



Item And Code No.

I T E M	C O N N E C T O R
S P E C	2.50mm Pitch Wire to Board DIP Type
M A K E R S P E C	25048HS-0
Code No.	

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Specification Approval Sheet



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PRODUCT SPECIFICATION

25048 Series

Pitch	2.50 mm
Special	Wire to Board
Type	DIP

25048 Series

Connector 제품규격

Product Specification

Indemnification

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● 제, 개정 이력 『History Revision』

NO	DATE	ISS.	CHK.	APP.	SUMMARY
1	2001.10.15	P.K.H	A.J.I	B.J.S	Presentation
2	2002.10.04	C.A.N	J.J.E	A.J.I	영수분무 시험조건 개정
3	2003.01.21	C.A.N	J.J.E	A.J.I	특허문구 삽입
4	2004.06.07	K.H.S		A.J.I	시험방법 및 시험조건 개정



아래와 같이 사양 승인원을 제출합니다.

『Yeon Ho Electronics CO.,LTD. submits the approval certification of connector specification.』

1. 업체명 : (주)연호전자

『Manufactured by : Yeon Ho Electronics CO.,LTD.』

2. 기안부서 : 품질관리실

『Written by : Quality Control Department』

♠ ♠ ♠ 목 차 『Contents』 ♠ ♠ ♠

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6. Q.C 공정도 『QC Process Chart』



PRODUCT SPECIFICATION

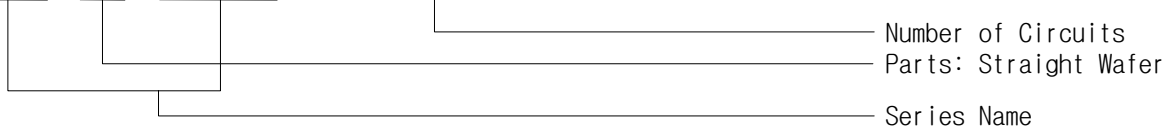
25048 Series

1. 적용 범위 『Scope』

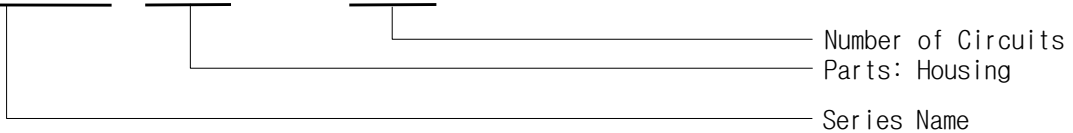
본 사양서는 (주)연호전자 제품 25048 series DIP type connector에 한하여 적용한다.
 『This specification covers the requirements for 25048 series DIP type connector』

2. 형명 구성 『Numbering System of Products(Ordering Information of Products)』

SM W 250 - NN



25048 HS - NN



SM H 250J - NN RT ————— Part : Retainer

25045 TS ————— Parts : Terminal

3. 원재료 『Material』

Item	Material	Maker	Plated / Color
Wafer Material	PA66	Rhodia	Natural
Housing Material	PA66	LG Chem	White
Rt Material	PA66	Rhodia	Red
Pin Material	Brass C2700	Poong San	* Over plating : Sn(2-6μm)
Terminal Material	Phosphor Bronze C5191	Poong San	* Over plating : Pre-plated tin(1-2μm)

4. 정 격 『Ratings』

항 목 (Item)	정 격 (Standard Data)
정격 전압 (Operating Voltage)	AC/DC 250V
정격 전류 (Current Rating)	AC/DC 3A
사용 온도 (Operating Temperature)	-25℃ ~ +85℃
적용 전선 (Applicable Wire)	AWG #22 ~ #28
적용 PCB (Applicable P.C.B)	1.2 ~ 1.6mm



PRODUCT SPECIFICATION

25048 Series

5. 성능 『Performance Characteristics』

NO.	시험항목 『Test Title』	시험 방법 및 조건 『Test Procedures/Methods Conditions』	규격 『Requirements』
1.	외관 치수 『Dimensions』		첨부 제품도에 준한다. 『Refer to drawings』
2.	전기적 성능 『Electrical Characteristics』		
2-1.	절연저항	<ul style="list-style-type: none"> 인접 Terminal(Contact)간에 DC 500V ±5V 전압을 1분±5초간 인가하였을 때 절연저항을 측정한다. (1회 측정에서 규격치 미달인 경우 3시간 이내 재측정) 	1000MΩ 이상
2-1.	Insulation Resistance	<ul style="list-style-type: none"> Measured between adjacent contacts Test voltage : DC 500V ±5V / 1 min ±5 sec (Based upon MIL-STD-202G Method 302 Condition B) 	1000MΩ MIN
2-2.	내전압	<ul style="list-style-type: none"> 인접한 Terminal간에 AC 1000V 전압을 1분±5초간 인가한다. 	절연파괴/성락이 없고 사용상 결함이 없을 것
2-2.	Dielectric Withstanding Voltage	<ul style="list-style-type: none"> Measured between adjacent contacts Test voltage : AC 1000V / 1 min ±5 sec (Based upon MIL-STD-202G Method 301) 	No flash over and no physical damage shall be observed
2-3.	접촉저항	<ul style="list-style-type: none"> Terminal과 Wafer Pin간의 접촉저항 측정 20mV. 10mA 	30mΩ 이하
2-3.	Contact Resistance	<ul style="list-style-type: none"> Measured the resistance of mated connector, 20mV. 10mA 	30mΩ MAX
3.	물리적 성질 『Physical Characteristics』		
3-1.	납땀성	<ul style="list-style-type: none"> FLUX (ROSIN 10%, METHANOL 90%)에 5~10초 동안 담근 후 SnAg(3.5)Cu(0.7)의 Pot 납땀조 온도 (240℃±5℃)에 3초±0.5초 동안 침전시킨다. 	침전 부위의 납땀이 90% 이상일 것
3-1.	Solder Ability	<ul style="list-style-type: none"> Immersion in flux consisting of rosin 10% and methanol 90% for a period of 5 to 10 seconds dip in molten solder consisting of SnAg(3.5)Cu(0.7) at 240℃±5℃degrees for 3 ± 0.5 seconds. 	More than 90% of area dipped in molten solder should be coated by solder
3-2.	납땀내열성	<ul style="list-style-type: none"> ※ WAVE TYPE ○ 온도 260℃±5℃ 5±0.5초간 침적시킨다. 	외관 변형등이 없을 것
3-2.	Solder Heat Resistance	<ul style="list-style-type: none"> ※ WAVE TYPE ○ Solder consisting : 260℃±5℃ degrees for 5±0.5 seconds 	Appearance : Good
3-3.	Pin유지력	<ul style="list-style-type: none"> ○ 사출물(수지)이 Pin을 유지하고 있는 힘 측정 * Pin을 25±3mm/min 속도로 뺄 때의 힘을 측정한다. 	0.5Kgf 이상
3-3.	Pin Retention Force	<ul style="list-style-type: none"> ○ Measured withdrawal force that resin grips and supports pin * Velocity of withdrawal : 25 ±3mm/min 	0.5Kgf MIN



PRODUCT SPECIFICATION

25048 Series

NO.	시험항목 『Test Title』	시험 방법 및 조건 『Test Procedures/Methods Conditions』	규격 『Requirements』									
			Pos	Push(Kgf)	Pull(Kgf)							
3-4.총합삽입력	회로수가 같은 Housing Ass`Y에 Wafer Ass`Y를 삽입할 때의 힘 측정	<ul style="list-style-type: none"> Measured forces to insert Wafer Assembly into the Housing Assembly which has same circuits 	2	1.5 Max	0.30 Min							
3-4.Total Insertion Force	<ul style="list-style-type: none"> Measured forces to withdrawal Wafer Assembly from the Housing Assembly which has same circuits 		3	1.7 "	0.35 "							
3-5.총합발거력			결합된 Housing Ass`Y로부터 Wafer Ass`Y를 발거할 때의 힘 측정	4	2.0 "	0.40 "						
3-5.Total Withdrawal Force			<ul style="list-style-type: none"> Measured forces to insertion and withdrawal operation Withdrawal rate : 10th/min 	5	2.3 "	0.50 "						
3-6.내구성시험				결합된 제품 Housing Ass`Y과 Wafer Ass`Y의 삽입 및 분리 동작을 10회/분 속도로 30회 행한 후 접촉저항 측정	6	2.6 "	0.60 "					
3-6.Durability of Contact Resistance				<ul style="list-style-type: none"> Insert a terminal into the housing straightly and measure insertion force Velocity of insertion : 25 ±3mm/min 	7	3.0 "	0.70 "					
3-7.Terminal 삽입력					Housing을 고정시키고 Terminal를 25 ±3mm/min 속도로 일직선으로 삽입할 때의 삽입력 측정	8	3.4 "	0.80 "				
3-7.Insertion Force of Terminal					<ul style="list-style-type: none"> Insert a terminal into the housing and measure the force to withdraw the terminal from housing Apply axial pull out force at the speed rate of 25 ±3mm/minute 	9	3.8 "	1.00 "				
3-8.Terminal 조립강도						Housing에 Terminal을 조립한 후 Terminal을 25 ±3mm/min 속도로 인장시켜 이탈될 때의 힘 측정	10	4.2 "	1.20 "			
3-8.Terminal Retention Force						<ul style="list-style-type: none"> Terminal에 Lead Wire를 압착한후 압착부위(심선부위)가 파괴될 때까지 25 ±3mm/min 속도로 인장강도 측정. Measured tensile strength of the crimped contact (stripped wire barrel section of contact) to conductor joint 	11	4.6 "	1.40 "			
3-9.압착강도							<ul style="list-style-type: none"> 접촉저항 : 50mΩ 이하 Contact Resistance : 50mΩ MAX 	12	5.0 "	1.60 "		
3-9.Crimp Tensile Strength								<ul style="list-style-type: none"> 1.0Kgf 이하 1.0Kgf MAX 0.5Kgf 이상 0.5Kgf MIN AWG #22 : 2.5Kgf MIN AWG #24 : 2.0Kgf MIN AWG #26 : 1.5Kgf MIN AWG #28 : 1.0Kgf MIN 	13	5.4 "	1.80 "	
										14	5.8 "	2.00 "
										15	6.4 "	2.20 "



