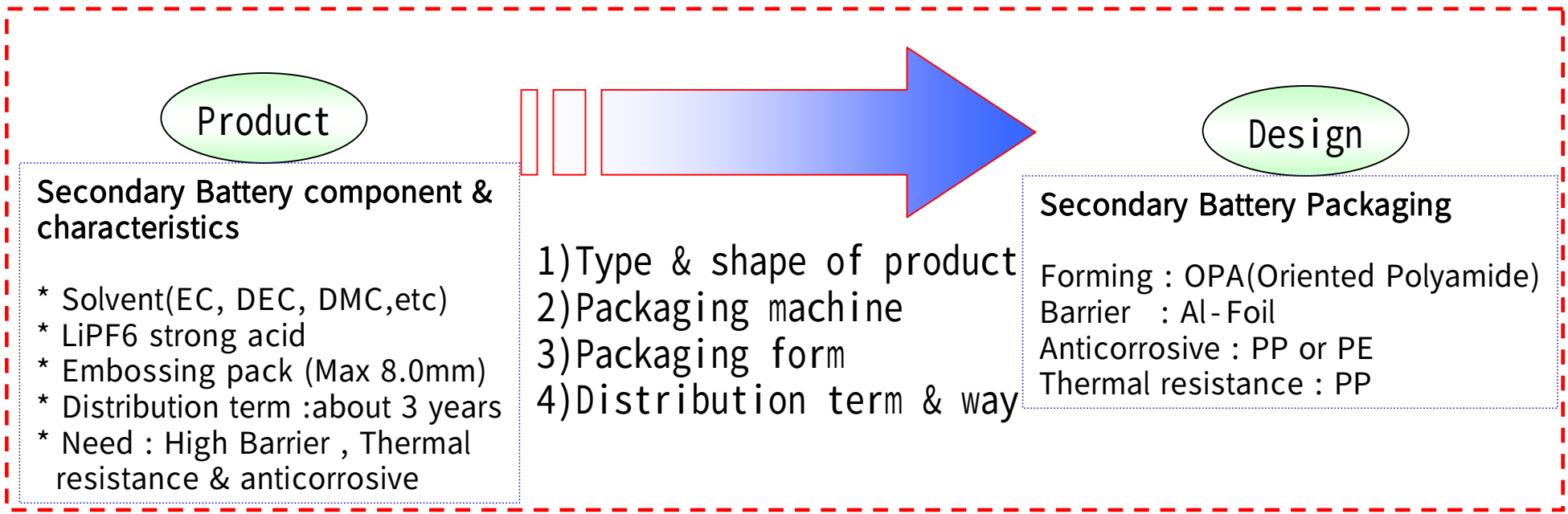
- We are operating 5 factories with the pride of the newest and large facilities and the R&D institute, and the infrastructure CIM system for the fastest business efficiency, serving quickly and completely all procedures from order to production & delivery.

- As total maker in the plastic packaging field with Flexible Packaging,BOPP Film,Corrugated Cardboard. Carrier Tape, Laminated Tube, PP Shrink Film , We're doing our best to develop high-tech products for future and the product for the harmony with environment.

Battery POUCH for Secondary Battery (Li-Polymer)

Pouch Structure Design

1. The main check point in the design of the plastic pouch
   - ① Hygiene
   - ② Property for printing (Printing method, Ink, etc)
   - ③ Barrier (OTR ,WVTR, etc)
   - ④ Property for processing (Laminating method, The physical & chemical property after being laminated)
   - ⑤ Packing property in line (Slip(Feeding),Heat sealing, etc)
   - ⑥ Convenience for customer&user(Display,Opening,Re-deposit)
   - ⑦ Economics (Production efficiency, Price, etc)



Battery POUCH for Secondary Battery (Li-Polymer)

