

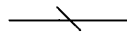
LS Mtron 표준
Product Specifications

Doc. No. : LSM(25)-K-A5118
Series Name : GB042
Page : 1 / 11

커넥터 제품규격
Product Specification

초판발행(1st Date Issued) : Apr. 13. 2005




작성 (Issued by) : K. C. Park

검토 (Checked by) : 

승인 (Approved by) : D. H. Kim

전자부품 개발팀
(Electronic Component Development Team)

● 개정이력 (Revision Record)

판수 (NO.)	일자 (Date)	DCN 번호 (DCN No.)	담당 (ISS.)	검토 (CHK.)	승인 (APP.)	주요 개정 내용 (Summary)
2	08.9.22	CN08-DP-100	S.J.0h	K.C.Park	I.D.Song	Changed CI
3	08.9.29	CN08-DP-103	S.J.0h	K.C.Park	I.D.Song	5 개정 / 7, 8, 9 추가
4	08.10.30	CN08-DP-116				5.3.3 개정

LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
 Series Name : GB042
 Page : 2 / 11

1. 적용범위 (Scope)

이 제품규격은 LS 엠트론(주)에서 만드는 GB042 시리즈 (0.4 mm Pitch 기판 대 기판 접속용) 커넥터에 대하여 적용한다.

This specification covers **GB042 Series connector** manufactured by LS Mtron Co., Ltd.

2. 관련규격 (Relative Documents)

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-1344	Test Methods for Electrical Connectors
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

3. 정격 (Standard Data)

항 목 (Item)	정격 (Standard Data)
정격전류 (Operating Current)	AC,DC 0.3 A/pin
정격전압 (Operating Voltage)	AC,DC 50 V/pin
사용온도 (Operating Temperature)	- 55℃ ~ + 85℃

4. 외관, 치수 및 재료상태 (Appearance, Dimensions & Material Finish)

승인 도면과 다르지 않을 것

To be same as specified by drawings

LS Mtron 표준

Product Specifications

Doc. No. : LSM(25)-K-A5118
 Series Name : GB042
 Page : 3 / 11

5. 성능 (Performance)

5.1 전기적 성능 (Electrical Performance)

시험 항목 및 방법 (Test Item & Method)	규격 (Requirement)
5.1.1 내전압 (Dielectric Withstanding Voltage) MIL-STD-1344 시험방법 3001 에 준하여 인접 콘택트 간에 규정 전압을 인가한다 / The specified voltage is applied between adjacent contacts in accordance with MIL-STD-1344 Method 3001	AC 250V r.m.s 로 1 분간 가했을 때 이상이 없어야 한다. / There shall be no shortcircuiting and damage detected at AC 250V r.m.s for one minute.
5.1.2 접촉저항 (Contact Resistance) MIL-STD-1344 시험방법 3002 에 준하여 저레벨(20 mV, 100mA 이하)로 접촉저항을 측정한다 / Measured by low level (20mV, 100mA Max.) in accordance with MIL-STD-1344 Method 3002.	70mΩ Max.
5.1.3 절연저항 (Insulation Resistance) MIL-STD-1344 시험방법 3003 에 준하여 인접 콘택트 간에 DC 250V 를 인가하고 1 분 이내에 측정한다 / DC 100V is applied between adjacent contacts and insulation resistance is measured within one minute in accordance with MIL-STD-1344 Method 3003	1000 MΩ Min.

LS Mtron 표준 Product Specifications

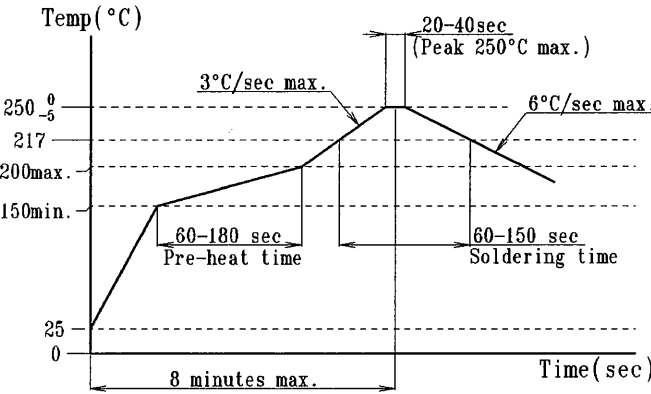
Doc. No. : LSM(25)-K-A5118
 Series Name : GB042
 Page : 4 / 11

5.2 기계적 성능 (Mechanical Performance)

시험 항목 및 방법 (Test Item & Method)	규격 (Requirement)
5.2.1 총합삽입력 (Mating Force) PCB 에 실장된 커넥터간에 20mm/분 속도로 삽입력을 측정한다 / Measure the force required to mate connectors soldered on a PCB at a speed of 20mm/min.	(100 x n)gf Max. / (n = No. of pin)
5.2.2 총합발거력 (Unmating Force) PCB 에 실장된 커넥터간에 20mm/분 속도로 발거력을 측정한다 / Measure the force required to unmate connectors soldered on a PCB at a speed of 20mm/min.	(15 x n)gf Min. / (n = No. of pin)
5.2.3 콘택트 버팀력 (Contact Retention Force) 20mm/분 속도로 콘택트 버팀력을 측정한다. / Apply an axial load to contact at a speed of 20mm/min	Plug Connector : not Available Receptacle Connector : 50 gf Min.
5.2.4 내진동성 (Vibration) MIL-STD-1344 시험방법 2005 에 준하여 진폭 1.5mm, 주파수 10~55Hz, X,Y,Z 축 각각 2 시간(총 6 시간)의 진동시험을 한다. 단, 시험 중 커넥터 고정용 Holder 는 사용해도 좋다. / Total amplitude of 1.5mm, 10~55 Hz for 2 hours per axis for a total of 6 hours for three axes in accordance with MIL-STD-1344 method 2005. An appropriate holder may be used for fixing purpose for tests.	시험 중 1μ sec 이상의 전류차단이 없고, 시험 중이나 후에 제품의 파손 등의 기계적 결함이 생기 지 않을 것 / There shall be no current discontinuity of more than 1 microsecond. And there shall be no mechanical defect detected on the parts during and after test.)
5.2.5 내충격성 (Shock) 총 낙하 중량 100g 으로 150cm 높이에서 X,Y,Z 축 방향 각각 3 회씩 자유 낙하 시험을 한다. 단, 시험 중 커넥터 고정용 Holder 는 사용해도 좋다. / Free fall is applied along the 3 axes three times(total weight : 100g, height 150cm). An appropriate holder may be used for fixing purpose for tests.	
5.2.6 수명시험 (Durability) 20mm/분 속도로 30 회의 삽입 발거를 한다. / 30 cycle of inserting and separating actions are conducted at a speed of 20mm/min	접촉저항/ Contact resistance : 90mΩ Max.
5.2.7 납땜성 (Solderability) 적합 플럭스에 5~10 초 동안 침적 시킨 다음 Sn : Pb 가 60 : 40 인 납조에 230±5℃의 온도로 3±0.5 초 동안 담근다. / The end of the post shall be dipped in a solder bath(6:4 SnPb) at 230±5℃ for 3±0.5 sec.	침적 면적의 95% 이상이 납으로 덮혀 있을 것. / More than 95% of the dipped part shall be covered with solder.

LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
 Series Name : GB042
 Page : 5 / 11

시험 항목 및 방법 (Test Item & Method)	규격 (Requirement)
<p>5.2.8 납땜내열성(Resistance to Soldering Heat)</p> <p>1) Reflow Soldering 아래와 같은 조건으로 시험한다. Test condition of reflow soldering is as follows.</p>  <p>2) Manual Soldering Solder Iron : $300 \pm 10^\circ\text{C}$ Duration : $3 \pm 1\text{sec}$ Should not apply excessive pressure to the contacts</p>	<p>절연체에 사용상 유해한 변형이나 흠집이 없을 것. During test, no physical damage.</p>

LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
 Series Name : GB042
 Page : 6 / 11

5.3 환경적 성능 (Environmental Performance)

시험 항목 및 방법 (Test item & method)	규격 (Requirement)
5.3.1 열충격 시험 (Thermal Shock) MIL-STD-202 시험방법 107 에 준하여 -55℃ (30 분), +25℃ (5 분), +85℃ (30 분), +25℃ (5 분) 의 온도 사이클을 연속 5 회 반복한다. / -55℃ (30min), +25℃ (5min), +85℃ (30min), +25℃ (5min) consecutive five cycles. (MIL-STD-202 method 107)	절연저항 Insulation Resistance : 100 MΩ Min. 접촉저항 Contact Resistance : 90mΩ Max.
5.3.2 내습도 (Humidity) MIL-STD-1344 시험방법 1002 에 준하여 온도 60℃, 상대습도 90~95% RH로 96 시간 동안 습도시험을 한다. / Temperature : 60℃, Relative humidity : 90~95%, Length of test : 96 hours (MIL-STD-1344 method 1002)	Contact Resistance : 90mΩ Max.
5.3.3 저온방치 (Low Temperature Exposure) 온도 -40±3℃로 96 시간 동안 시험 한다. / Temperature : -40±3℃, Length of test : 96 hours	
5.3.4 고온방치 (High Temperature Exposure) MIL-STD-1344 시험방법 1005 에 준하여 온도 85 ±2℃로 96 시간 동안 시험 한다 / Temperature : 85 ± 2℃, Length of test : 96 hours (MIL-STD-1344 method 1005)	접촉저항 Contact Resistance : 90mΩ Max.
5.3.5 내부식성 (Salt Spray) MIL-STD-1344 시험방법 1001 에 준하여 염수농도 5%, 시험온도 35℃, 시험시간 48 시간의 조건으로 염수분무 시험을 한다. / Salt water density of 5%, 35℃ for 48 hours. (MIL-STD-1344 method 1001)	콘택트에 접촉에 유해한 素地 금속의 노출이 없고 접촉저항 90mΩ 이하 / There shall be no exposure of base metal of contacts which is detrimental to contacting. Contact resistance shall be below 90 mΩ.

LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
Series Name : GB042
Page : 7 / 11

6. 시험 (Test)

시험은 다음과 같이 2 가지로 나눈다.

Test is classified two kinds of methods as following.

6.1 인정시험 (Approval Test)

인정시험은 원칙적으로 제품이 제작되었을 때 표-1 (시험 순서 및 시료수)에 따라 본 제품규격의 요구 사항을 만족하는 가를 확인하는 시험이지만, 필요에 따라 양산 중에 할 수도 있다.

In principle approval test shall be done to confirm whether the products are satisfied with the specification or not before production in accordance with table-1 (Test sequence and sample quantity), but if necessary, it can be carried out during mass production.

6.2 출하검사 (Inspection By Attributes)

출하검사는 제품 출하 시 실시하는 검사로써, MIL-STD-105 에 준하고 특별한 이의 사항이 없는 한 AQL 1.0%를 보증한다.

Inspection by attributes is the test based on MIL-STD-105, which shall be carried out when the products are delivered. On condition that any special significance is not designated, the acceptable quality level 1.0% shall be guaranteed.

6.3 시험조건 (Test Condition)

특별한 시험조건을 지정하지 않는 한 일반적으로 시험은 다음의 조건에서 실시한다.

Test conditions shall be maintained as following if not specially designated.

온도 (Temperature) : 10 ~ 35 °C

습도 (Humidity) : 40 ~ 90 % RH

기압 (Atmospheric Pressure) : 650 ~ 800 mmHg

LS Mtron 표준 Product Specifications

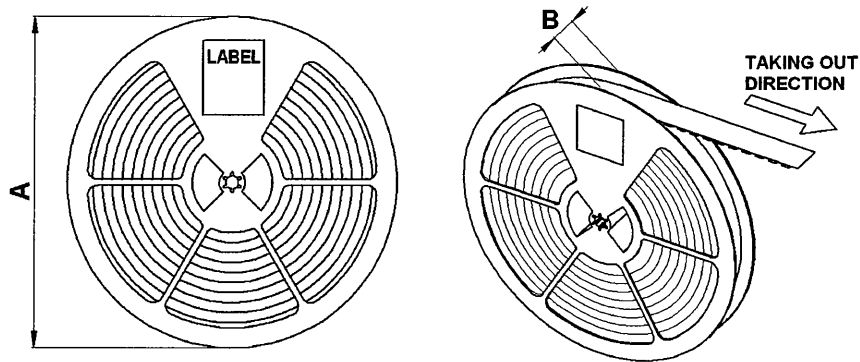
Doc. No. : LSM(25)-K-A5118
 Series Name : GB042
 Page : 8 / 11

7. 포장 (Packing)

7.1 Emboss 포장 (Embossed Packing)

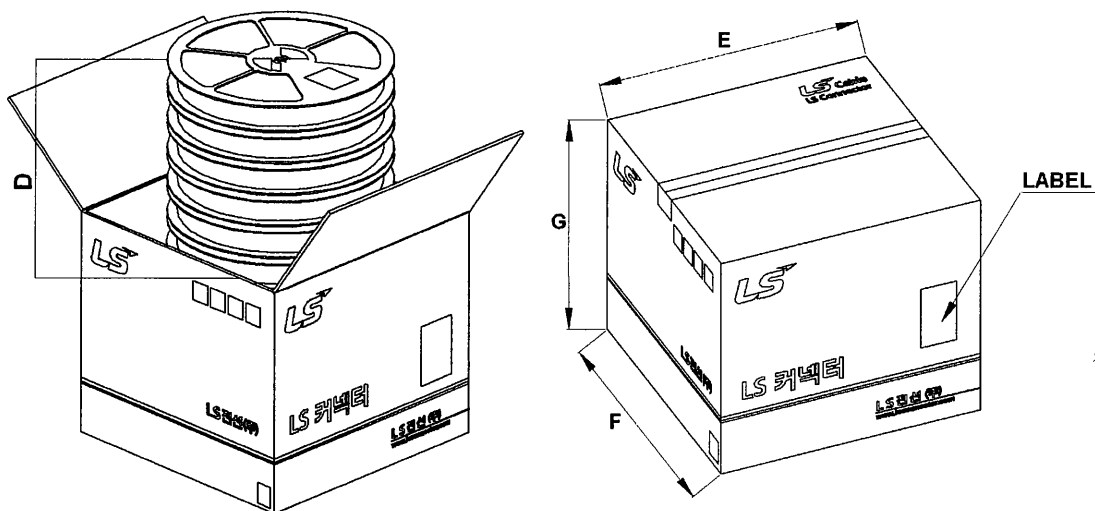
- 관련규격: EIA-481-2

심수 (No.of contacts)	Carrier Tape 폭 (mm)	Bobbin diameter[A] (mm)	Bobbin Width[B] (mm)
20~28	16.0	330	18
30~60	24.0	330	26
60~80	32.0	330	34



7.2 Box 포장

심수 (No.of Contacts)	Box 당 Reel 포장 수량(D)	Box 당 제품수량	Box Size (E × F × G)
20~80	10 Reel	30,000 EA	350 × 350 × 350



LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
Series Name : GB042
Page : 9 / 11

8. 사용자 주의사항(NOTICE)

8.1 작업시 주의사항 (Precaution at the time of operation)

(1) B2B Connector 를 FPCB 와 PCB 의 연결에 사용시 가급적 Plug 를 FPCB 에 실장하고 Receptacle 을 PCB 에 실장 할 것.

→ Mating 시 파손 및 낙하 파손에 유리함.