PRODUCT SPECIFICATION

25048 Series

NO.	시험항목 『Test Title』	시험 방법 및 조건 『Test Procedures/Methods Conditions』	규격 『Requirements』
4. 환경 시험 『Environmental Test』			
4-1.내진동성 시험	4-1.Vibration	<ul style="list-style-type: none"> DC 100mA 통전상태에서 진폭1.52mm 진동수 10-55-10HZ 진동 상태에서 X,Y,Z방향으로 각각 2시간씩 진동을 시킨 후 단전상태 및 접촉저항 측정 Current of 100mA shall be applied during the testing The vibration shall be along each axis for the period of two hours with the maximum amplitude of 1.52mm and frequency of 10-55-10Hz/Min (Based upon MIL-STD-202G Method 201A) 	1)접촉저항: 50mΩ 이하 2)단전상태: 1μsec 동안 단전상태 없을것 1)Contact Resistance : 50mΩ MAX 2)Discontinue : 1μsec MAX
4-2.염수분무 시험	4-2.Salt Spray	<ul style="list-style-type: none"> Connector를 결합한 상태에서 아래 조건으로 시험 후 흐르는 물에 세척 후 상온에서 4시간 방치 후에 특성을 측정한다. 조건: 염수농도 5% ±1% 염수분무 시간 48시간 ±4시간(단,원자재: 2시간 적용함) 시험온도 35℃ ±2℃ Measure after exposure to salt solution spray of 5 ±1% density at a temperature of 35℃ ±2℃ for 48hrs ±4hrs. (But, material apply to 2hrs) after test wash and leave to dry (Based upon MIL-STD-202G Method 101E Condition B) 	1)접촉저항: 50mΩ 이하 2)외관: 흑녹현상 없을것 1)Contact Resistance : 50mΩ MAX 2)Appearance : Not black rust
4-3.내습성시험	4-3.Humidity	<ul style="list-style-type: none"> Connector를 결합한 상태에서 아래조건에 따라 시험을 행한 후 측정한다. 조건 : 시험조의 온도 40℃ ±2℃ 상 대 습 도 90% ~ 95% 시 험 시 간 96시간 Mated connector shall be left for 96 hours in an environment of 40 ±2℃, and 90 ~ 95% humidity. After the exposure the connector shall be left in an ambient condition for one hour before the measurement is done (Based upon MIL-STD-202G Method 103B Condition B) 	1)절연저항: 500MΩ 이상 2)접촉저항: 50mΩ 이하 3)외관 : 양호할 것 1)Insulation Resistance : 500MΩ MIN 2)Contact Resistance : 50mΩ MAX 3)Appearance : Good
4-4.내고온성 시험	4-4.Resistance to High Temperature	<ul style="list-style-type: none"> Connector를 결합한 상태에서 시험조의 온도 85 ±2℃에서 96시간 동안 시험 후 상온에서 30분간 방치 후 측정한다. Chamber temperature : 85 ±2℃ Exposed 30 minutes after being exposed 96 hours under the chamber temperature electrical characteristics were measured and tested (Based upon MIL-STD-202G Method 108A Condition A) 	1)접촉저항: 50mΩ 이하 1)Contact Resistance : 50mΩ MAX
4-5.내한성시험	4-5.Altitude Low Temperature	<ul style="list-style-type: none"> Connector를 결합한 상태에서 시험조의 온도 -40 ±3℃에서 96시간 동안 시험 후 상온에서 30분간 방치 후 측정한다. Chamber temperature : -40 ±3℃ Exposed 30 minutes after being exposed 96 hours under the chamber temperature electrical characteristics were measured and tested (Based upon JIS C60068-2-1) 	1)접촉저항: 50mΩ 이하 1)Contact Resistance : 50mΩ MAX



PRODUCT SPECIFICATION

25048 Series

NO.	시험항목 『Test Title』	시험 방법 및 조건 『Test Procedures/Methods Conditions』	규격 『Requirements』																														
4-6.	열충격시험 4-6. Thermal Shock	<p>◎ Connector를 결합한 상태에서 아래조건에 따라 5회 연속 시험을 행한 후 시험을 실시한다.</p> <table border="1" data-bbox="427 461 1131 591"> <thead> <tr> <th>단 계</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>온도(℃)</td> <td>-55 +0 -3</td> <td>25 +10 -5</td> <td>85 +3 -0</td> <td>25 +10 -5</td> </tr> <tr> <td>시간(분)</td> <td>30</td> <td>5</td> <td>30</td> <td>5</td> </tr> </tbody> </table> <p>◎ Mated connector shall be exposed five cycles as table #1 (Based upon MIL-STD-202G Method 107-A table #1)</p> <table border="1" data-bbox="427 696 1131 842"> <thead> <tr> <th>STEP</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temperature (℃)</td> <td>-55 +0 -3</td> <td>25 +10 -5</td> <td>85 +3 -0</td> <td>25 +10 -5</td> </tr> <tr> <td>Exposed Time (MIN)</td> <td>30</td> <td>5</td> <td>30</td> <td>5</td> </tr> </tbody> </table>	단 계	1	2	3	4	온도(℃)	-55 +0 -3	25 +10 -5	85 +3 -0	25 +10 -5	시간(분)	30	5	30	5	STEP	1	2	3	4	Temperature (℃)	-55 +0 -3	25 +10 -5	85 +3 -0	25 +10 -5	Exposed Time (MIN)	30	5	30	5	<p>1)내전압: 절연파괴 및 섬락이 없고 사용상 결함이 없을 것 2)접촉저항: 50mΩ 이하 3)절연저항: 500MΩ 이상 4)외관 : 양호할 것</p> <p>1)Dielectric Strength : No flash over and no physical damage shall be observed 2)Contact Resistance : 50mΩ MAX 3)Insulation Resistance : 500MΩ MIN 4)Appearance : Good</p>
단 계	1	2	3	4																													
온도(℃)	-55 +0 -3	25 +10 -5	85 +3 -0	25 +10 -5																													
시간(분)	30	5	30	5																													
STEP	1	2	3	4																													
Temperature (℃)	-55 +0 -3	25 +10 -5	85 +3 -0	25 +10 -5																													
Exposed Time (MIN)	30	5	30	5																													

6. 포장 및 식별방법 『Identification and Packing』

- 1) 포장 조건 『Packing Condition』 : Bulk Packing
- 2) 수 량 『Quantity』
- 3) 포장 방법 『Packing Method』 :

충분한 강도의 종이 BOX를 사용하여 충격을 방지하여 물리적 변형 또는 화학적 변화가 발생되지 않도록 하여야 한다.

『 Carton box for shipment must have enough strength in order to protect physical damage during transportation.』

- 4) 식별 표시 : 다음과 같은 사항을 제품포장 BOX에 명기한다.

『Identifications shall be marked as follows』

- 4-1. 제조회사, 제조자명 또는 상표 『Manufacturer's LOGO』
- 4-2. 형명 또는 부품번호 『Part Number』
- 4-3. 수 량 『Quantity』
- 4-4. 제조 LOT NO 『Date Code』
- 4-5. 기타 상호 필요하다고 인정되는 사항

『Others agreed with manufacturer and customer』



7. 사용상 주의사항 『Caution for Use』

본 connector는 강(強)Lock 사양이므로, Connector 감합후의 Wire Harness의 부정확한 취급방향이나 과도하게 잡아당길 경우에는 납땀부의 파괴, Lock등 Connector자체의 파괴 또는 실장기판의 파괴등 Trouble를 발생시킬 가능성이 있습니다.

이와 같은 Trouble을 미연에 방지하고, Connector 성능을 충분히 내기 위해서는, Wire Harness를 취급할 때 다음과 같은 주의를 바랍니다.

『This connector is secure lock type, so the connector must be treated with care after mated. Incorrect handling direction and excessive pulling load to the wire harness may cause troubles which affect its performances such as degradation at solder tail, breakage of connector itself (lock devise, etc.) and a PCB for mounting. To prevent these troubles and make full use of connector's performances, special care should be taken on the following points when handling the wire harness.』

- 1) Connector에는 평소 Wire Harness 취급할 때, 인장하중 이외에 외력을 지속적으로 가하지 않는다.

『Do not apply an external force to a connector continuously except for pulling load and so on when handling wire harness as usual.』

- 2) 전선에는 Connector의 삽발작업이 무리없이 이루어 질 수 있도록 “느슨하게” 설계하고 삽발작업은 감합축 선으로 한다.

『For the wire, make an appropriate looseness to mate and unmate the connector on the mating axis without strain.』

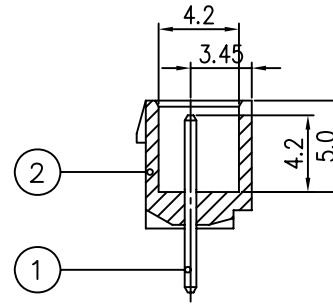
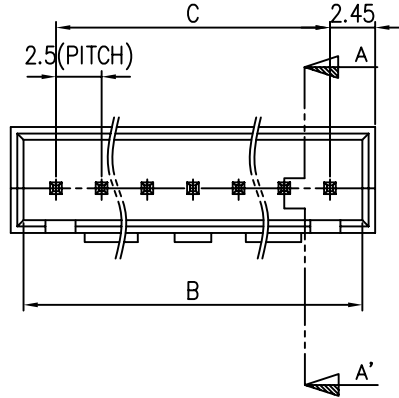
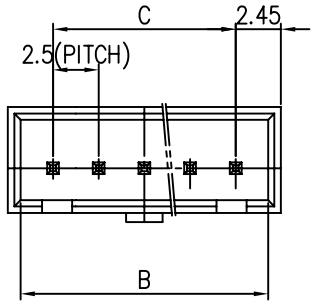
- 3) Connector에서 Wire Harness를 분리할 때에는 Lock을 완전히 해제하고 발거한다.

『When withdraw wire harness from the connector, Lock should be unlocked perfectly and withdraw.』

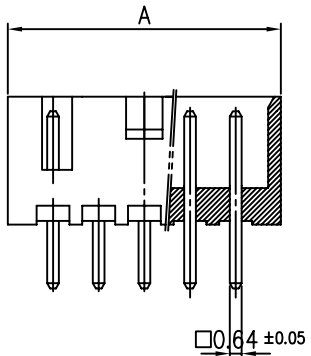


Reliability Test Report						A P P R	Writ`N	CHK`D	APR`D	
							J.M.C	K.J.M	L.J.H	
DESCRIPTION	CONNECTOR	MODEL NO	25048HS-05		TEST CONDITION			Temp:22℃,Humid:65%		
Test Title	Test Procedures		Specification	X1	X2	X3	X4	X5	Conclusion	
1-1.Insulation Resistance	◦ Test voltage : DC 500V±5V ◦ Electrification time : 1min±5sec		1000MΩ MIN	1000MΩ MIN					GOOD	
1-2.Dielectric Withstanding Voltage	◦ Test voltage : AC 1000V ◦ Electrification time : 1min±5sec		No damage	0.K	0.K	0.K	0.K	0.K	GOOD	
1-3.Contact Resistance	◦ Measured the resistance of mated connector, 20mV. 10mA		30mΩ MAX	5.4	5.2	5.5	5.1	5.3	GOOD	
2-1.Solder Ability	◦ SnAgCu 240±5℃, 3±0.5sec		90% MIN	0.K	0.K	0.K	0.K	0.K	GOOD	
2-2.Solder Heat Resistance	◦ 260℃ ±5℃, 5±0.5sec		GOOD	0.K	0.K	0.K	0.K	0.K	GOOD	
2-3.Pin Retention Force	◦ Measured withdrawal force that resin grips and supports pin		0.5Kgf MIN	2.38	2.45	2.33	2.52	2.60	GOOD	
2-4.Total Insertion Force	◦ Measured force to insert wafer ass'y into the housing ass'y which has same circuits		05P: 2.3Kgf MAX	1.52	1.49	1.57	1.48	1.50	GOOD	
2-5.Total Withdrawal Force	◦ Measured force to withdraw wafer ass'y from the housing ass'y which has same circuits (Un Locking)		05P: 0.5Kgf MIN	1.13	1.15	1.12	1.08	1.06	GOOD	
2-6.Durability of Contact Resistance	◦ Measured contact resistance after 30 cycles of total insertion and withdrawal operation.		Contact Resistance : 50mΩ MAX	5.6	5.7	5.3	5.5	5.4	GOOD	
2-7.Insertion Force of Terminal	◦ Insert a terminal into the housing straightly and measure insertion force		1.0Kgf MAX	0.18	0.16	0.18	0.17	0.15	GOOD	
2-8.Terminal Retention Force	◦ Insert a terminal into the housing and measure the force to withdraw the terminal from housing.		0.5Kgf MIN	3.33	3.46	3.36	3.44	3.41	GOOD	
2-9.Crimp Tensile Strength	◦ Measured tensile strength of the crimped contact to conductor joint		AWG #26: 1.5Kgf MIN	5.36	5.20	5.27	5.32	5.22	GOOD	
3-1.Vibration	◦ 100mA, 1.52mm, 10-55-10Hz, 2hrs		Contact Resistance	50mΩ MAX	5.7	5.4	5.3	5.5	5.6	GOOD
			Discontinue	1μsec MAX	0.K	0.K	0.K	0.K	0.K	GOOD
3-2.Salt Spray	◦ Salt solution : 5±1% ◦ Exposed time : 48hrs ±4hrs (Material : 2hrs) ◦ Temperature : 35±2℃		Contact Resistance	50mΩ MAX	6.3	6.4	6.1	6.5	6.2	GOOD
			Appearance	Not black rust	0.K	0.K	0.K	0.K	0.K	GOOD
3-3.Humidity	◦ Chamber temperature: 40℃ ±2℃ ◦ Relative humidity : 90~95% ◦ Duration : 96hrs		Insulation Resistance	500MΩ MIN	500MΩ MIN					GOOD
			Contact Resistance	50mΩ MAX	5.9	6.1	5.8	5.7	6.0	GOOD
			Appearance	Good	0.K	0.K	0.K	0.K	0.K	GOOD
3-4.Resistance to High Temper	◦ Chamber temperature : 85±2℃ ◦ Exposed time : 96hrs		Contact Resistance	50mΩ MAX	5.6	5.5	5.4	5.8	5.7	GOOD
3-5.Altitude Low Temperature	◦ Chamber temperature: -40±3℃ ◦ Exposed time : 96hrs		Contact Resistance	50mΩ MAX	5.6	5.7	5.4	5.3	5.8	GOOD
3-6.Thermal Shock	◦ 1 Cycle is table #1 ◦ After performing 5 cycles		Dielectric Strength	No damage	0.K	0.K	0.K	0.K	0.K	GOOD
			Contact Resistance	50mΩ MAX	5.9	5.6	5.8	6.0	5.7	GOOD
			Insulation Resistance	500MΩ MIN	500MΩ MIN					GOOD
			Appearance	Good	0.K	0.K	0.K	0.K	0.K	GOOD
	STEP	1	2	3	4					
	Temperature (℃)	-55 +0 -3	25 +10 -5	85 +3 -0	25 +10 -5					
	Exposed Time (MIN)	30	5	30	5					