FEATURE

※ Superior insulation property

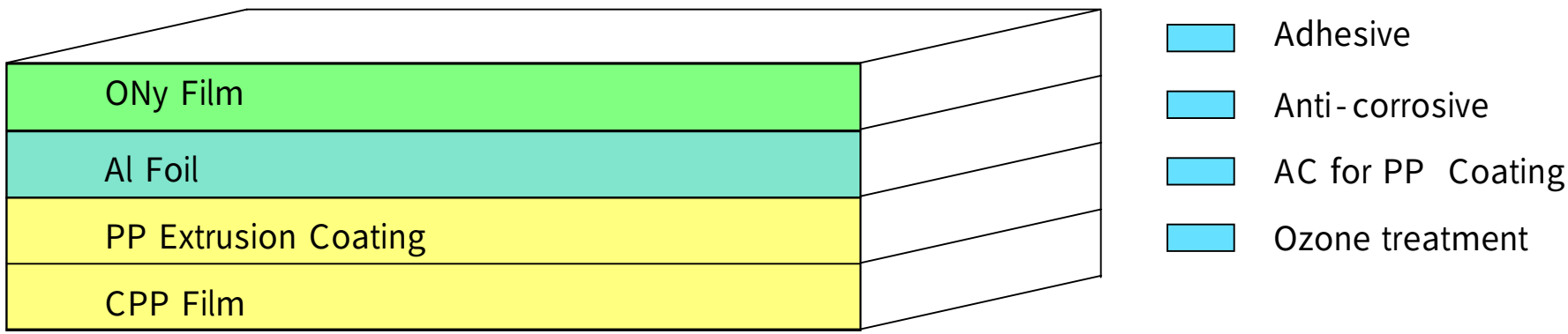
※ Excellent thermal resistance property (160°C)

※ Good anti-chemicals (excellent anti-corrosive)

※ Predominant heat sealing strength

※ Excellent forming property

POUCH Structure of Grade YCC-ALPA40J



Battery POUCH for Secondary Battery (Li-Polymer)

FEATURE

※ Superior insulation property

※ Excellent thermal resistance property (160℃)

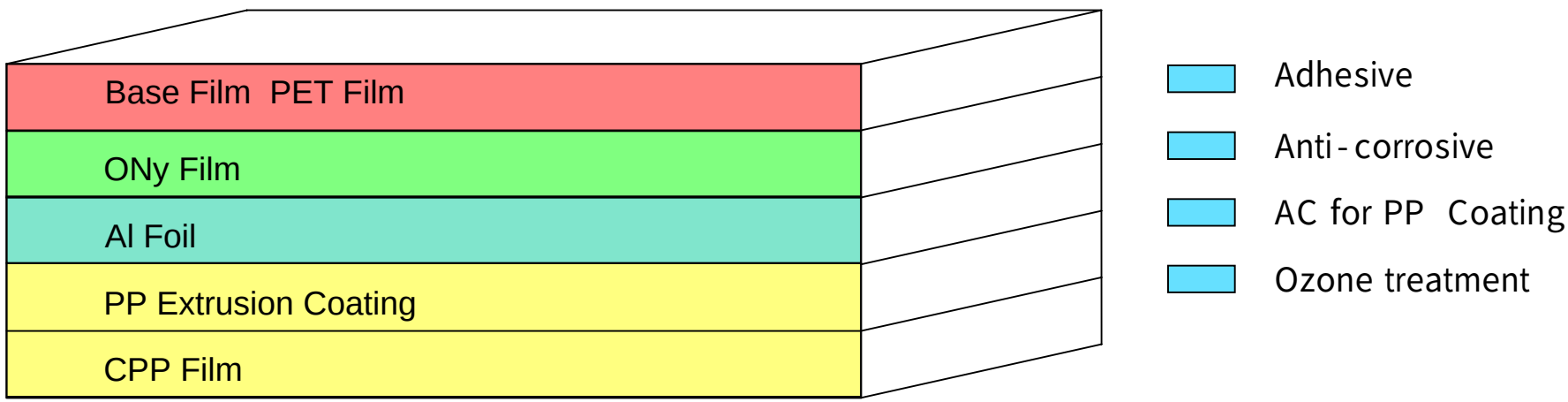
※ Good anti-chemicals (excellent anti-corrosive)