When you use B2B connector in connecting FPCB to PCB, We Recommend that Plug put on FPCB, and receptacle on PCB. Because it is better for drop damage.

(2) FPCB 에 실장시 가급적 FPCB 에 보강판을 부착 할 것.

→ 고심수의 경우 삽,발시 제품의 휨 발생에 의한 불량 발생 가능성 有

Please support plate behind FPCB. Deformed Connector is caused by transformed FPCB, when you mate and unmate connector. Particularly, take care in case of high pin connector

(3) FPCB 에 제품 SMT 이전 FPCB 의 휨변형 유무를 확인 할 것.

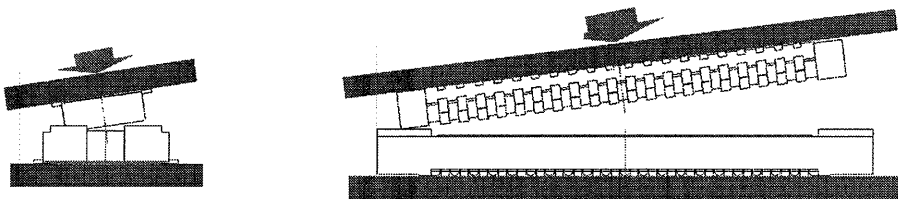
→ SMT 전 FPCB 의 과도한 휨변형에 의해 제품 SMT 후 냉땀 발생 가능성 有

Please confirm whether warpage exist or not in FPCB itself because it is possible that poor soldering takes place by FPCB

(4) Plug 와 Receptacle 의 삽입, 발거시 가급적 제품을 수평하게 삽입, 발거 하도록 할 것.

→ 수평하지 않게 삽발시 Insulator Damage, 파손 및 Contact 변형 발생 가능성 有

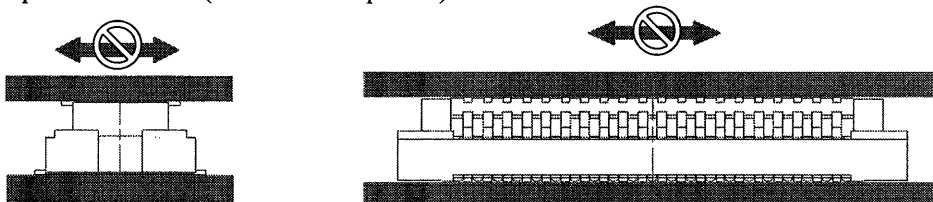
Please mate and unmate B2B connector straightly, not askew. Or it is possible that insulator damage, contact deformation takes place. (refer to below picture)



(5) Mating 시 Plug 와 Receptacle 의 적절한 Align 을 맞춘 상태에서 가압하여 체결 할 것.

→ 적절한 Align 없이 삽입시 Insulator Damage, 파손 및 Contact 변형 발생 가능성 有

In mating and unmating B2B connector, push down slowly after confirming that align between plug and receptacle is correct. (refer to below picture)



LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
Series Name : GB042
Page : 10 / 11

(6) Test Plug 로 사용할 경우 (4), (5) 항목을 유의 할 것.

→ (4), (5) 항목 유의 사용시 Test Plug 사용 수명 증가됨

If you want to increase the life cycle of connector, necessarily observe the item of 4 and 5.

(Especially when you want to use connector on purpose of test plug).

(7) 납땜 이나 수리 작업시 플럭스로 인한 접촉 문제가 발생할 수도 있으므로 플럭스가 커넥터에 묻게 하지 말 것.

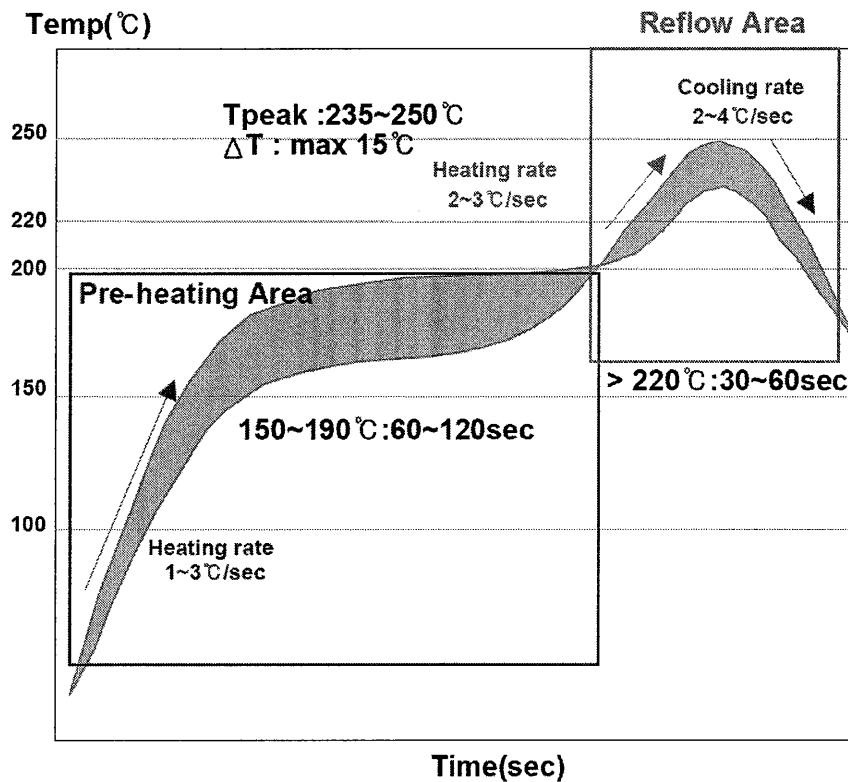
When reworking or soldering by hand, do not put solder flux to connector terminal. That may cause contact problem by flux.

(8) 제품을 PICK-UP 시 제품의 Pick-Up 부를 충분한 힘으로 흡입하여 사용 할 것

When picking up the connector, suck the center of the upper side

(9) 추천 Reflow profile 은 아래와 같으며, 하기 Profile 의 기준은 커넥터 리드부 기준 임.

The following diagram shows the recommended reflow soldering temperature profile.



(10) 가급적 보관 기간 내에 사용할 것. (보관 기간 이상으로 사용시 Contact 부식 발생 가능성 有.)

Have to use if possible within Storage duration.

- Emboss 포장 상태 (Emboss Packing Condition) : 1 년 (1 year)

- Emboss 포장 개봉 상태 (Emboss Packing Release Condition) : 1 개월 (1 Month)

- 추천 보관 조건 (Recommend Storage Condition) : 10~35°C , 40~60% RH

LS Mtron 표준 Product Specifications

Doc. No. : LSM(25)-K-A5118
Series Name : GB042
Page : 11 / 11

(11) GB042 Receptacle 과 타사 Plug 또는 GB042 Plug 와 타사 Receptacle 을 혼용하지 말 것..

Don't use to blend GB042 Receptacle with other company's Plug or GB042 Plug with other company's Receptacle.

9. 설계시 주의사항 (Precaution at the time of design)

(1) PCB Pattern 설계시 고객용 도면에 제시된 Pattern 사양에 준할 것.

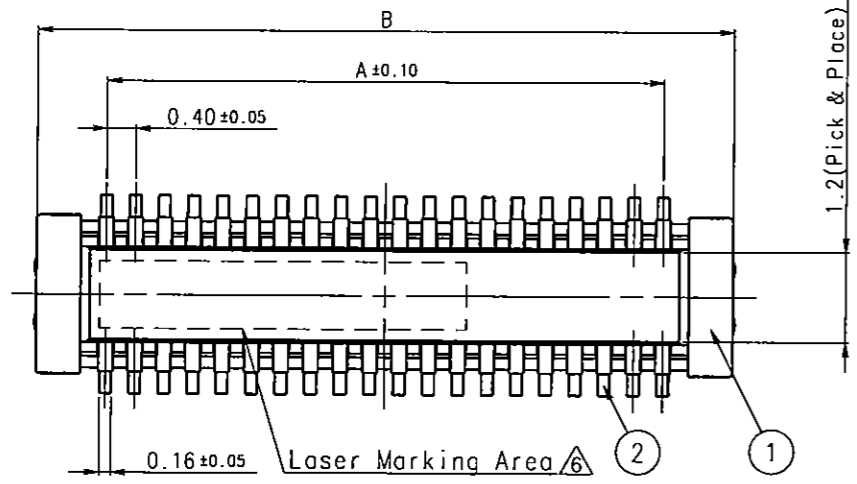
When Designing the PCB Pattern, apply the recommended the pattern.