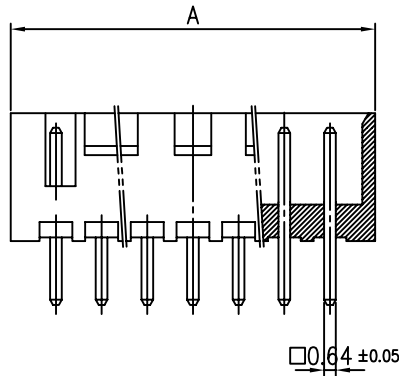
PART NO	PIN 수	A	B	C	COLOR
SMW250-02	02	7.4	5.8	2.50	K.B.Y.R
SMW250-03	03	9.9	8.3	5.00	K.B.Y.R
SMW250-04	04	12.4	10.8	7.50	K.B.Y.R
SMW250-05	05	14.9	13.3	10.00	K.B.Y.R
SMW250-06	06	17.4	15.8	12.50	K.B.Y.R
SMW250-07	07	19.9	18.3	15.00	K.B.Y.R
SMW250-08	08	22.4	20.8	17.50	K.B.Y.R
SMW250-09	09	24.9	23.3	20.00	K.B.Y.R
SMW250-10	10	27.4	25.8	22.50	K.B.Y.R
SMW250-11	11	29.9	28.3	25.00	K.B.Y.R
SMW250-12	12	32.4	30.8	27.50	K.B.Y.R
SMW250-13	13	34.9	33.3	30.00	K.B.Y.R
SMW250-14	14	37.4	35.8	32.50	K.B.Y.R
SMW250-15	15	39.9	38.3	35.00	K.B.Y.R



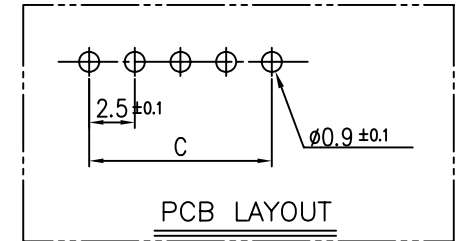
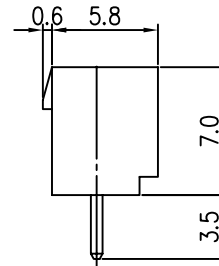
SECTION A-A'



2-5pin 형상
(Locking 1개소)



6-15pin 형상
(Locking 3개소)



NOTE

- 1. G/TOL : ±0.3
- 2. PART No.: SMW250-NN(*)

COLOR	표시색
WHITE	---
BLACK	BK ---
BLUE	BL ---
YELLOW	YE ---
RED	RE ---
GREEN	GR ---
VIOLET	VI ---

2	PIN	BRASS	Tin-Plated
1	WAFER	NYLON66,UL94 V-0	
NO	DESCRIPTION	MATERIAL	REMARK



YEONHO ELECTRONICS CO., LTD.

TITLE

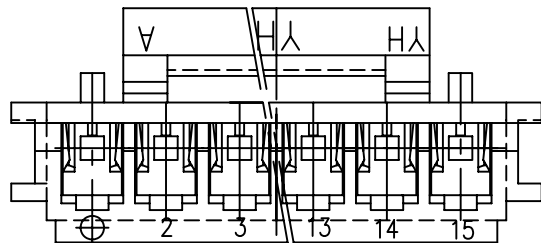
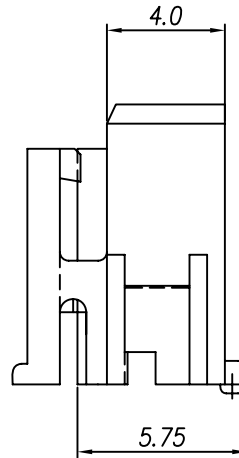
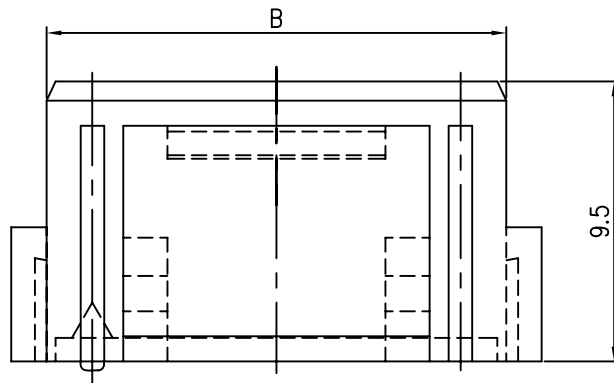
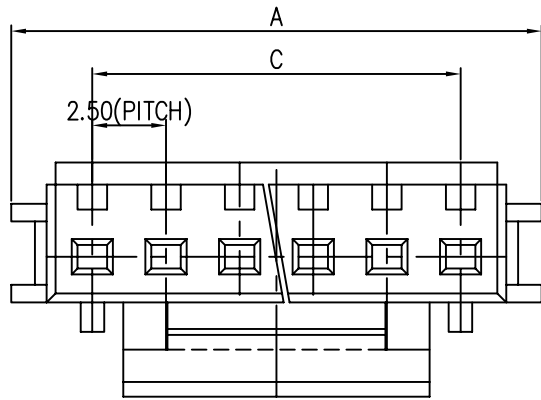
SMW250-NN

SCALE	DRAWN	DESIGN	CHECK	APPD
N/S	95.6.28 J J H		95.9.1 K S N	

SIZE	DWG. NO	REV
A3	SMW250-00A-S	

LTR	REVISION RECORD	DATE	DR	CHK

"본 도면은 연호전자의 지적재산이므로 임의 COPY 및 배포를 금합니다"



PART NO.	A	B	C
25048HS-02000	8.0	5.6	2.50
25048HS-03000	10.5	8.1	5.0
25048HS-04000	13.0	10.6	7.50
25048HS-05000	15.5	13.1	10.0
25048HS-06000	18.0	15.6	12.5
25048HS-07000	20.5	18.1	15.0
25048HS-08000	23.0	20.6	17.5
25048HS-09000	25.5	23.1	20.0
25048HS-10000	28.0	25.6	22.5
25048HS-11000	30.5	28.1	25.0
25048HS-12000	33.0	30.6	27.5
25048HS-13000	35.5	33.1	30.0
25048HS-14000	38.0	35.6	32.5
25048HS-15000	40.5	38.1	35.0

NOTE

- 관련 TERMINAL : ~~25048TS~~ △25045TS
- 일반공차 : ±0.3
- 형명구성 : 25048HS-NN (*)

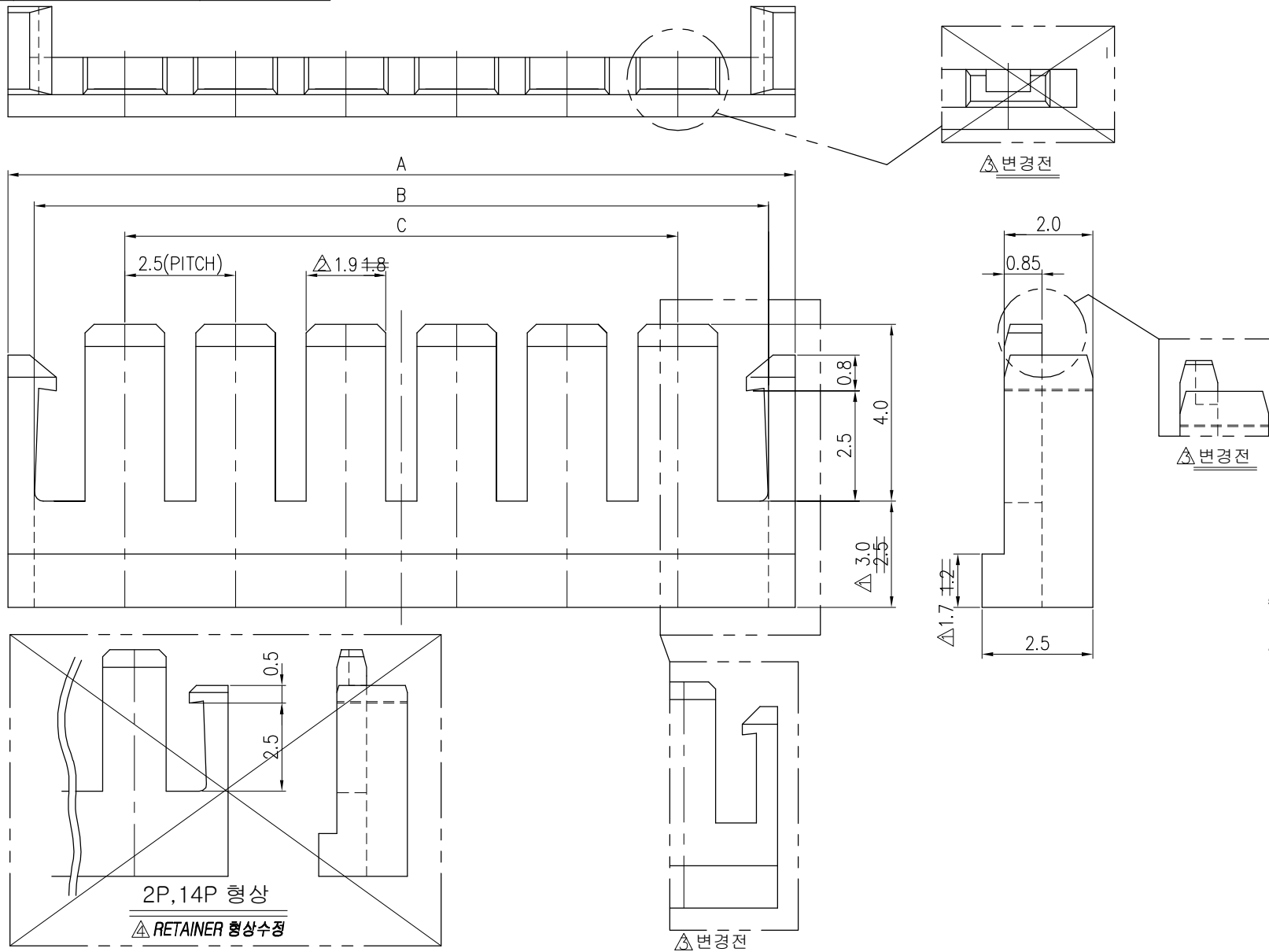
COLOR ———

표기없음 --- NATURAL
(WH) ---- WHITE
(BK) ---- BLACK
(BL) ---- BLUE
(RE) ---- RED
(YE) ---- YELLOW
(BR) ---- BROWN
(GR) ---- GRAY