※ Predominant heat sealing strength

※ Excellent forming property

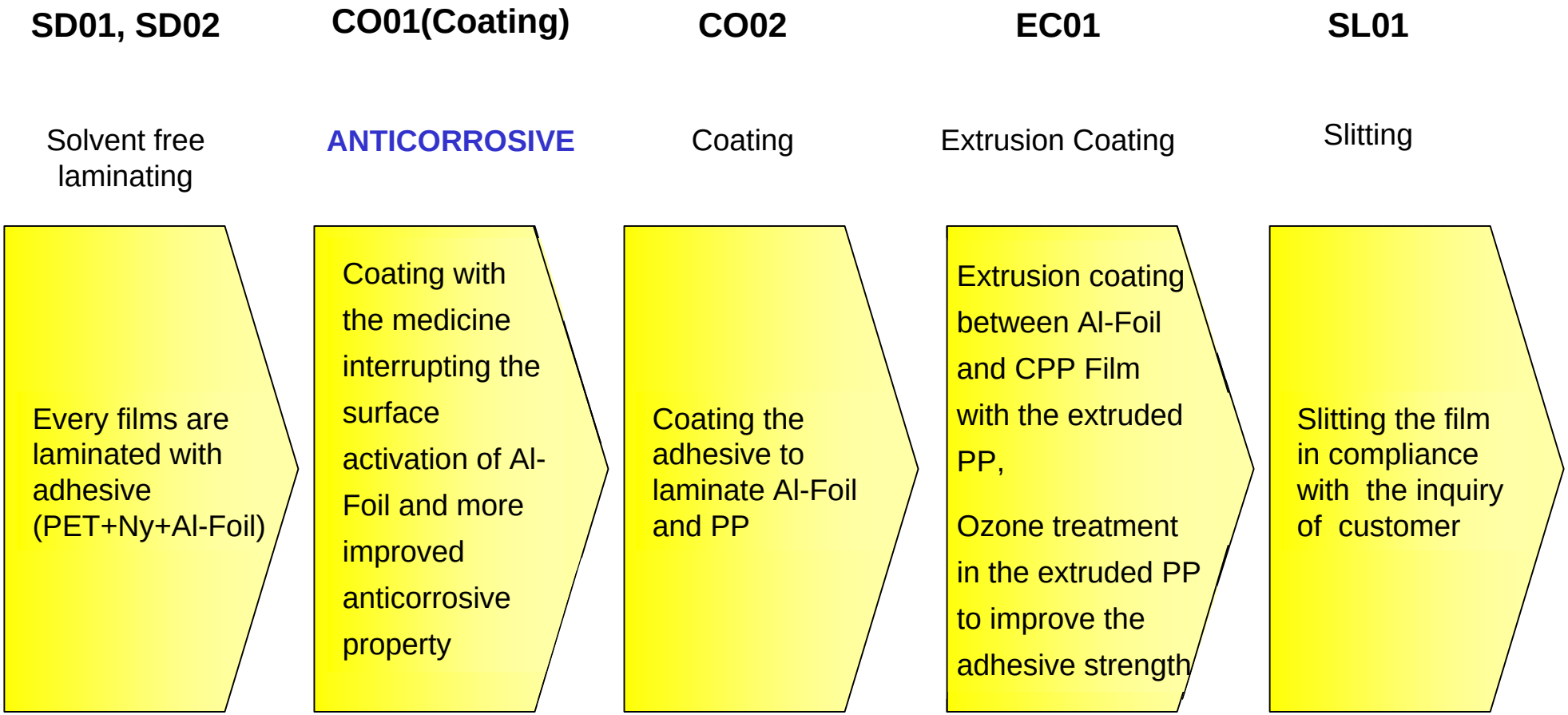
※ Excellent resistance performance from electrolyte

POUCH Structure of Grade YCC-ALPA40U



Battery POUCH for Secondary Battery (Li-Polymer)

Production Process of Pouch Film



Battery POUCH for Secondary Battery (Li-Polymer)

Feature by each layer

※ Base Film : Laminating PET FILM for excellent surface protection and anti-electrolytic property

※ Adhesive 1 : PU line adhesive for excellent thermal resistance (Heat Resistant = 260 ℃ 10 sec) and anti-chemicals

※ ONy : Oriented Polyamide(ONy) Film for excellent form processing property

※ Adhesive 1 : PU line adhesive for excellent thermal resistance (Heat Resistant = 260 ℃ 10 sec) and anti-chemicals

※ Al-Foil : Excellent forming property , High Barrier

※ ANTICORROSIVE : Interrupting the surface activation of Al-Foil and increasing anticorrosive property

※ Adhesive 2 : PP line Adhesive for excellent insulation property and excellent adhesive strength with metal