(2) Metal mask 의 두께는 $t=0.08\sim 0.12$ 를 사용하여야 하며, Mask 의 개구율은 추천한 PCB Pattern 크기의 90%를 적용할 것

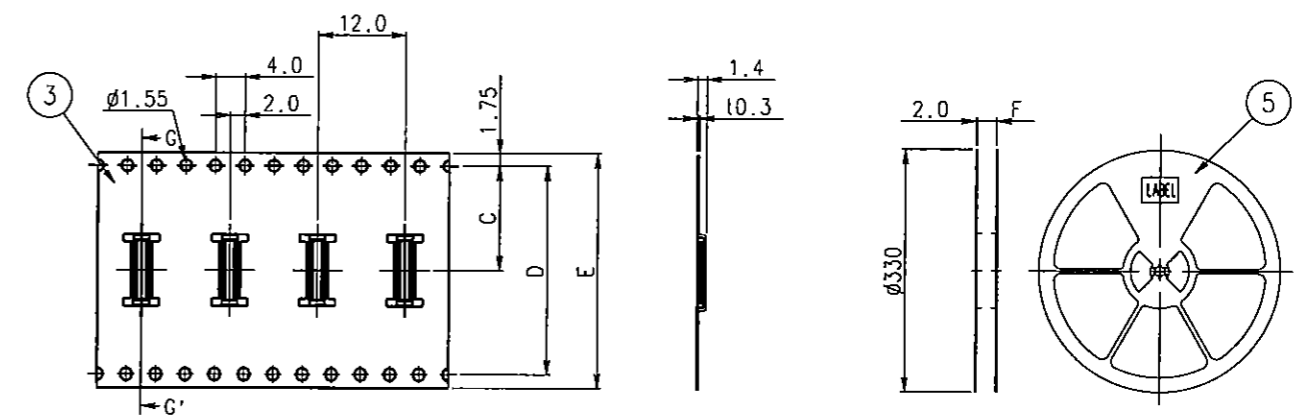
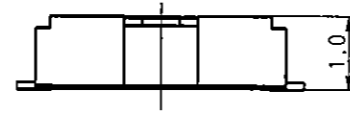
Metal mask thickness shall be 0.08 to 0.12mm.

Metal mask open area ratio should be 90% of the pattern (refer to the recommended pattern dimension)

REV. NO	DATE	DCN. NO	REMARKS	DES. D	CHE. D	APP. D
5	Dec.05.2006	1043	Modified dimensions (64P)	K.C.PARK		J.W.Huh
6	Apr.16.2008	08-044	Added Laser Marking Area	S.J.Oh	K.C.Park	I.D.Song
7	Sep.22.2008	08-100	Changed CI		K.C.Park	



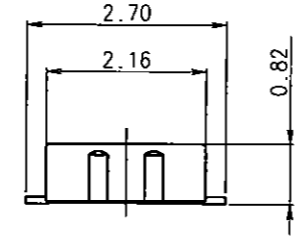
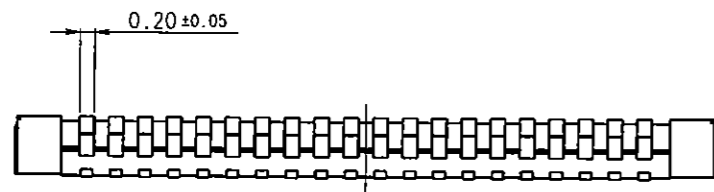
Mating (Height = 1.0mm)



Carrier Tape (S=1/1)

SEC. G-G'

Bobbin (S=1/10)



[NOTE] 1. Ordering Information

GB042 - ** P - H10 - E3000

No of position Plug 3,000 pcs/Plastic reel

2. Packing Specification

3. Peel strength : 10~70g

Recommended PCB Lay-Out

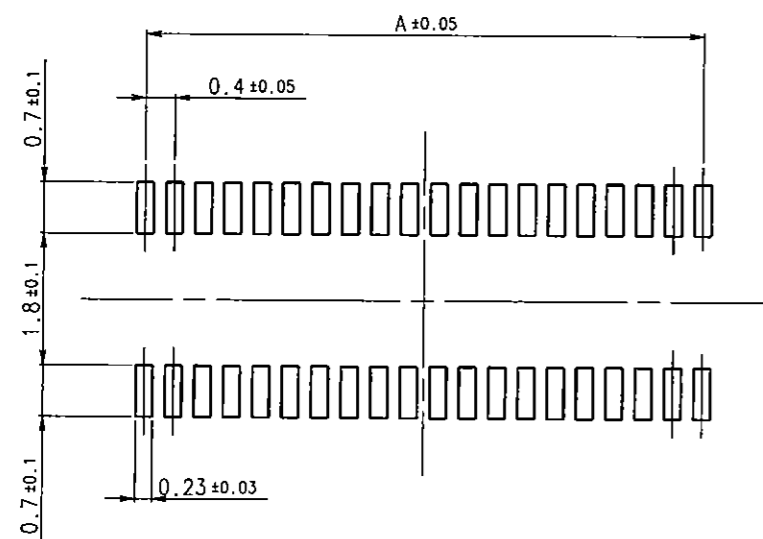
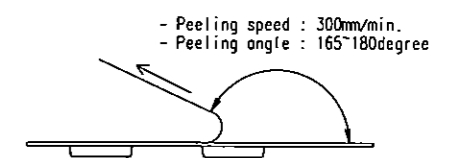
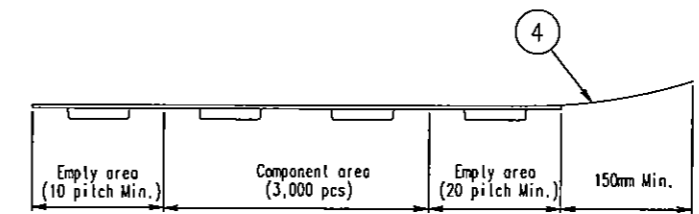


Table-1

No. of Positions	A	B	C	D	E	F
20	3.6	5.5				
24	4.4	6.3	7.5		16.0	18.0
28	5.2	7.1				
30	5.6	7.5				
34	6.4	8.3				
40	7.6	9.5				
44	8.4	10.3				
50	9.6	11.5	11.5		24.0	26.0
54	10.4	12.3				
60	11.6	13.5				
64	12.4	14.3				
70	13.6	15.5	14.2	28.4	32.0	34.0
80	15.6	17.5				



4. Co-Planarity of contacts is 0.1mm Max.

ITEM	DESCRIPTION	Q'TY	MATERIAL	FINISH	REMARKS
5	Bobbin	1	Plastic	-	-
4	Cover Tape	1	Polyester or Polystyrene	-	-
3	Carrier Tape	1	Polyester or Polystyrene	-	-
2	Plug Contact	n	Copper Alloy	Au over Ni	-
1	Plug Insulator	1	Engineering Plastic	-	UL94V-0