1	HOUSING	NYLON 66	UL94V-0	NN	UL94V-0
I/NO	DESCRIPTION	MATERIAL	TREATMENT	QTY	REMARK
			TITLE		
			25048HS-NN		
SCALE	DRAWN	DESIGN	CHECK	APPD	
5/1	C. B. H		K. S. N		
	02.11.06	1.06	02.11.06		
SIZE	DWG. NO		REV		
A3	25048HS-00A-S		01		

△	도면현실화 (터미널 품명변경)	07.02.01	L.S.H	J.J.H
LTR	REVISION RECORD	DR	CHK	ECN

PART NO.	A	B	C
SMH250J-02RT	7.8	6.6	2.5
SMH250J-03RT	10.3	9.1	5.0
SMH250J-04RT	12.8	11.6	7.5
SMH250J-05RT	15.3	14.1	10.0
SMH250J-06RT	17.8	16.6	12.5
SMH250J-07RT	20.3	19.1	15.0
SMH250J-08RT	22.8	21.6	17.5
SMH250J-09RT	25.3	24.1	20.0
SMH250J-10RT	27.8	26.6	22.5
SMH250J-11RT	30.3	29.1	25.0
SMH250J-12RT	32.8	31.6	27.5
SMH250J-13RT	35.3	34.1	30.0
SMH250J-14RT	37.8	36.6	32.5
SMH250J-15RT	40.3	39.1	35.0

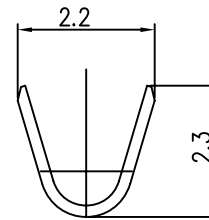
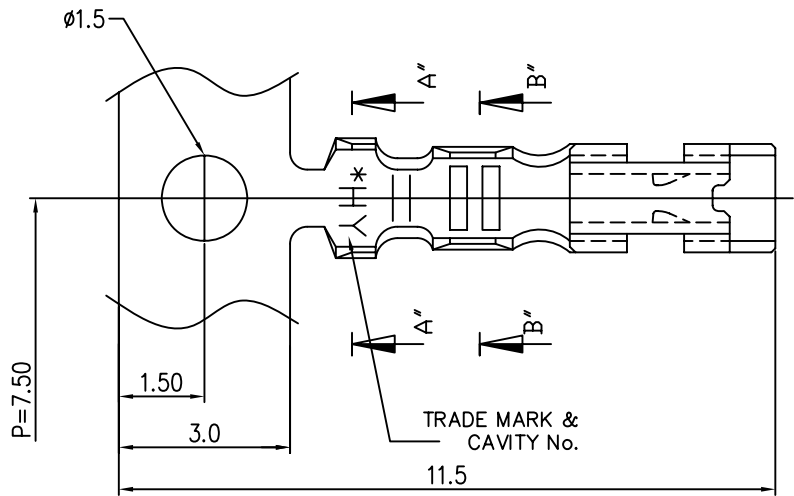


NOTE
 1. 일반공차 : ±0.3
 2. 형명구성 : SMH250J-NNRT

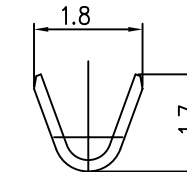
△	REVISION RECORD	DR	CHK	ECN
△	RETAINER 02P, 14P 형상수정(작업성 개선)	10.03.08	K.K.S	C.J.W
△	RETAINER 기능 강화(형상삭제)	05.03.03	H.S.K	C.J.W
△	터미널 밀림방지 살보강 (1.8-->1.9MM)	04.08.31	K.K.S	
△	표시부 시방변경(살보강 2.5--3.0MM)	04.07.06	J.J.H	
LTR	REVISION RECORD	DR	CHK	ECN

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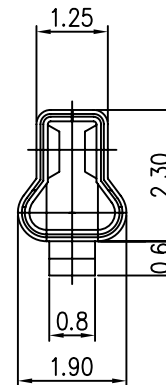
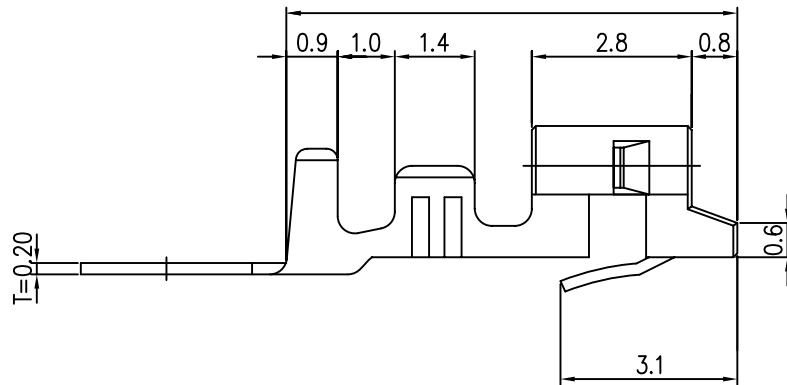
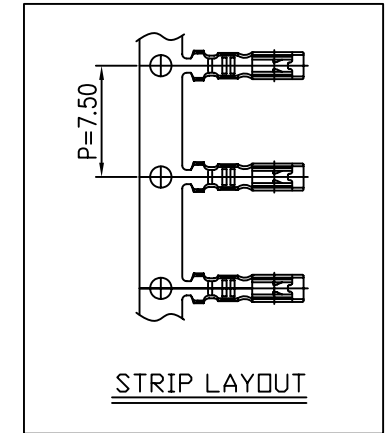
I/NO	DESCRIPTION	MATERIAL	TREATMENT	QTY	REMARK
	RETAINER	NYLON 66	UL94V-0	NN	
YEONHO ELECTRONICS CO., LTD.			TITLE SMH250J-NNRT (RETAINER)		
SCALE	DRAWN	DESIGN	CHECK	APPD	
10/1	C.	B. H	K. S. N		
		01.12.04	02.06.25		
SIZE	DWG. NO			REV	
A3	25037RT-00A-S			04	



SEC A-"A"



SEC B-"B"



NOTE

1. GENERAL TOLERLANCE ± 0.3
2. FINISH : TIN PLATED.
3. 사용전선 : AWG #22 - # 28.
4. 피복외경 : $\phi 1.2 - \phi 2.4$.
5. 관련부품
- HOUSING : 25048HS.

	TERMINAL	P, Bronze	TIN - PLATED		
I/NO	DESCRIPTION	MATERIAL	TREATMENT	QTY	REMARK
			TITLE		
			25045TS		
SCALE	DRAWN	DESIGN	CHECK	APPD	
10/1 (20/1)	C.B.H		K.S.N		
	02.11.26		02.11.26		
SIZE	DWG. NO			REV	
A3	25045TS-00S00				

LTR	REVISION RECORD	DATE	DR	CHK
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RHODIA POLYAMIDE CO., LTD.
 3 FL. KANGNAM BLDG. 1321-1
 SEOCHO-DONG SEOCHO-KU
 SEOUL 137-070
 KOREA

(주)고려상사
 729-9 안창동
 광주시 000-000

제조공장
 RHODIA POLYAMIDE ONSAN PLANT
 WONSAN-RI, ONSAN-EUP, ULJU-KUN
 689-892, ULSAN-SI
 SOUTH KOREA

시험성적서

날짜

L/C order n / 날짜

아웃바운드 품목/날짜
 81274156 900003 /

Order item/날짜
 820772 000050

Customer
 82004

Contract number

제품명: 참조
 110526 TECHNYL 2413GW2 BRIGHT-E 25 KG BAG(S) / TY 2413GW2 BRIGHT-E 25 KG PB/A TY 2413GW
 2 BRIGHT-E 25 KG PB/A

당사는 상기 제품이 검사 기준에 적합함을 확인 합니다.

배치번호 0916307 / Quantity 10,000 KG

검사항목	Unit	결과값	Limit 하한	Limit 상한
포장수분율	ISO 15512	%	0.051	0.000 0.200
Ash 함량	ISO 3451	%	15.8	12.0 17.0
용융흐름지수	ISO 1133	g/10mn	29.4	25.0 40.0
	ISO 1133 (275 °C 2.16 kg)			
Izod 충격강도	ASTM D256	J/m	70.2	40.0
인장강도	ASTM D638	MPa	99.4	80.0
굴곡강도	ASTM D790	MPa	151.3	135.0
굴곡탄성률	ASTM D790	MPa	4976	4500
UL94 난연성	UL 94 (3.2mm)	-	UL 94 V-0	-

CHECKED BY 
 QUALITY MANAGER Onsan AA/EP/POLYMER

검사성적서

고객명	(주)동은피에프	제품명	EPC	GRADE/ COLOR	LUMID GN1001BF NP 25KG
LOT NO	Z90818B	출하수량 (KG)	9000	출하 일자	

검사결과 값

검사항목	시험방법	시험조건	시험단위	규격	시험결과
충격강도(Izod)	ASTM D256	1/4", NOTCHED	kgf cm/cm	Min.2.4	2.8
열변형온도	ASTM D648	4.6KG	℃	Min.220.0	238.8
인장강도	ASTM D638	50mm/min	kgf/cm ²	Min.770	783
인장신율	ASTM D638	BP	%	Min.10.0	29.4
굴곡강도	ASTM D790	1/4", SPAN100, 2.8mm/ min	kgf/cm ²	Min.1000	1042
굴곡탄성율	ASTM D790	1/4", SPAN100, 2.8mm/ min	kgf/cm ²	Min.31000	31790
수분율	ASTM D4019		%	0.040-0.120	0.120
난연성	UL 94	UL94, 1/32"		V-0	V-0
Br	LSR-XA-Z6040	XRF	ppm	Max.100.0	3.5
Cl	LSR-XA-Z6040	XRF	ppm	Max.200.0	59.0

본 시험성적서는 당사 표준 및 시험기기에 준한 결과치 임.

생산일자		생산처	LG화학 익산공장 생산2팀
측정일자		측정자	
발행인	Technical Team Manager J. H. Yang		





RHODIA POLYAMIDE CO., LTD.
 3 FL. KANGNAM BLDG. 1321-1
 SEOCHO-DONG SEOCHO-KU
 SEOUL 137-070
 KOREA

㈜고려상사
 729-9 안청동
 광주시 000-000

제조공장
 RHODIA POLYAMIDE ONSAN PLANT
 WONSAN-RI, ONSAN-EUP, ULJU-KUN
 689-892, ULSAN-SI
 SOUTH KOREA

시험성적서

날짜

L/C order n / 날짜

아웃바운드 품목/날짜
 81343781 900001 /

Order item/날짜
 864662 000020

Customer
 82004

Contract number

제품명 : 참조
 101429 TECHNYL 2413GW2 RED 25 KG BAG(S) / TY 2413GW2 RED 25KG PB/A TY 2413GW2 RED 25KG PB/A

당사는 상기 제품이 검사 기준에 적합함을 확인 합니다.

배치번호 0925008 / Quantity 3,850 KG

검사항목	Unit	결과값	Limit 하한	Limit 상한
포장수분율	ISO 15512/B	%	0.048	0.100
Ash 함량	ISO 3451-4/A	%	15.6	17.0
융용흐름지수	ISO 1133	g/10mn	26.2	40.0
	ISO 1133 (275 °C, 2.16 kg)			
Izod 충격강도	ASTM D256	J/m	77.1	40.0
인장강도	ASTM D638	MPa	95.4	80.0
굴곡강도	ASTM D790	MPa	152.3	135.0
굴곡탄성률	ASTM D790	MPa	5387	5000
UL94 난연성	UL 94 (3.2mm)		UL 94 V-0	

CHECKED BY 
 QUALITY MANAGER Onsan AA/EP/POLYMER

CERTIFICATE OF TEST

POONGSAN

Customer : 대웅국통사
 Sheet No. : C50126-026
 Specification : KS D 5103 C2700WF-F
 Size : 9.000 (mm) X 0.000 (mm) X 0.000 (mm)

Onsan Plant :
 611, DaeJung-Ri, Onsan-Up, Uiju-Kun,
 Ulsan Metropolitan City, Korea
 Tel : (052) 231-9114
 Fax : (052) 231-9400

	Cu (%)	Zn (%)	Pb (%)	Fe (%)	Tensile Strength (N/mm ²)
SPEC. Min	63.0000	R			245.000
MAX	67.0000		0.0500	0.0500	
4BTB610	64.4700	R	0.0020	0.0054	307.736
4BTB620	64.4700	R	0.0020	0.0054	301.358 305.085 303.222
4BVB210	64.4400	R	0.0020	0.0045	306.850 302.829
4BVB510	64.2500	R	0.0020	0.0042	303.222 302.241

	Elongation (%)	Thickness (Outdiameter) (mm)	Appearance	Weight (kg)
SPEC. Min	30.000	8.900		
MAX		9.100		
4BTB610	42.000	9.000	Good	1,036.000
4BTB620	43.000	9.050		
4BTB620	36.000	9.040	Good	3,581.000
4BVB210	36.000	9.060		
4BVB210	36.000	9.040	Good	3,464.000
4BVB210	38.000	9.060		
4BVB510	38.000	9.040	Good	1,798.000
4BVB510	38.000	9.060		

Total Weight : 19,513.000 (kg)

Remark : We hereby certify that above material has been tested to comply with the specification.