※ Sealant Layer : CPP Film (Homo PP + Co-polymer PP + PE) for excellent heat sealing strength , Excellent thermal resistance property (Tm 160℃)
Excellent anti-chemicals (ANTICORROSIVE) , Good Slip ,
No white change situation when being processed

Battery POUCH for Secondary Battery (Li-Polymer)

PHYSICAL PROPERTY

Property			Unit	YCC-ALPA50J	YCC-ALPA40U	Remark
Thickness			μm	122.2	107.2	* Feature : excellent insulation property on surface
Strength	Breaking Factor	MD	Kgf/mm^2	16.1	8.08	
		TD		15.2	8.27	
	Elongation	MD	%	90.83	82.92	
		TD		86.00	73.75	
	Heat Sealing	170℃	gf/15mm	3.5	3.5	
		180℃		4.2	3.8	
		190℃		4.5	4.5	
		200℃		4.8	4.9	
		210℃		4.6	4.5	
	Puncture		kgf	8.5	6.8	
Moisture Vapor Transmission Ratio			g/100in^2/day	0.000	0.000	
Oxygen Transmission Ratio			cc/100in^2/day	0.000	0.000	
Surface Resistivity (Sealant Layer)			Ω/cm^2	10^{17}	10^{17}	

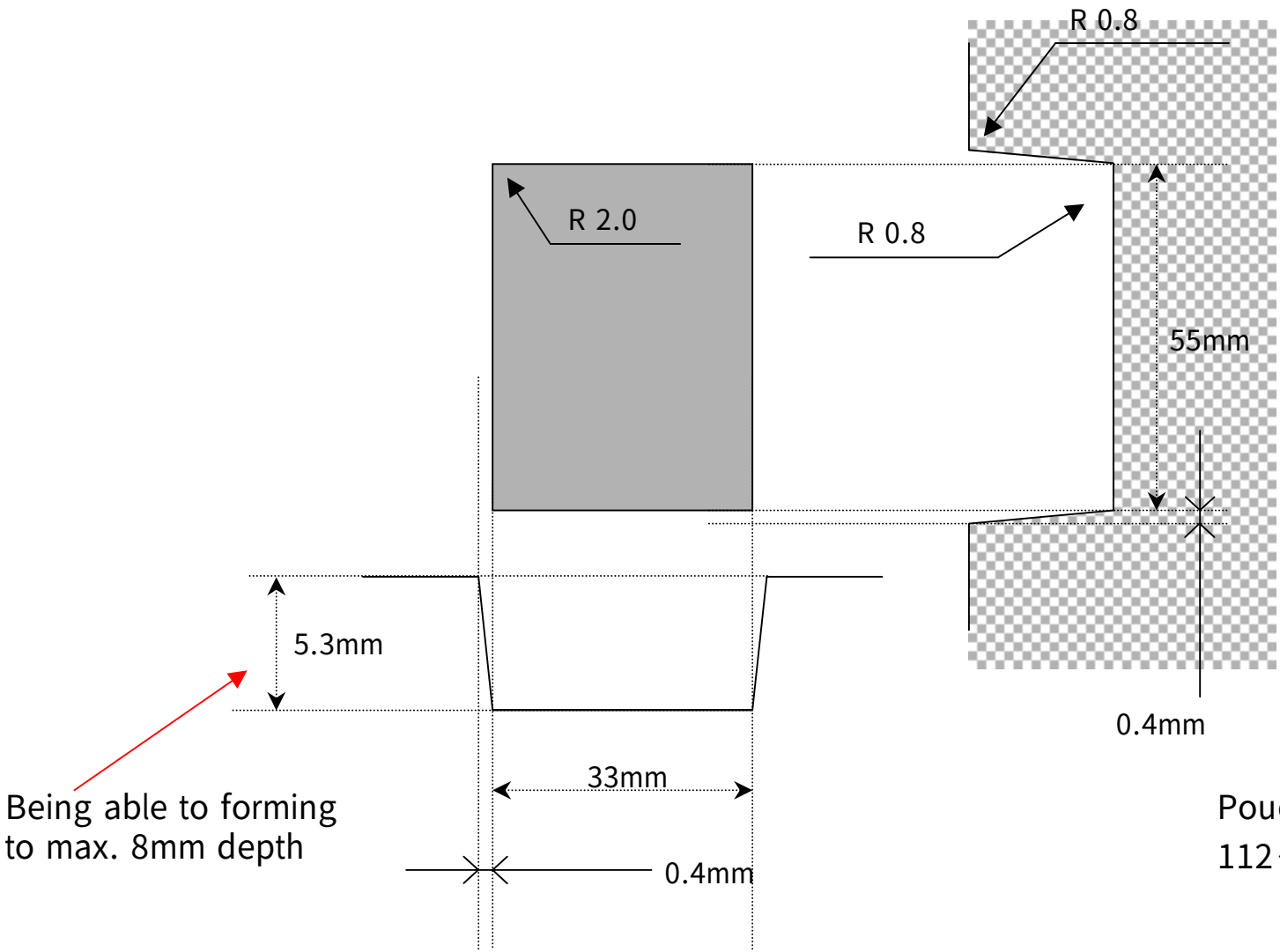
CHEMICAL PROEPRTY

- Anti-electrolyte property : No de-lamination in the sealant layer in the electrolyte at 85℃ for over 72hr

FORMING PROPERTY

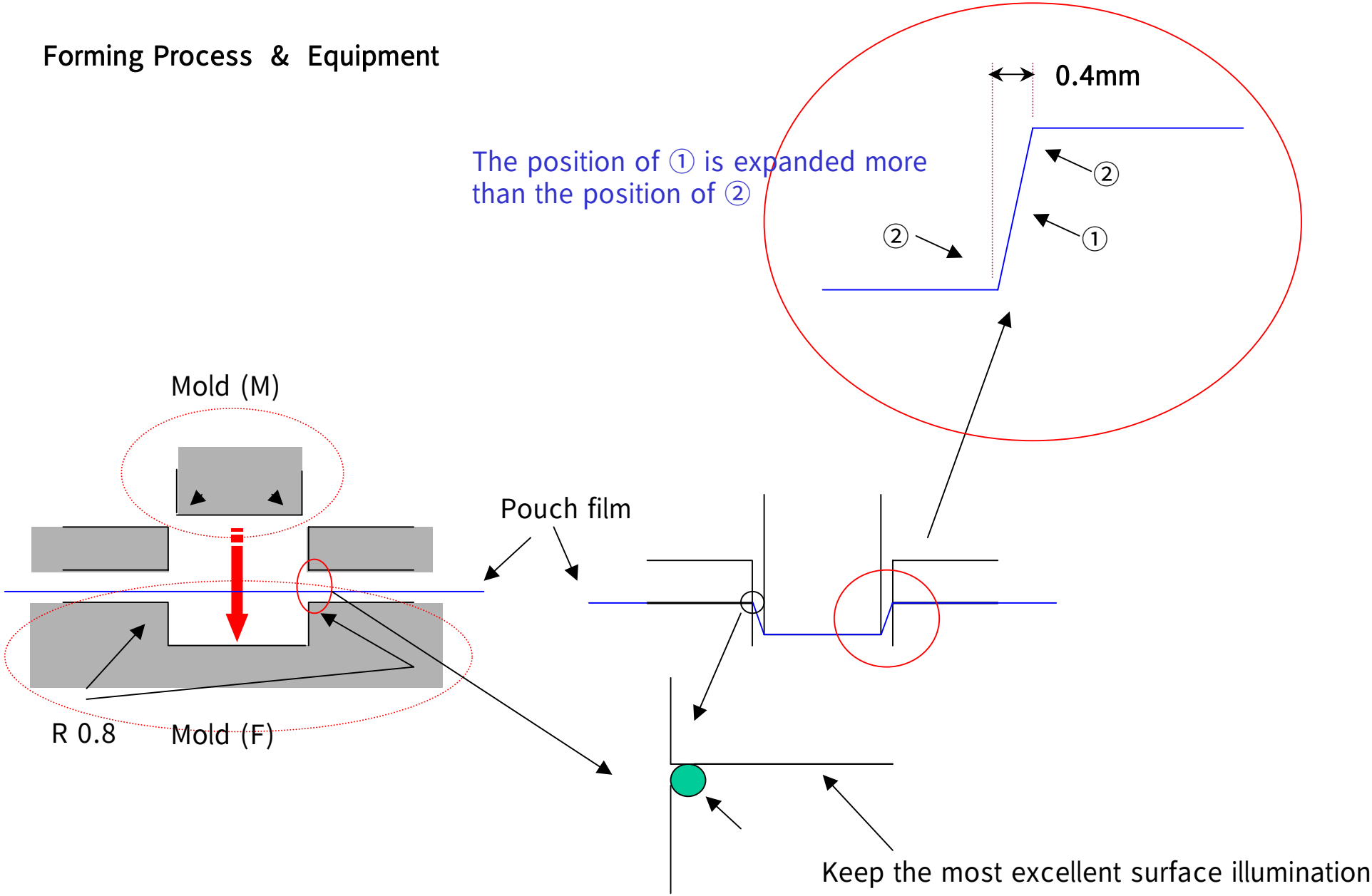
- No trouble over 6mm in our forming machine