UNIT - mm GENERAL TOLERANCES: DIMENSION . X ± 0.2 . XX ± 0.1 ANGLES X. X. X	REFERENCE DOCUMENT	DATE	SCALE	SIZE	555, Hoge-Dong, Anyang-Si Kyungki-Do, 430-080, KOREA
	△ LSM(25)-K-A5118	Apr.14.2005	10/1	A3	
	MATERIAL	DESIGNED	TITLE		
		K.C.PARK	GB042 Plug (GB042-**-P-H10)		
	TREATMENT	CHECKED			DWG. NO GUS511801
	FINISH	APPROVED	SERIES	SHEET	
		D.H.KIM	GB042	1 / 1	

- 고객 제출용(Submit to customer)
 내부 회람용(Certification for inner LSM)

발행번호(Issue No) : QCN-C-F09-046 (Rev. 0)
발행일(Issue Date) : 2009. 03. 03

검사 및 시험 성적서

(Inspection and/or Test Report)

검사 / 시험 명(Inspection / Test Name) : Inspection for approval

제품명 / 고객(Item / Customer) : GB042-60P-H10-E3000

적용규격 / 개정번호(Spec. / Rev. No) : LGM(25)-K-A5118 / Ver. 4

작성 (Issued by) : K. H. Jung

검토 (Checked by) : H. J. Kwon

승인 (Approved by) : D. H. Kim



Electro-Component Division
Quality Assurance Team

검사/시험명 (Inspec/Test Name)	Inspection for approval (Dimension Inspection)	발행 번호 (Issue No.)	QCN-C-F09-046 (Rev. 0)		
품명(Item)	GB042-60P-H10-E3000	고객(Customer)	-		
생산처(Maker)	LSM	금형 정보 (Tool Inform.)			
원재료(Material)	Engineering Plastic, Copper Alloy(Au/Ni)	금형 제작 (Tooling Date)	-	검사/시험 환경 (Condition)	
제조일(Production Date)	-	제조 No. (Lot No.)	-	<input type="checkbox"/> Temperature	
검사일(Test Date)	2009.02.01 ~ 2009.02.23	검사자 (Inspector)	M. S SUL	<input type="checkbox"/> Humidity	
판정 기준 (Judgment Standard)		검사 및 시험 장비 (Inspection / Test Equipments)			
적용 표준명(Standard)	표준 번호(Standard No.)	장비명 (Equipment Name)		모델 (Model)	
도면(Drawing No.) 규격 (Spec No.)	GUS511801 (Ver. 7) LGM(25)-K-A5118 (Ver. 4)	치수측정기(공구현미경, 3차원자동측정기) 접촉 저항 측정기 (CR Tester) 절연 저항 측정기 (IR Tester) 내전압 측정기 (DWV Tester) 수명시험기 (Durability Tester) 인장 시험기 (Tensile Stress Tester) 진동 시험기 (Vibrator) Reflow Tester 납땜 시험기 (Solder Checker) 열충격 시험기 (Thermal Shock Chamber) 항온 항습기(Temp. & Humi. Chamber) 염수분무 시험기 (Salt Sprayer) 도금두께 측정기 Gas Tester		MM60, OGP 3540(HIOKI) SM-5E TUS8650 CLF-1(Aikoh) 1840S M0218-B RF-460LG SAT-5100 UP750-51 IM 4D8B1-S05 TC-M SFT9300(SII) GH-180(Yamasaki)	
목적(Purpose)					
고객 승인용 (Customer Approval) ; C/T재료변경, Dimple					
시험장소(Test Lab)					
LS엠트론 안양공장 전자부품 사업부 성능 실험실 (Functional Test Laboratory, Component Division, An-Yang Plant, LS Mtron)					
결과 (Test Result)		Appendix-A	Reflow 전, 후 평탄도		
■ 전기적 성능 (Electrical Performance) 1. 내전압시험 O.K (Dielectric Withstanding Voltage) 2. 절연저항시험 O.K (Insulation Resistance) 3. 접촉 저항 O.K (Contact Resistance)		■ 기계적 성능 (Mechanical Performance) 1. 총합삽입력 O.K (Mating Force) 2. 총합발거력 O.K (Unmating Force) 3. 컨택트 버팀력 O.K (Contact Retention Force) 4. 내진동성시험 O.K (Vibration Test) 5. 내충격시험 O.K (Shock Test) 6. 수명시험 O.K (Durability Test)		■ 환경적 성능 (Environmental Performance) 1. 열충격시험 O.K (Thermal Shock) 2. 내습도시험 O.K (Humidity) 3. 저온방치시험 O.K (Low Temperature Exposure) 4. 고온방치시험 O.K (Heigh Temperature Exposure) 5. 내부식성시험 O.K (Salt Spray) 6. 납땜성시험 O.K (Solderability) 7. 납땜내열성시험 O.K (Resistance to Soldering Heat)	

□ Performacne Test Result / 성능평가 결과

QCN-C-F09-046 (Rev. 0)

I. 전기적 성능 (Electrical Performance)

시험항목 (Test item)	Test 방법 (Test Method)	규격 (Requirement)	결과 (Data)					판정 (Result)
			SPL-1	SPL-2	SPL-3	SPL-4	SPL-5	
내전압 (Dielectric Withstanding Voltage)	MIL-STD-1344 시험방법 3001에 준하여 인접 콘택트 간에 규정 전압을 인가한다 / The specified voltage is applied between adjacent contacts in accordance with MIL-STD-1344 Method 3001	AC 250V r.m.s 로 1분간 가했을 때 이상이 없어야 한다. /There shall be no shortcircuiting and damage deteted at AC 250V r.m.s for 1 minute.	OK	OK	OK	OK	OK	O.K
접촉저항 (Contact Resistance)	MIL-STD-1344A 시험 방법 3002 에 준하여 저레벨 (20mV, 100mA이하) 로 접촉저항을 측정한다. (Measured by low level (20mV, 100mA Max.) in accordance with MIL-STD-1344A method 3002.	Max. 70mΩ	43.5	45.4	45.4	44.0	43.4	O.K
			39.6	45.4	45.4	38.0	37.8	
			45.2	38.8	37.5	37.4	40.2	
			46.2	43.5	38.8	41.2	43.8	
			46.2	37.4	44.2	44.4	41.2	
			43.4	38.6	39.8	43.6	38.3	
			Min	39.6	37.4	37.5	37.4	
Max	46.2	45.4	45.4	44.4	43.8			
Avg	44.0	41.5	41.9	41.4	40.8			
절연저항 (Insulation Resistance)	MIL-STD-1344 시험 방법 3003에 준하여 인접 콘택트 간에 DC 250V 를 인가하고 1분 이내에 측정한다. (DC 250V is applied between adjacent contacts and insulation resistance is measured within one minute in accordance with MIL-STD-1344 method 3003.)	Min. 1000MΩ	1X10 ⁶	1X10 ⁶	1X10 ⁶	1X10 ⁶	1X10 ⁶	O.K

□ Performacne Test Result / 성능평가 결과

QCN-C-F09-046 (Rev. 0)