A. K. Choi

Manager of Quality Assurance Dept.

CERTIFICATE OF TEST

1 / 1

POONGSAN

Customer : 쥘연호전자(광주)
 Sheet No. : C90917-024
 Specification : KS D 5506 C5191R(TPW)-H
 Size : 0.200 (mm) X 14.000 (mm) X 0.000 (mm)
 Date : _____

Onsan Plant :
 611, DaeJung-Ri, Onsan-Up, Uiju-Kun,
 Ulsan Metropolitan City, Korea
 Tel : (052) 231-9114
 Fax : (052) 231-9400

	Cu	Sn	P	Cu+Sn+P	Tensile Strength
	(%)	(%)	(%)	(%)	(N/mm ²)
SPEC. Min	R	5.5000	0.0300	99.5000	618.000
MAX		7.0000	0.3500		667.000
98KF2BM	R	5.7700	0.1635	99.9744	623.703
98PF1BM	R	5.9670	0.1640	99.9848	629.587
- Blank Line -					
	Elongation	Hardness	Thickness (Outdiameter)	Width (Thickness)	Sn Plating
	(%)	(Hv 1kg)	(mm)	(mm)	(μ m)
SPEC. Min	12.000	190.000	0.190	13.920	1.000
MAX		210.000	0.210	14.020	2.000
98KF2BM	17.000	202.000	0.198	13.960	1.570
			0.204	13.980	1.590
98PF1BM	14.000	202.000	0.200	13.960	1.550
			0.201	13.980	1.570
- Blank Line -					
	BendingTest (Badway)	Yellow(Heat) TEST	Camber (mm) (1000mm)	Appearance	Weight (kg)
SPEC. Min	(180° ,	(260°C 2			
MAX	R/t=0.5)		1.000		
98KF2BM	Good	Good	0.200	Good	1,966.500
			0.800		
98PF1BM	Good	Good	0.200	Good	2,875.000
			0.800		
- Blank Line -					

Total Weight : 4,841.500 (kg)

Remark : We hereby certify that above material has been tested to comply with the specification.

I. Y. HWANG

* 1 kg/mm² = 9.806 N/mm²

 Manager of Quality Assurance Dept.



Test Report No. F690101/LF-CTSAYGA15-03243

Issued Date : 2015. 12. 02

Page 1 of 9

YEONHO ELECTRONICS CO., LTD.

506-2,Hanam-dong
Gwangsan-gu,Gwangju
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYGA15-03243
Product Name : NYLON
Item No./Part No. : N/A
Client Reference Data : 2413GW2 NC, 2413GW2 RE, 2413GW2 BL, 2413GW2 BK, 2413GW2 YE
Received Date : 2015. 11. 27
Test Period : 2015. 11. 27 to 2015. 12. 02
Test Comments : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.
Report Comments : By the applicant's request, item No.s/part No.s & client reference information are stated/added on report.
Test Results : For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang / Chemical Lab Mgr

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Test Report No. F690101/LF-CTSAYGA15-03243

Issued Date : 2015. 12. 02

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Sample No. : AYGA15-03243.001
Sample Description : NYLON
Item No./Part No. : N/A
Materials : NYLON

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	8.23
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis)	1	N.D.
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	52500

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

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Test Report No. F690101/LF-CTSAYGA15-03243

Issued Date : 2015. 12. 02

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Sample No. : AYGA15-03243.001
Sample Description : NYLON
Item No./Part No. : N/A
Materials : NYLON

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

Phthalates

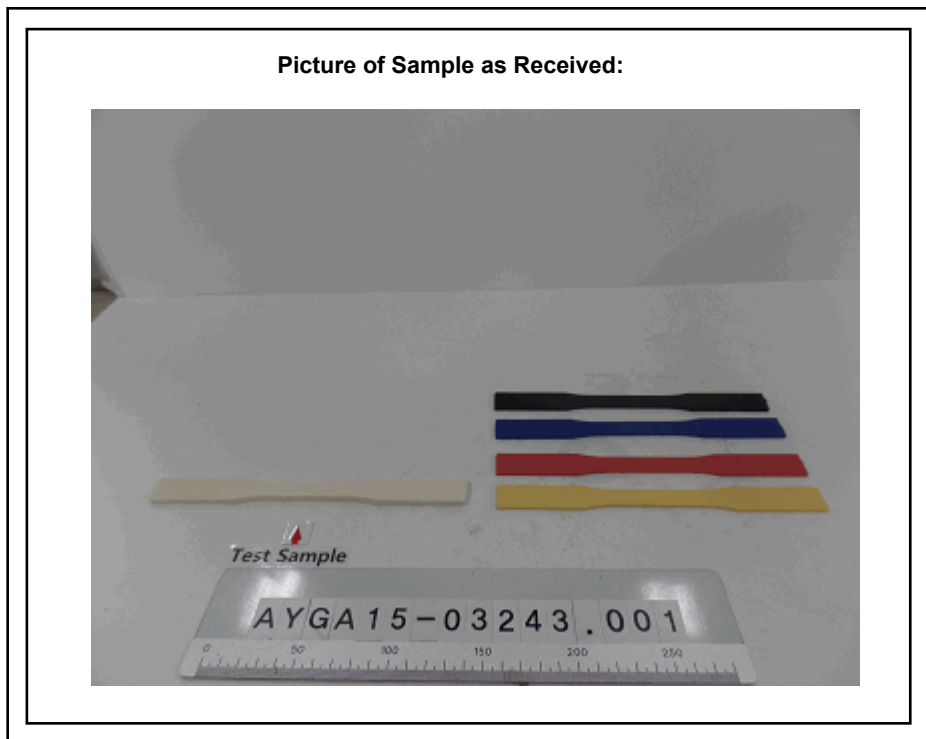
Test Items	Unit	Test Method	MDL	Results
Di-(2-ethylhexyl) phthalate (DEHP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-butyl phthalate (DBP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Benzyl butyl phthalate (BBP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-isodecyl phthalate (DIDP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-isononyl phthalate (DINP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-isobutyl phthalate (DIBP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
[di(C7-C11 alkyl)phthalate] linear and branched (DHNUP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
[di(C6-C8 alkyl)phthalate] branched (DIHP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Bis(2-methoxyethyl) phthalate (BMP, BMEP, DMEP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.

Halogen Content

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	With reference to EN 14582, IC	30	81000
Chlorine(Cl)	mg/kg	With reference to EN 14582, IC	30	1620

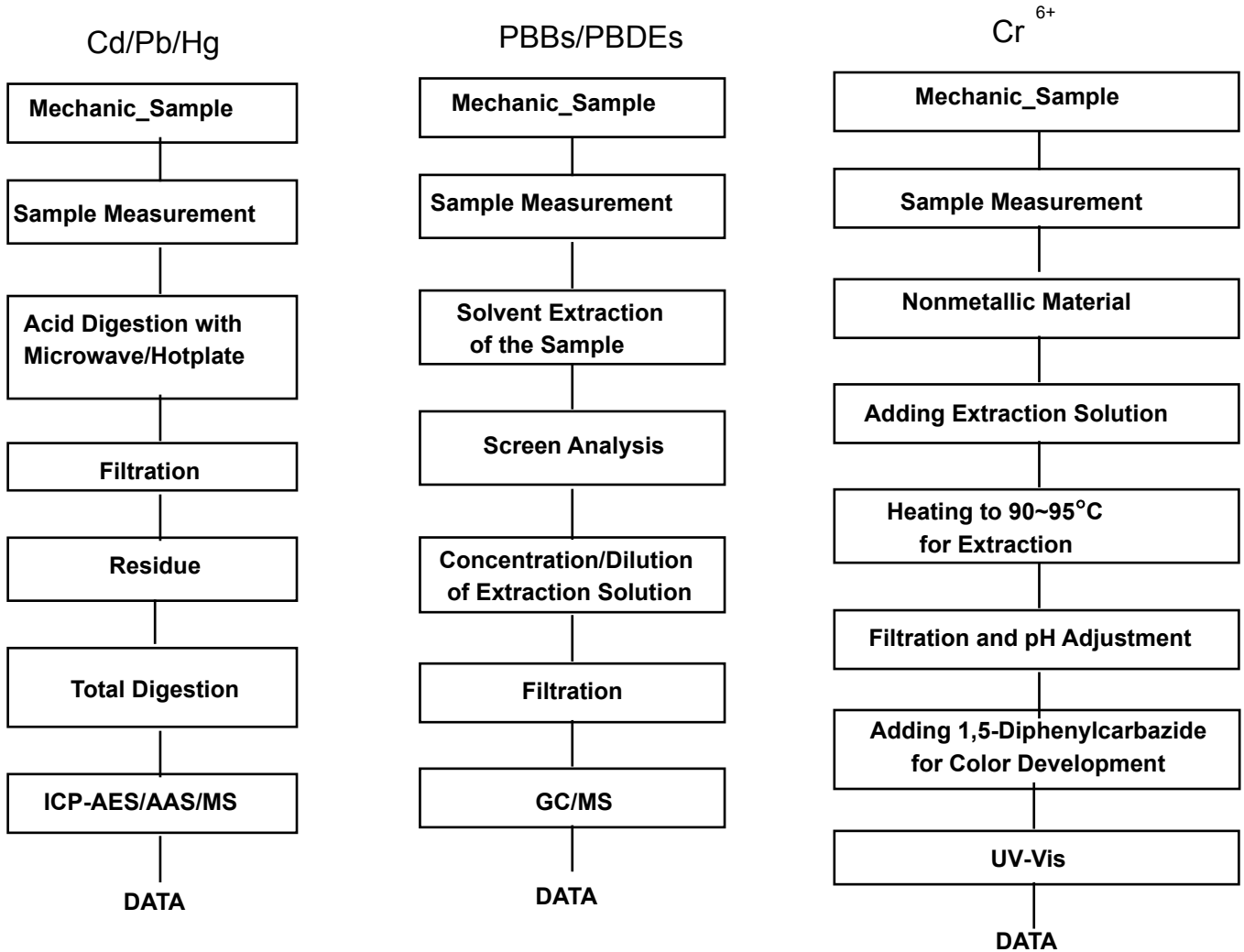
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- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) Negative = Undetectable / Positive = Detectable
 - (6) ** = Qualitative analysis (No Unit)
 - (7) * = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI.
 b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating.
 c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination.