Typical forming measurement of Cell Pouch



Pouch Film thickness
112~123㎛

Forming Process & Equipment



Battery POUCH for Secondary Battery (Li-Polymer)

QUALITY CONTROL

※ ISO 9002 CERTIFICATION : 1997

※ QUALITY Check :

1) Forming property : YCC Method
   - Possible over 7mm

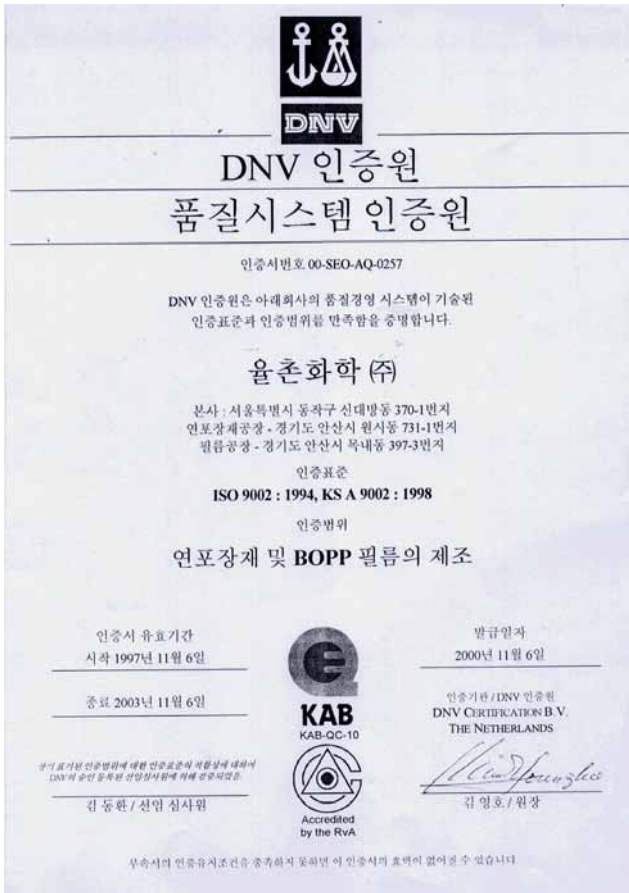
2) Heat Seal : ASTM F88-89

3) Barrier : YCC Method (MVTR , OTR)

4) De-Lamination in electrolyte
   : YCC Method (Electrolyte Precipitation Test)
   - Checking the sealant de-lamination after precipitating in the electrolyte at 60℃ and 85℃

5) GENERAL PROPERTY
   - Raw material inspection , Process inspection , Final inspection , Inspection before delivery

QA System (ISO)



DNV

DNV 인증원

품질시스템 인증원

인증서번호 00-SEO-AQ-0257

DNV 인증원은 아래회사의 품질경영 시스템이 기술된
인증표준과 인증범위를 만족함을 증명합니다.