II. 기계적 성능 (Mechanical Performance)

시험항목 (Test item)	Test 방법 (Test Method)	규격 (Requirement)	결과 (Data)					판정 (Result)
			SPL-1	SPL-2	SPL-3	SPL-4	SPL-5	
총합삽입력 (Mating Force)	PCB에 실장된 커넥터간에 20mm/분 속도로 삽입력을 측정한다 / Measure the force required to mate connectors soldered on a PCB at a speed of 20mm/min.	(100xn)gf Max./(n=No.of pin) =Max 6.0(kgf)	2.82	2.54	2.46	2.89	2.59	O.K
총합발거력 (Unmating Force)	PCB에 실장된 커넥터간에 20mm/분 속도로 발거력을 측정한다 / Measure the force required to unmate connectors soldered on a PCB at a speed of 20mm/min	(15xn)gf Max./(n=No.of pin) =Min 0.90(kgf)	2.41	2.45	2.13	2.41	2.50	O.K
컨택트버팀력 (Contact Retention Force)	20mm/분 속도로 콘택트 버팀력을 측정한다. / Apply an axial load to contact at a speed of 20mm/min	Plug Connector : not Available						
내진동성 (Vibration)	MIL-STD-1344 시험방법 2005에 준하여 진폭 1.5mm, 주파수 10~55Hz, X,Y,Z 축 각각 2시간(총 6시간)의 진동 시험을 한다. 단, 시험 중 커넥터 고정용 Holder는 사용해도 좋다. (Total amplitude of 1.5mm, 10~55Hz for 2 hours per axis for a total of 6 hours for three axes in accordance with MIL-STD-1344 method 2005	시험 중 1μsec 이상의 전류 차단이 없고, 시험 중이나 후에 제품의 파손 등의 기계적 결함이 생기지 않을 것 (There shall be no current discontinuity of more than 1 microsecond. And there shall be no mechanical defect detected on the parts during and after test)	OK	OK	OK	OK	OK	O.K
내충격성 (Shock)	총 낙하 중량 100g으로 150cm의 높이에서 X, Y, Z 축 방향 각각 3회씩 자유낙하 시험을 한다. 단 시험 중 커넥터 고정용 Holder는 사용해도 좋다. (Free fall is applied along the 3 axes three times(total weight:100g, height 150cm). An appropriate holder may be used for fixing purpose for tests.)		OK	OK	OK	OK	OK	O.K
수명시험 (Durability)	20mm/분 속도로 30회의 삽입 발거를 한다. / 30 cycle of inserting and separating actions are conducted at a speed of 20mm/min	접촉저항/ Contact resistance : Max. 90mΩ	41.3	40.6	43.5	40.2	44.0	O.K
			44.6	44.5	43.9	40.4	43.4	
			42.4	42.9	43.6	41.9	44.0	
			41.3	42.1	40.9	43.6	42.4	
			41.5	41.8	43.8	42.8	43.7	
			44.6	43.5	40.4	43.0	41.8	
			Min	41.3	40.6	40.4	40.2	
Max	44.6	44.5	43.9	43.6	44.0			
Avg	42.6	42.6	42.7	42.0	43.2			

□ Performacne Test Result / 성능평가 결과

QCN-C-F09-046 (Rev. 0)

III. 환경적 특성 (Environmental Performance)

시험항목 (Test item)	Test 방법 (Test Method)	규격 (Requirement)	결과 (Data)					판정 (Result)
			SPL-1	SPL-2	SPL-3	SPL-4	SPL-5	
열충격 (Thermal Shock)	MIL-STD-202F 시험방법 107G에 준하여 -55℃ (30분), +25℃ (5분), +85℃ (30분), +25℃ (5분) 의 온도 사이클을 연속 5회 반복한다. (-55℃ (30min), +25℃ (5min), +85℃ (30min), +25℃ (5min) consecutive five cycles. ; MIL-STD-202 method 107G)	접촉저항 (Contact Resistance) Max. 90mΩ	42.8	43.9	42.4	42.2	42.7	O.K
		절연저항 (InsulationResistance) Min. 100MΩ	1X10 ⁶	1X10 ⁶	1X10 ⁶	1X10 ⁶	1X10 ⁶	O.K
내습도 (Humidity)	MIL-STD-1344A 시험방법 1002 에 준하여 온도60℃, 상대습도 90 ~ 95 % RH 로 96시간 동안 습도 시험을 한다. (Temp.:60℃, Relative humidity:90~95%, Length of test:96hours ; MIL-STD-1344 method 1002)	접촉저항 (Contact Resistance) Max. 90mΩ	43.2	43.0	43.6	43.3	41.3	O.K
		절연저항 (InsulationResistance) Min. 100MΩ	1X10 ⁶	1X10 ⁶	1X10 ⁶	1X10 ⁶	1X10 ⁶	O.K
저온방치 (Low Temperature Exposure)	온도 -40±3℃로 48시간 동안 시험 한다. / Temperature : -40±3℃, Length of test : 48 hours	접촉저항 (Contact Resistance) Max. 90mΩ	41.9	42.4	42.6	41.6	42.0	O.K
고온방치 (High Temperature Exposure)	MIL-STD-1344 시험방법 1005에 준하여 온도 85±2℃로 96시간 동안 시험 한다 / Temperature : 85±2℃, Length of test : 96 hours (MIL-STD-1344 method 1005)	절연저항 (InsulationResistance) Min. 100MΩ	43.3	42.6	42.1	43.8	42.5	O.K
내부식성 (Salt Spray)	MIL-STD-1344 시험방법 1002 에 준하여 염수농도 5%, 시험온도 35℃, 시험시간 48 시간의 조건으로 염수분무 시험을 한다. (Salt water density of 5%, 35℃ for 48 hours ; MIL-STD-1344A method 1001)	컨택트 접촉에 유해한 소지 금속의 노출이 없고 접촉저항 90mΩ 이하 (There shall be no exposure of base metal of contacts which is detrimental to contacting. Contact resistance shall be below 90mΩ)	41.7	42.0	42.6	41.5	42.0	O.K
납땜성 (Solderability)	적합 플럭스에 5~10초 동안 침적 시킨 다음 Sn : Pb가 60 : 40인 납조에 230±5℃의 온도로 3±0.5 초 동안 담근다. / The end of the post shall be dipped in a solder bath(6:4 SnPb) at 230±5℃ for 3±0.5 sec	침적 면적의 95% 이상이 납으로 덮혀 있을 것 (More than 95% of the dipped part shall be covered with solder.)	OK	OK	OK	OK	OK	O.K
납땜 내열성 (Resistance to Soldering Heat)	1)Reflow Soldering 아래와 같은 조건으로 시험한다.Test condition of reflow soldering is as follows. 2) Manual Soldering Solder Iron : 300±10℃ Duration : 3±1sec Should not apply excessive pressure to the contacts	절연체에 사용상 유해한 변형이나 흠집이 없을 것 (During test, no physical damage)	OK	OK	OK	OK	OK	O.K

유해물질 분석표

1. 일반정보

부품명 (Class Name)	Connector	작성자	정경한	작성일자	2009 . 2 . 19
LG전자 Part No.	ENBY0036701	전화번호	031-428-4304	제출사업부	LGE MC
Maker Part No.	GB042-60P-H10-E3000	e-mail Address	jungkh21@lsmtron.com	부품중량(gram)	0.0327
Maker Name (Eng)	LS Mtron Ltd.	Maker Name (Kor)	LS 엠트론	Maker Code	
Vendor Name (Eng)	LS Mtron Ltd.	Vendor Name (Kor)	LS 엠트론	Vendor Code	
				내열온도	260℃ 10 sec

2. 상세정보

Classification (구분)	Sub P/No	Sub part's Name	Sub Part Maker	Weight (g)	Material	Weight Ratio (%)	Exist (Y/N)	Substances Content (ppm)						Decision Standard	RoHS Exception Item	유해물질성적서 번호
								Pb	Cd	Cr6+	Hg	PBBs	PBDEs			
Components (부품 원자재)		Plug Contact		0.0060	C5210(Au/Ni)	18%	Y	37.2	n/d	n/d	n/d	-	-		F690501/LF-CTSAYAA08-12608R	
		Plug Insulator		0.0267	E473i BK210P	82%	N	n/d	n/d	n/d	n/d	n/d	n/d		F690501/LF-CTSAYAA08-28954 F690501/LF-CTSAYA07-25901	
Packaging (부품 포장재)		Outer Box					Y	17.8	0.9	n/d	n/d	n/d	n/d		F690501/LF-CTSAYAA08-15925	
		Plastic Bobbin					N	n/d	n/d	n/d	n/d	n/d	n/d		F690501/LF-CTSAYAA09-02301	
		Cover Tape					N	n/d	n/d	n/d	n/d	n/d	n/d		F690501/LF-CTSAYAA09-02300	
		Embossed Carrier Tape					N	n/d	n/d	n/d	n/d	n/d	n/d		F690501/LF-CTSAYA07-26129	

비사용 증명서

구분	<input checked="" type="checkbox"/> 승인용 <input type="checkbox"/> 양산용	제출일자	2009 . 2 . 19
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협력회사				
회사명	LS엠트론	결재	담당자	부서장
연락처	031-428-4304	성명	정경한	김동희
e-Mail	jungkh21@lsmtron.com	서명		

부품정보			
LG전자 P/No.	ENBY0036701	부품제조일자	N/A
Maker P/No.	GB042-60P-H10-E3000	생산공장	LS엠트론/안양공장
부품명(품명)	Connector	납품수량	N/A

당사가 납품하는 납입품 및 당사 제조 공정상 사용되는 물질이 아래 **Check** 항목에 대해 만족함을 증명합니다.