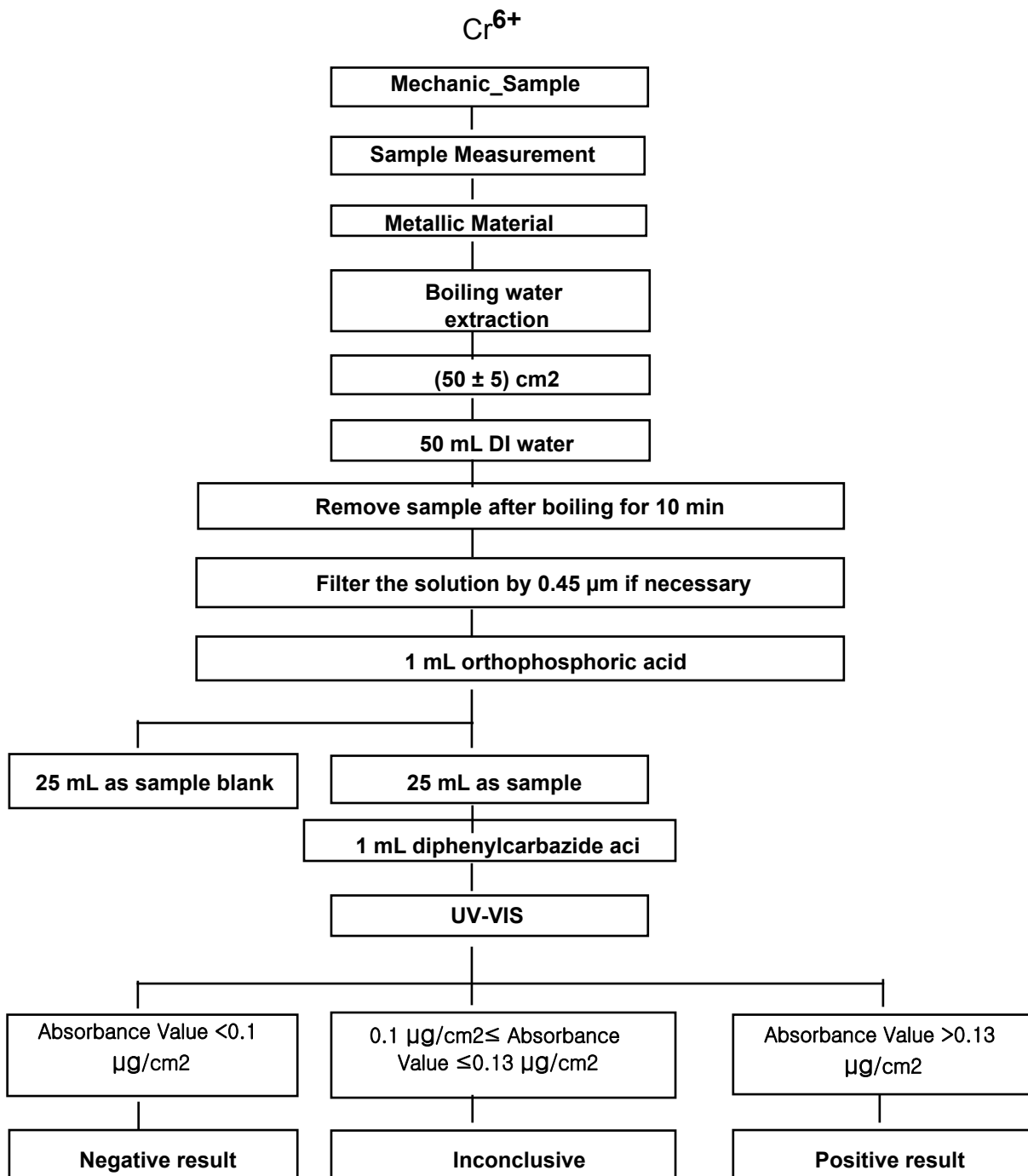
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Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr⁶⁺ /PBBs&PBDEs Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.
 Section Chief : Gilsae Yi

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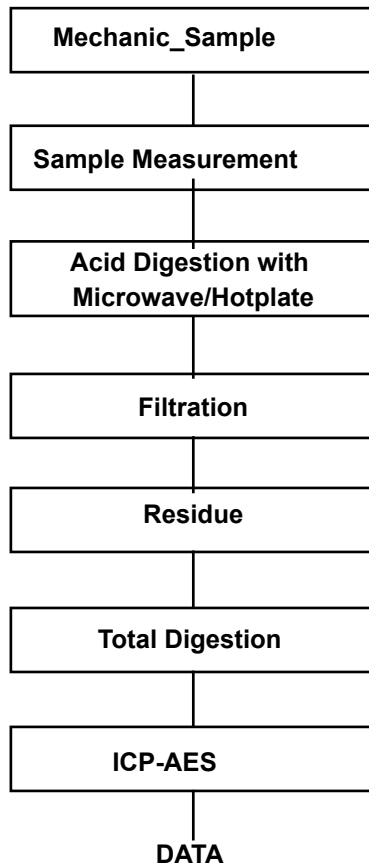


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Flow Chart for Inorganic Elements Testing

Inorganic Elements

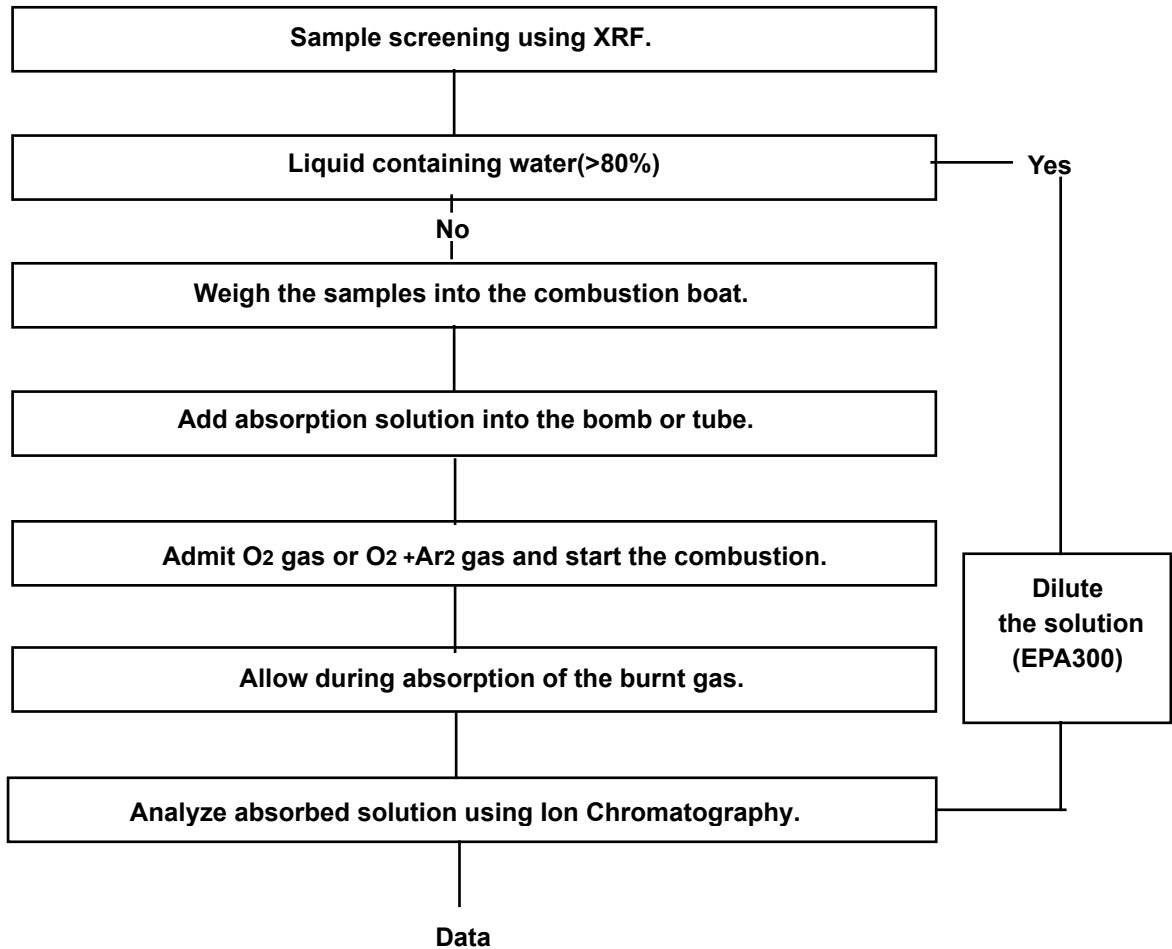


Major Inorganic Heavy Metals	Antimony(Sb) , Beryllium(Be) , Phosphorus(P) , Arsenic(As) etc.
------------------------------	---

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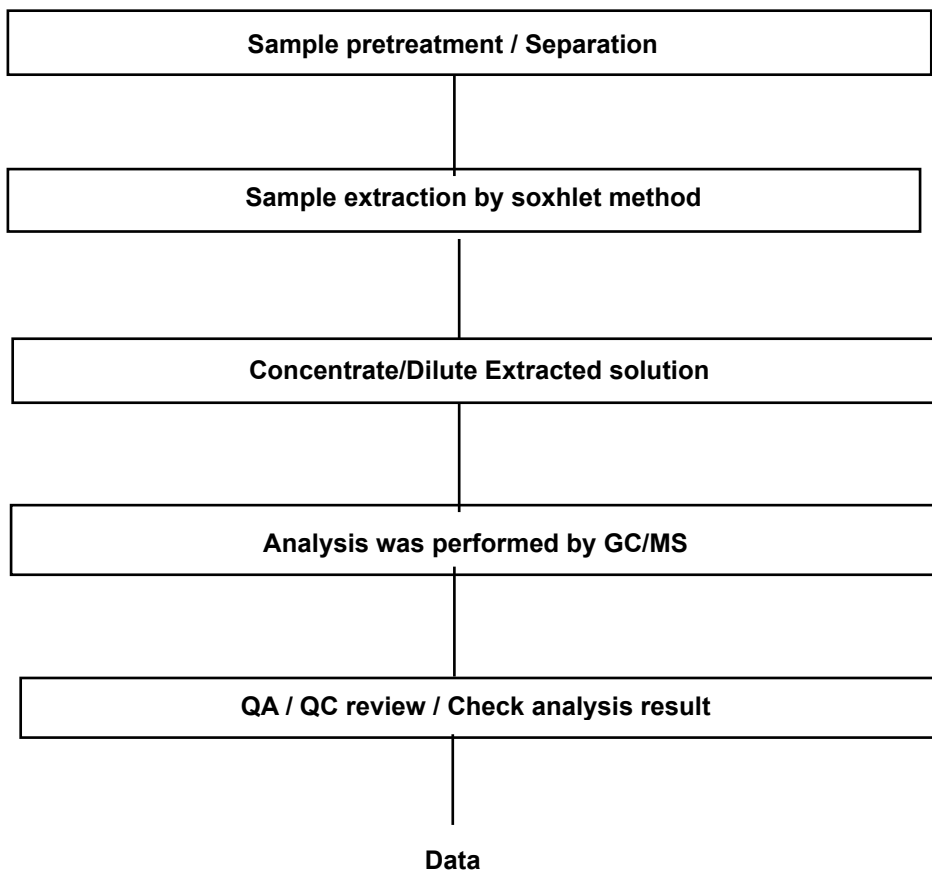
Flow Chart for Halogen Test



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Flow Chart for Phthalate Test



*** End of Report ***

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Test Report No. F690101/LF-CTSAYGA15-03199

Issued Date : 2015. 11. 25

Page 1 of 9

YEONHO ELECTRONICS CO., LTD.

506-2,Hanam-dong
Gwangsan-gu,Gwangju
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYGA15-03199
Product Name : NYLON
Item No./Part No. : GN1001BF NC
Received Date : 2015. 11. 20
Test Period : 2015. 11. 20 to 2015. 11. 25
Test Results : For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang / Chemical Lab Mgr

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Sample No. : AYGA15-03199.001
 Sample Description : NYLON
 Item No./Part No. : GN1001BF NC
 Materials : NYLON

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis)	1	N.D.
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

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Test Report No. F690101/LF-CTSAYGA15-03199

Issued Date : 2015. 11. 25

Page 3 of 9

Sample No. : AYGA15-03199.001
Sample Description : NYLON
Item No./Part No. : GN1001BF NC
Materials : NYLON

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

Phthalates

Test Items	Unit	Test Method	MDL	Results
Di-(2-ethylhexyl) phthalate (DEHP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-butyl phthalate (DBP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Benzyl butyl phthalate (BBP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-isodecyl phthalate (DIDP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-isononyl phthalate (DINP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Di-isobutyl phthalate (DIBP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
[di(C7-C11 alkyl)phthalate] linear and branched (DHNUP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
[di(C6-C8 alkyl)phthalate] branched (DIHP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.
Bis(2-methoxyethyl) phthalate (BMP, BMEP, DMEP)	mg/kg	With reference to EPA 8061A , GC/MS	50	N.D.