율촌화학 ㈜

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인증표준

ISO 9002 : 1994, KS A 9002 : 1998

인증범위

연포장제 및 BOPP 필름의 제조

인증서 유효기간
시작 1997년 11월 6일
종료 2003년 11월 6일

발급일자
2000년 11월 6일

KAB
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Accredited by the RvA

인증기관 / DNV 인증원
DNV CERTIFICATION B.V.
THE NETHERLANDS

김 동환 / 선임 심사원

김 영호 / 원장

Physical Properties

Property			Unit	Value(YCC-ALPA)			Remark
				40U	50J	80U	
Thickness			μm	107.2	122.2	169.7	
Strength	Breaking Factor	MD	kgf/15mm	13.0	13.9	18.1	
		TD		13.3	15.0	18.0	
	Elongation	MD	%	82.92	90.83	46.0	
		TD		73.75	86.00	40.0	
	Heat Sealing	170°C	kgf/15mm Press strength: 2kgf/cm^2	3.5	3.5	0.3	
		180°C		3.8	4.2	3.1	
		190°C		4.5	4.5	2.8	
		200°C		4.9	4.8	3.0	
		210°C		4.5	4.6	4.4	
Moisture Vapor Transmission Ratio			g/100in^2/day	0.000	0.000	0.000	
Oxygen Transmission Ratio			cc/100in^2/day	0.000	0.000	0.000	
Surface Resistivity (Sealant Layer)			Ω/cm^2	10^{17}	10^{17}	10^{17}	

Physical Properties Check Method and Standard

*** General Physical Properties : YCC Method**

1) Thickness : measure the thickness of laminated film by micrometer
2) Width : measure the width of the film on the last process by Vernier Calipers
3) Length : measure the length of the film on the last process by Tacometer

*** Physical Strength** : ASTM D-882(tensile strength elongation), ASTM D-1004(tear strength), ASTM F-1249(MVTR), ASTM D-3985(OTR)

1) Tensile Strength Elongation : Strength and Elongation of laminated film to fracture
2) Tear strength : after rend off pouch film partly, check the strength to be torn again
3) MVTR, OTR : Transmission Ratio of Moisture Vapor and Oxygen of laminated film

*** Sealant Layer Properties** : ASTM D-257(surface resistivity), ASTM D-1238(MFR), ASTM F-1249(MVTR), ASTM D-882(De-Lamination)

1) Surface Resistance : electrical properties of Sealant Layer about Insulation Resistance and Surface Resistance
2) MFR(Melt Flow Rate) : Flow rate of Sealant Layer by temperature
3) MVTR : Moisture Vapor Transmission Ratio of Sealant Layer
4) De-Lamination : Test the possibility of seperation between Sealant Layer and Al-Foil

*** Chemical Property** : YCC Method

1) Dipping Test : De-lamination property of Selant Layer of Laminated Film when the pouch film dip in the electrolyte under the condition of 60℃ and 85%RH
2) Electrolyte Injection Test : De-lamination rate of Selant Layer after injection of electrolyte

*** Visual Test** : YCC Method

1) Dust and alien substance : Visual testing dust of the inside/outside of pouch film surface
2) Fish Eye : Visual testing “Fish Eye” phenomenon of Sealant Layer

Physical Properties Check Method and Standard

Item	Spec		Test method
Dimension	Thickness	223 ± 12μm	Micrometer
	Width	266 ± 1mm	Vernier Calipers
	Length	400 +5, -0m	Tachometer
Heat Seal strength		more than 3.5 kgf/15mm	ASTM F88-85
Extrusion property	No Pin-Hole when checking with laser after forming by testing machine of this company		Visual Testing
Core (Plastic)	Inside diameter	6 inch	Visual Testing
	Thickness	10mm	Visual Testing
Tape Attachment	Counter	control two and below	Visual Testing
	Method	attach with red tape	Visual Testing
Appearance	No crack of Aluminum, No Pin-Hole		Visual Testing
	No dust inside and on the surface		Visual Testing
	within 1.0mmϕ Fish Eye of CPP		Visual Testing
	No creases		Visual Testing
	Control transverse offset within 1mm		Visual Testing
	wind Ny to appear outside		Visual Testing

YOULCHON Li - Polymer 2차전지 Cell POUCH

보관시 주의사항

1. 온도는 상온에서 보관요망(23℃전후)
2. 습도50%RH 이하에서 관리요망
3. 콘크리트 바닥, 젖은 바닥 등 수분에 민감한 장소에 두지 말것
4. Handing시 충격을 가해서는 안된다

Sony사 Li-Polymer 2차 전지제품 개요

Cell 형태 : Winding Type

Pouch : 日本 DNP 및 소화사제품 사용

Tab Film : 소화제품 사용

가장 많이 생산하는 규격 : 38 34 56, 50 37 59

제품 성형에 전혀 문제없음