————— 아 래 —————

- ROHS 규제 6대 물질(Pb, Cd, Cr⁶⁺, Hg, PBBs, PBDEs)이 LG전자 기준을 만족함
- 최대 내열성 온도 및 시간
 최대 내열성 온도 : 260 ℃, 최대 내열성 시간 : 10 Sec
 ※ PCB(Printed Circuit Board)위에 실장되는 회로 칩 부품일 경우에 기록 요망
- Pb-Free Soldering(Solder Cream, Bar, Wire 모두 포함) 적용이 가능함.

Note.

1. 본 자료상의 모든 기재 내용은 사실에 근거하여 작성하여야 하며, LG전자가 근거 자료를 요구시 관련 Data를 제출하여야 한다.
2. 본 자료가 승인용으로 사용될 경우 Sample 제출시 반드시 제출하고, 양산용으로 사용될 경우 초도품 납품 시 제출하여야 한다.



유해물질 관리 목록표

Version 2.0

구분	Material(Kor)	Material(Eng)	유해물질 함유 여부	
			유	무
Level A-I	납 및 화합물	Lead(Pb) and its compounds	○	
	카드뮴 및 화합물	Cadmium(Cd) and its compounds		○
	수은 및 화합물	Mercury(Hg) and its compounds		○
	6가 크롬 및 화합물	Hexavalent chromium and its compounds		○
	PBB	Polybrominated biphenyls(PBBs)		○
	PBDE	Polybrominated diphenylethers(PBDEs)		○
Level A-II	폴리염화 비페닐	Polychlorinated biphenyls (PCB)		○
	폴리염화 나프탈렌	Polychlorinated naphthalenes (PCN)		○
	폴리염화 테르페닐	Polychlorinated terphenyls (PCT)		○
	단쇄 염화 파라핀	Short-chain Chlorinated paraffins (SCCP)		○
	석면 및 화합물	Asbestos and its compounds		○
	오존 파괴물질	Ozone Depleting Substances		○
	아조 화합물	Azo compounds		○
	니켈 및 화합물	Nickel and its compounds	○	
	유기 주석계 화합물	Specific Organic tin compounds		○
	비소 및 화합물	Arsenic and its compounds		○
	포름알데히드	Formaldehydes		○
Level B	염화비닐수지	Polyvinyl chloride, (PVC)		○
	프탈레이트	Phthalates		○
	베릴륨 및 화합물	Beryllium and its compounds		○
	안티몬 및 화합물	Antimony and its compounds		○
	셀레니움 및 화합물	Selenium and its compounds		○
	팔라듐 및 화합물	Palladium and its compounds		○
	비스무스 및 화합물	Bismuth and its compounds		○
	기타 염소계 난연제	Other chlorinated flame retardants		○
	기타 브롬계 난연제	Other brominated flame retardants		○

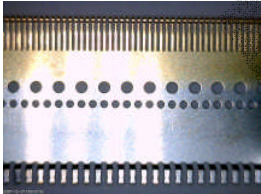

Note

1. 기본적으로 전사기준에 따라 실행하되, Buyer 등 거래선의 요구사항을 반영한 별도의 유해물질관리 목 제시한 사업부의 요청이 있는경우 사업부 관리목록에 준해서 작성되어야 한다.
2. 협력업체에서 현재 해당물질을 사용하고 있는지 확인을 하여 사용유무에 대해서 체크한다.

모델명	B2B Connector	협력사명	LSM	인정부품의뢰일자	2009.02.25
품명	GB042-60P-H10-E3000 GB042-60S-H10-E3000	Part No	ENBY0036701 ENBY0036801		
시험목적		인정차수			

공정명	업체(공장)명	사출기 No	사출기 Spec	사출기 Maker	Resin명	사출조건		생산일시	생산수율				사용 Jig
						관리항목	조건		생산수량	양품수량	불량수량	수율	
사출 RECEP. INSULATOR	LSM	13 호기	Ton수: 5 Ton Nozzle Φ: 2.0	NISSEI	LCP (E130i)	금형온도(상 Core)	120 ± 20 °C	04월 22일	39,280 EA	39,280 EA	0 EA	100.0%	현미경
						금형온도(하 Core)	120 ± 20 °C						
						실린더온도(H1)	310 ± 20 °C						
						실린더온도(H2)	310 ± 20 °C						
						실린더온도(H3)	310 ± 20 °C						
						실린더온도(H4)	290 ± 20 °C						
						사출압력	950 ± 100 kg/cm ²						
						사출속도	50 ± 20 mm/sec						
						모압압력	350 ± 100 kg/cm ²						
냉각시간	2.0 ± 1.0 sec												
사출 PLUG INSULATOR	LSM	3 호기	Ton수: 25 Ton Nozzle Φ: 2.0	NISSEI	LCP (E473i)	금형온도(상 Core)	120 ± 20 °C	04월 06일	20,000 EA	20,000 EA	0 EA	100.0%	현미경
						금형온도(하 Core)	120 ± 20 °C						
						실린더온도(H1)	340 ± 20 °C						
						실린더온도(H2)	340 ± 20 °C						
						실린더온도(H3)	340 ± 20 °C						
						실린더온도(H4)	340 ± 20 °C						
						사출압력	600 ± 100 kg/cm ²						
						사출속도	120 ± 20 mm/sec						
						모압압력	150 ± 100 kg/cm ²						
냉각시간	2.0 ± 1.0 sec												
공정명	업체(공장)명	Line명	조립 Spec	조립기 Maker		작업조건표		생산일시	생산수율				사용 Jig
						관리항목	조건		생산수량	양품수량	불량수량	수율	
조립	LSM	GB042 Recep 조립		Meiyu (Japan)		감합부(내측)	0.68±0.02	04월 17일	1,182 EA	1,000 EA	182	84.6%	
						감합부(외측)	1.00±0.02						
						평탄도	0.08 이하						
						압입량	0.15 +0.02/-0.01						
공정명	업체(공장)명	Line명	조립 Spec	조립기 Maker		작업조건표		생산일시	생산수율				사용 Jig
						관리항목	조건		생산수량	양품수량	불량수량	수율	
커팅	LSM	GB042 Plug 커팅		M-solution (Korea)		평탄도	0.08 이하	04월 17일	3,094 EA	3,000 EA	94	97.0%	

사출기준				
Maker	Ton수	Nozzle Φ	No	대수
NISSEI	5 Ton	2 Φ		3
NISSEI	25 Ton	2 Φ		3

협력사 명	LS엠트론(주)	품 명	Connector	관리 NO	GB042-60P	시료 제작 부서	LSM CN 개발
관리 POINT 특이 사항	Total Pitch (0.4mm) 및 평탄도 (Max. 0.1mm)						
부품명	사 진	현 품	작업처명 (위치)	중점 관리 항목	비고		
Plug Contact			Press (LSM)	외관 및 특성 치수, 권취 상태	외관 돌기, Burr, Crack, 변형 치수 특성치 권취상태 전도, 권취 방향		
Plug			Insert Molding (LSM)	외관 및 특성 치수	외관 Flash, 충전 부족, 금형이상, 탄화, 기포, 웬드라인, 오염 치수 폭, 길이 높이, Total Pitch		

To: **LS MTRON**
555 Hogye-dong
Dongan-gu
Anyang-city
GYEONGGI-DO 431-831
Korea

The following merchandise was submitted and identified by the client as :

Product Name : C5210_Au_Ni
SGS File No. : AYAA08-12608R1
Received Date : April 24, 2008
Test Performing Date : April 25, 2008
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)
Comments : The sampling and testing was performed only for the part indicated in the photo without disassembly by the applicant's specific request.
This Report supersedes the Report No.F690501/LF-CTSAYAA08-12608 dated April 25,2008 issued by SGS Testing Korea Co.,Ltd. The applicant name is changed from LS CABLE to LS MTRON by customer's request.