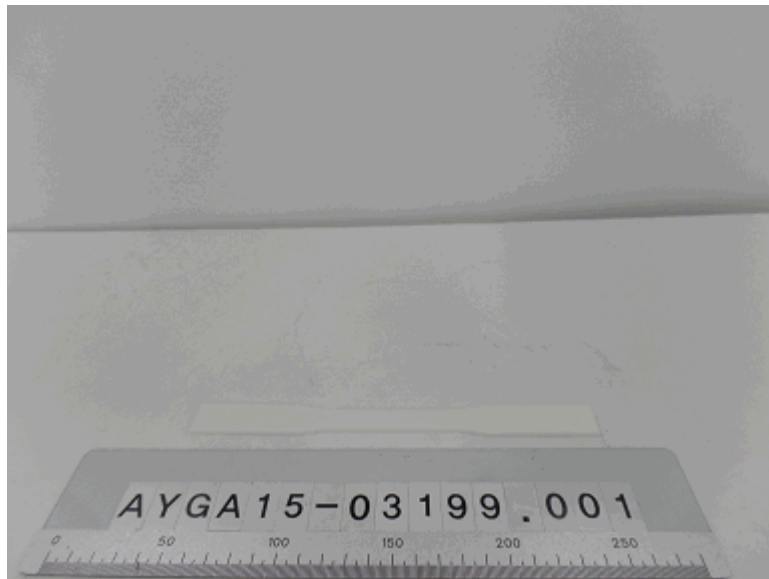
Halogen Content

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

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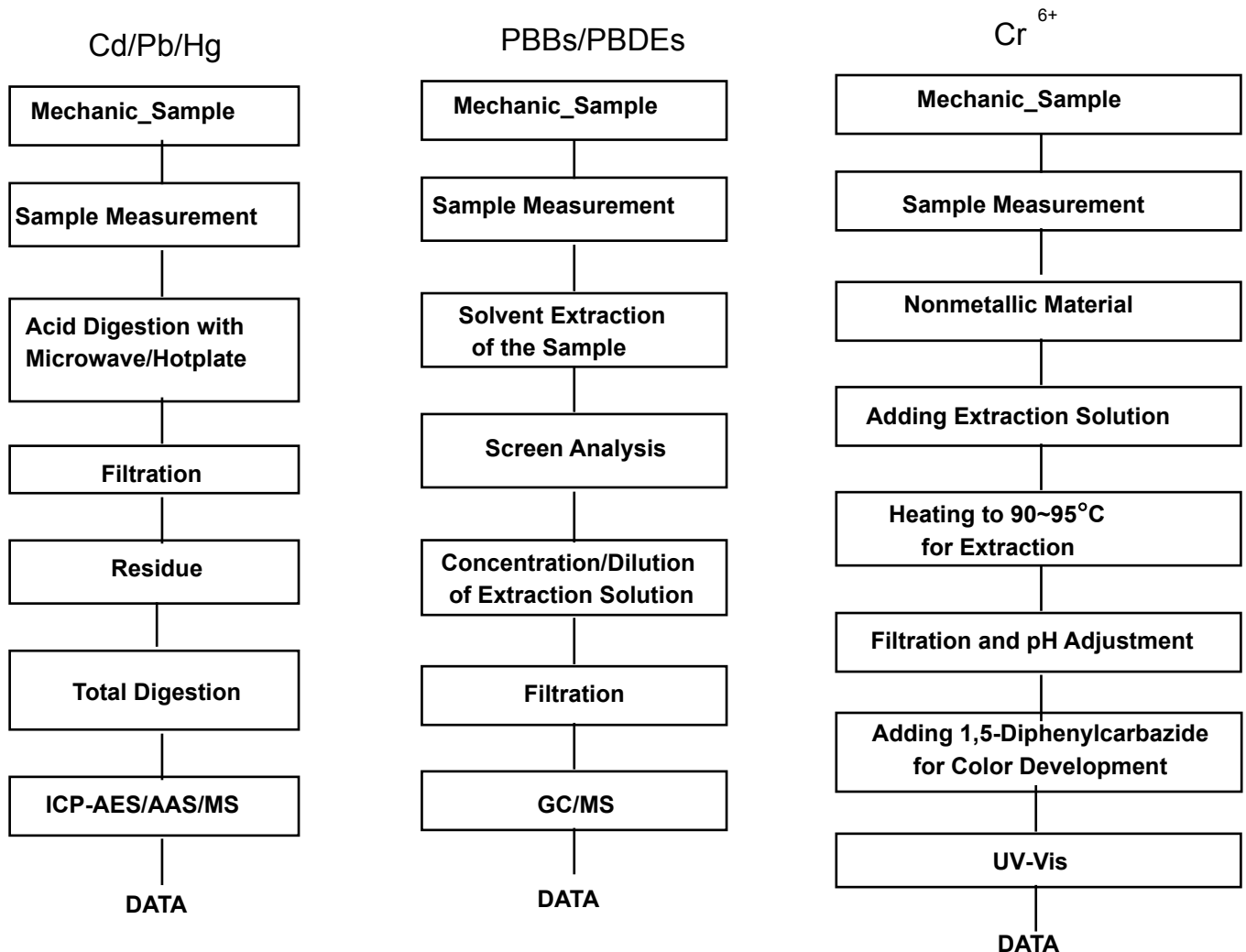
- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) Negative = Undetectable / Positive = Detectable
 - (6) ** = Qualitative analysis (No Unit)
 - (7) * = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm². The sample coating is considered to contain CrVI.
 b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm²). The coating is considered a non-CrVI based coating.
 c. The result between 0.10 ug/cm² and 0.13 ug/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination.

Picture of Sample as Received:



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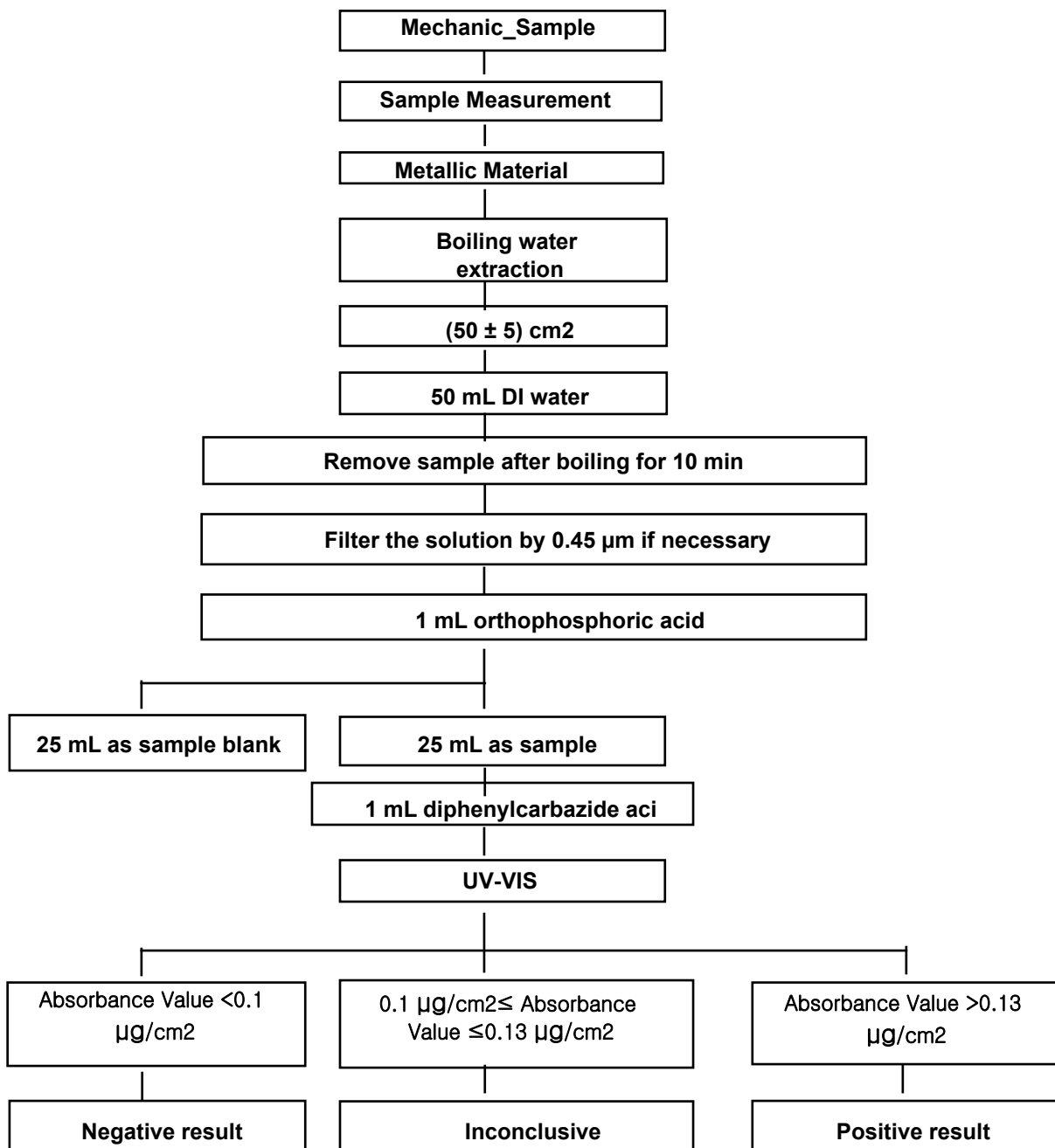
Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr⁶⁺ /PBBs&PBDEs Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.
 Section Chief : Gilsae Yi

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Cr⁶⁺

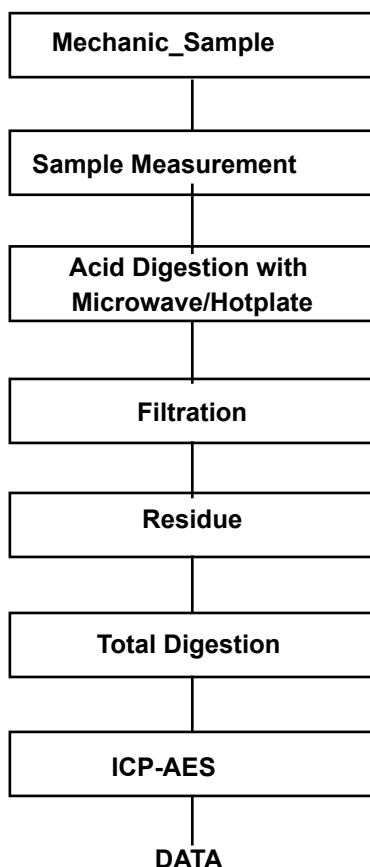


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Flow Chart for Inorganic Elements Testing