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

SGS Testing Korea Co. Ltd.



Jeff Jang / Chemical Lab Mgr

Sample No. : AYAA08-12608R1.001

Sample Description : C5210_Au_Ni

Item No./Part No. : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	37.2
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Picture of Sample as Received:

Sample Color : Gold



*** End ***

- NOTE:**
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable

To: **LS MTRON**
555.Hogye-dong
Dongan-gu
Anyang-city
GYEONGGI-DO 431-080
Korea

The following merchandise was submitted and identified by the client as :

Product Name : LCP(473i BK210P)
SGS File No. : AYAA08-28954
Received Date : October 27, 2008
Test Performing Date : October 28, 2008
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

SGS Testing Korea Co. Ltd.



Jeff Jang / Chemical Lab Mgr

Sample No. : AYAA08-28954.001
Sample Description : LCP(473i BK210P)
Item No./Part No. : GT05Q INSULATOR

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321/Ed.1 (111/116/FDIS), UV-VIS	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

- NOTE:
- (1) N.D. = Not detected. (<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable

Picture of Sample as Received:



*** End ***

- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable

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Test Report No. F690501/LF-CTSAYA07-25901R1

Issued Date: November 22, 2007 Page 1 of 3

To: LS MTRON
555 Hogye-dong
Dongan-gu
Anyang-city
GYEONGGI-DO 431-831
Korea

The following merchandise was submitted and identified by the client as :

Product Name : E473i
SGS File No. : AYA07-25901R1
Received Date : November 16, 2007
Test Performing Date : November 19, 2007
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)
Comments : This Report supersedes the Report No.F690501/LF-CTSAYA07-25901 dated November 22,2007 issued by SGS Testing Korea Co.,Ltd. The applicant name is changed from LS CABLE to LS MTRON by customer's request.

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr

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**Test Report No. F690501/LF-CTSAYA07-25901R1**

Issued Date: November 22, 2007 Page 2 of 3

Sample No. : AYA07-25901R1.001

Sample Description : E473i

Item No./Part No. : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.
Sb (Sb2O3)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	10	N.D.
Phosphorous (P)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	10	37.4

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

- NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable
(7) Sb2O3 : calculated from Sb by the equation = (121.760 X 2 + 15.9994 X 3) X Sb = 1.197 X Sb

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Sample No. : AYA07-25901R1.001
 Sample Description : E473i
 Item No./Part No. : N/A

Halogen Contents

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	EN 14582:2007 , IC	30	N.D.
Chlorine(Cl)	mg/kg	EN 14582:2007 , IC	30	N.D.

Picture of Sample as Received:

Sample Color : Black



*** End ***

- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable
 - (7) Sb2O3 : calculated from Sb by the equation = (121.760 X 2 + 15.9994 X 3) X Sb = 1.197 X Sb

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1. Carton Box (Packaging)

Test Report No. F690501/LF-CTSAYA07-09112

Date: April 16, 2007

Page 1 of 3

To: **LS CABLE LTD.**
555, Hogye-dong
Dongan-gu
Anyang-city
Kyunggi-do 431-831
Korea

The following merchandise was submitted and identified by the client as :

Product Name : Carton box
SGS File No. : AYA07-09112
Received Date : April 10, 2007
Test Performing Date : April 11, 2007
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)

Pluto Kim
Monet Jeong
Jully Oh
Jerry Jung
/Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr



1. Carton Box (Packaging)

Test Report No. F690501/LF-CTSAYA07-09112

Date: April 16, 2007

Page 2 of 3

Sample No. : AYA07-09112.001

Sample Description : Carton box

Item No./Part No. : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	0.5	0.54
Lead (Pb)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	5	12.5
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

- NOTE:
- (1) N.D. = Not detected,(<MDL)
 - (2) ppm = mg/kg
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable

Picture of Sample as Received:**Sample Color :****Light brown**

*** End ***

- NOTE:**
- (1) N.D. = Not detected,(<MDL)
 - (2) ppm = mg/kg
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable



2. Plastic Bobbin

Test Report No. F690501/LF-CTSAYA07-17916

Issued Date: August 17, 2007

Page 1 of 3

To: SEMILAND INC.
274-5, Gunup-ri
Silchon-eup
Gwangju-city
GYEONGGI-DO
Korea

The following merchandise was submitted and identified by the client as :

Product Name : Lock Reel
SGS File No. : AYA07-17916
Received Date : August 10, 2007
Test Performing Date : August 13, 2007
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)
Buyer(s) : SONY

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr



2. Plastic Bobbin

Test Report No. F690501/LF-CTSAYA07-17916

Issued Date: August 17, 2007

Page 2 of 3

Sample No. : AYA07-17916.001
Sample Description : Lock Reel
Item No./Part No. : N/A
Comments : Material is HIPS.

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

- NOTE:
- (1) N.D. = Not detected, (<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) Negative = Undetectable / Positive = Detectable

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Picture of Sample as Received:**Sample Color :****White******* End *****

- NOTE:**
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3. Embossed Carrier tape (Packaging)

Test Report No. F690501/LF-CTSAYA07-26129

Issued Date: November 26, 2007 Page 1 of 3

To: FOSFIL
74-2, Sugi-ri
Bongdam-eup
Hwasung-city
KYUNGGI-DO
Korea

The following merchandise was submitted and identified by the client as :

Product Name : PS Transparent Carrier Tape
SGS File No. : AYA07-26129
Received Date : November 20, 2007
Test Performing Date : November 21, 2007
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr



3. Embossed Carrier tape (Packaging)

Test Report No. F690501/LF-CTSAYA07-26129

Issued Date: November 26, 2007 Page 2 of 3

Sample No. : AYA07-26129.001
Sample Description : PS Transparent Carrier Tape
Item No./Part No. : ICTS Grade
Comments : Material is poly styrene.

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

- NOTE:
- (1) N.D. = Not detected, (<MDL)
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 - (3) MDL = Method Detection Limit
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Picture of Sample as Received:

Sample Color :

Transparency



*** End ***

- NOTE:
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 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
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4. Cover tape (Packaging)

Test Report No. F690501/LF-CTSAYA08-06888

Issued Date: March 06, 2008

Page 1 of 3

To: ICT
130BL 5LOT Namdong industrial
Gojan-dong
Namdong-gu
INCHEON
Korea

The following merchandise was submitted and identified by the client as :

Product Name : Cover Tape
SGS File No. : AYA08-06888
Received Date : February 29, 2008
Test Performing Date : March 03, 2008
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr



4. Cover tape (Packaging)

Test Report No. F690501/LF-CTSAYA08-06888

Issued Date: March 06, 2008

Page 2 of 3

Sample No. : AYA08-06888.001
Sample Description : Cover Tape
Item No./Part No. : ICT-110
Comments : Material is after-treatment PET film.

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

- NOTE:
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Picture of Sample as Received:

Sample Color : Slightly yellowish



*** End ***

- NOTE:
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