Inorganic Elements

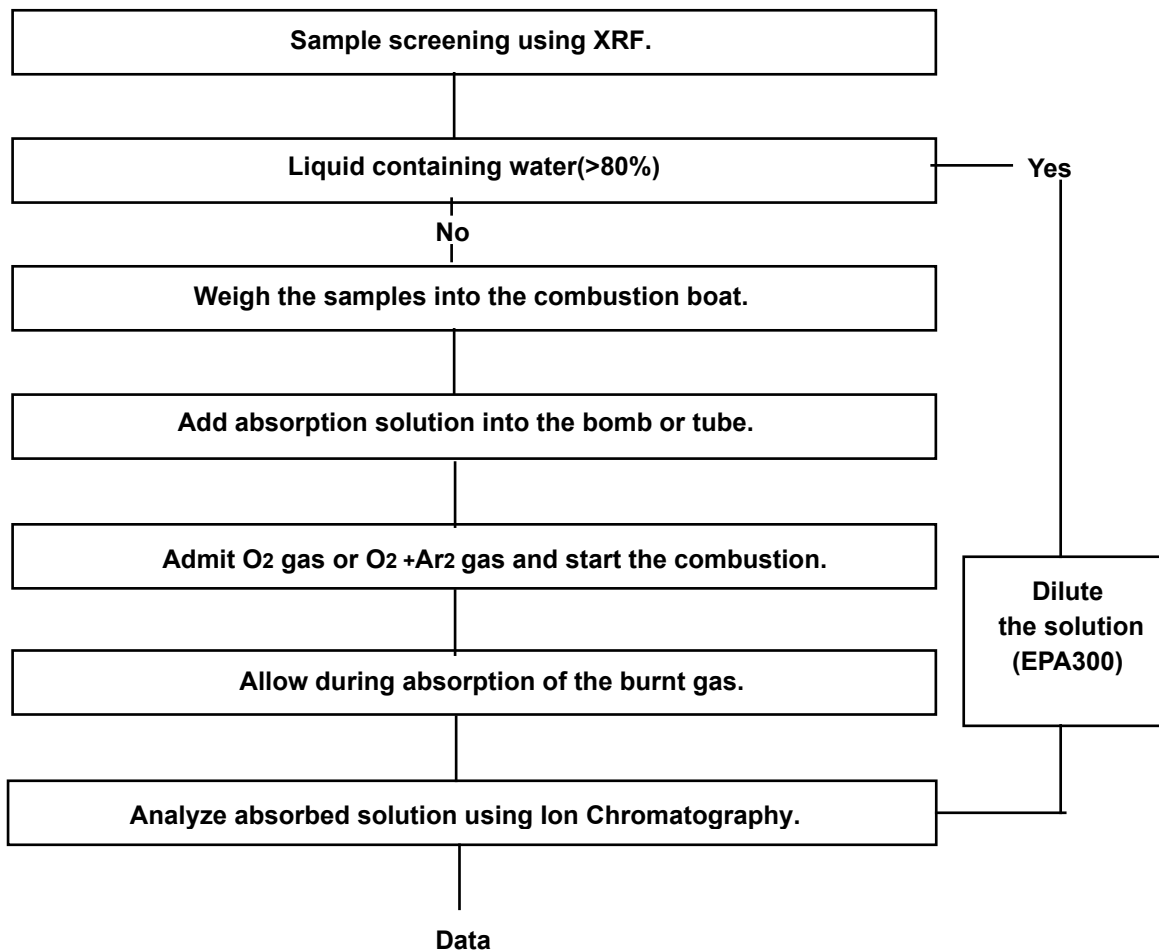


Major Inorganic Heavy Metals	Antimony(Sb) , Beryllium(Be) , Phosphorus(P) , Arsenic(As) etc.
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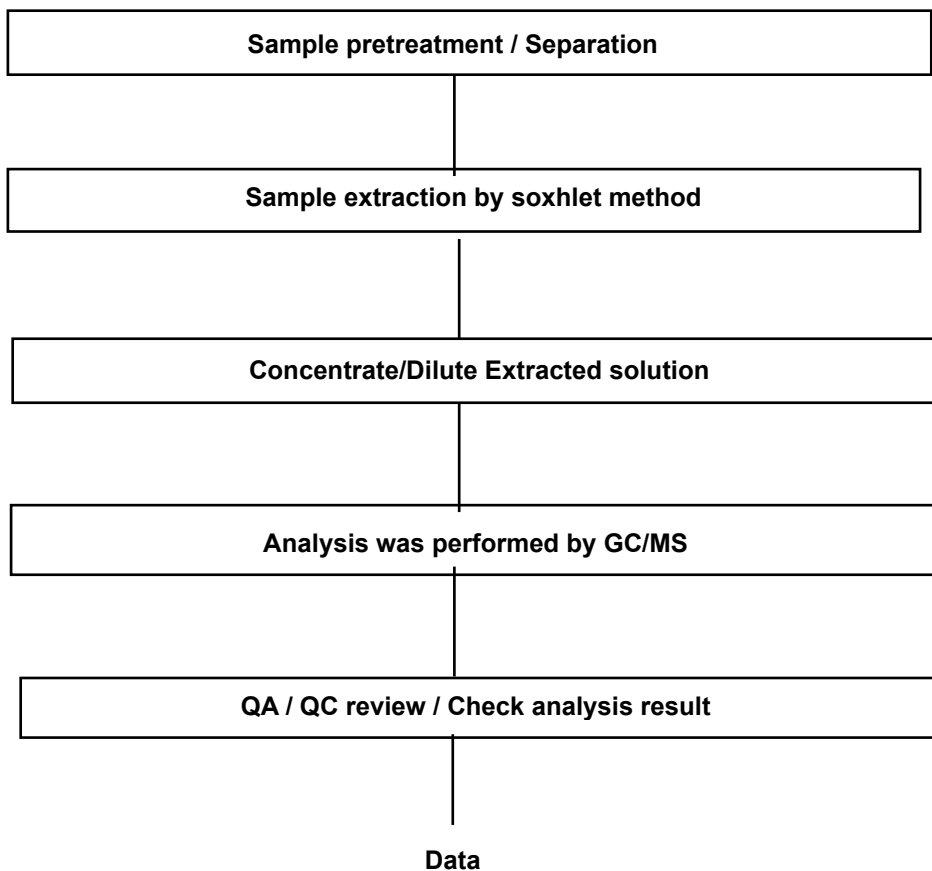
Flow Chart for Halogen Test



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Flow Chart for Phthalate Test



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Test Report No. F690101/LF-CTSAYGU15-02494

Issued Date : 2015. 04. 10

Page 1 of 5

POONGSAN CORPORATION

94 Sanam-ro, Onsan-eup
Ulju, Ulsan
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYGU15-02494
Product Name : C2700
Item No./Part No. : Brass
Received Date : 2015. 04. 07
Test Period : 2015. 04. 08 to 2015. 04. 10
Conclusion : Based on the performed tests on submitted samples, the test results of Cadmium, Lead, Mercury, Hexavalent Chromium Cr(VI), PBBs and PBDEs comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.
Test Results : For further details, please refer to following page(s)

SGS Korea Co., Ltd.
/ Gimhae Laboratory

Thomas Hwang / Lab Manager

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Test Report No. F690101/LF-CTSAYGU15-02494

Issued Date : 2015. 04. 10

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Sample No. : AYGU15-02494.001
Sample Description : C2700
Item No./Part No. : Brass
Materials : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013(Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013(Determination of Lead by ICP-OES)	5	32.0
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013(Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI) By boiling water extraction*	**	with reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis)	-	Negative

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

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Test Report No. F690101/LF-CTSAYGU15-02494

Issued Date : 2015. 04. 10

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Sample No. : AYGU15-02494.001
Sample Description : C2700
Item No./Part No. : Brass
Materials : N/A

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008 (Determination of PBBs and PBDEs by 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) Negative = Undetectable / Positive = Detectable
 - (6) ** = Qualitative analysis (No Unit)
 - (7) * = Boiling-water-extraction:
 - Negative = Absence of CrVI coating
 - Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

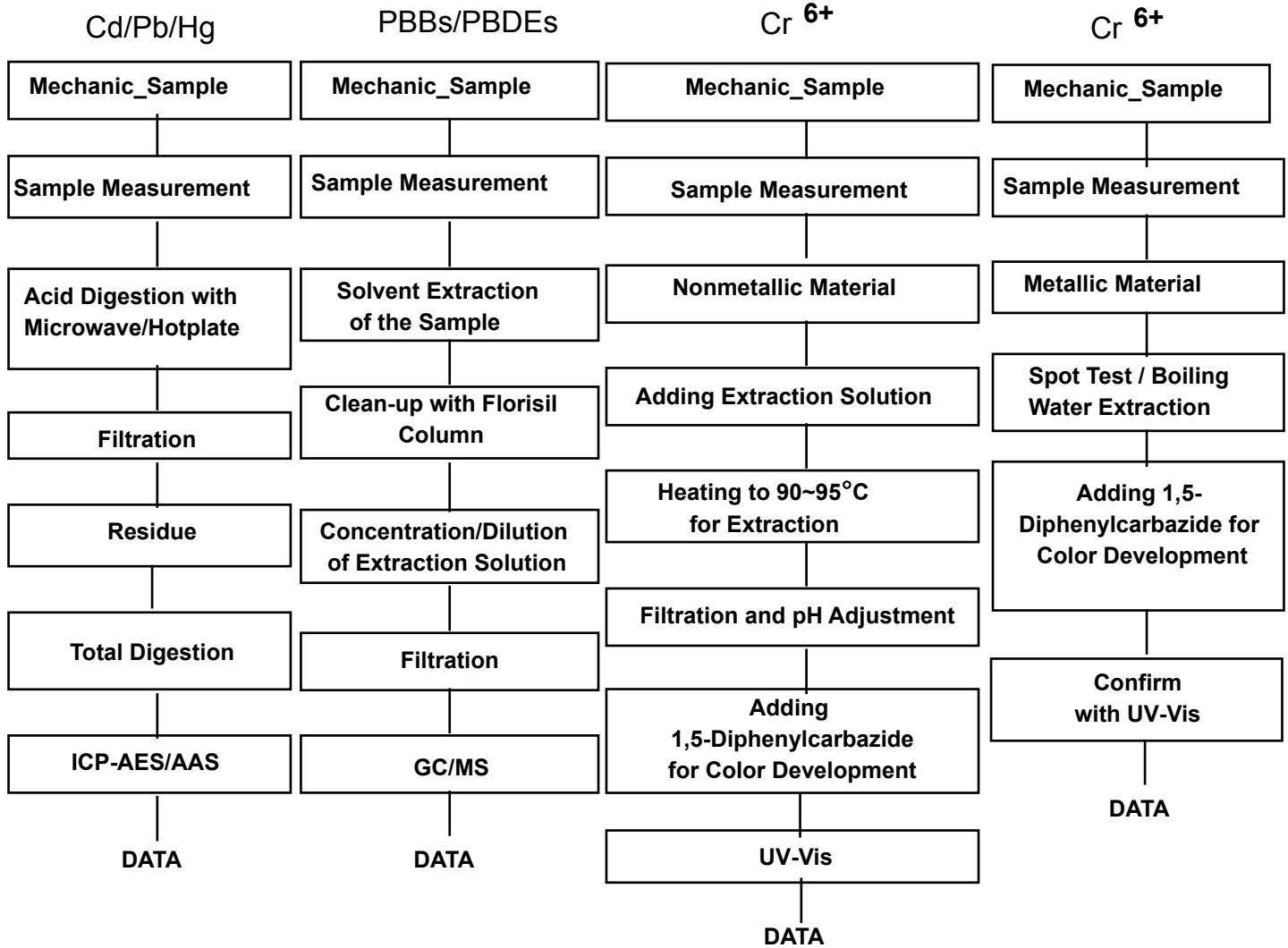
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Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr⁶⁺ /PBBs&PBDEs Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.
Section Chief : Shapless Park

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Test Report No. F690101/LF-CTSAYGU15-06461

Issued Date : 2015. 10. 07

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POONGSAN CORPORATION

94 Sanam-ro, Onsan-eup
Ulju, Ulsan
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYGU15-06461
Product Name : C5191
Item No./Part No. : Phosphor Bronze
Received Date : 2015. 10. 02
Test Period : 2015. 10. 02 to 2015. 10. 07
Conclusion : Based on the performed tests on submitted samples, the test results of Cadmium, Lead, Mercury, Hexavalent Chromium Cr(VI) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.
Test Results : For further details, please refer to following page(s)

SGS Korea Co., Ltd.
/ Gimhae Laboratory

Thomas Hwang / Lab Manager

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Test Report No. F690101/LF-CTSAYGU15-06461

Issued Date : 2015. 10. 07

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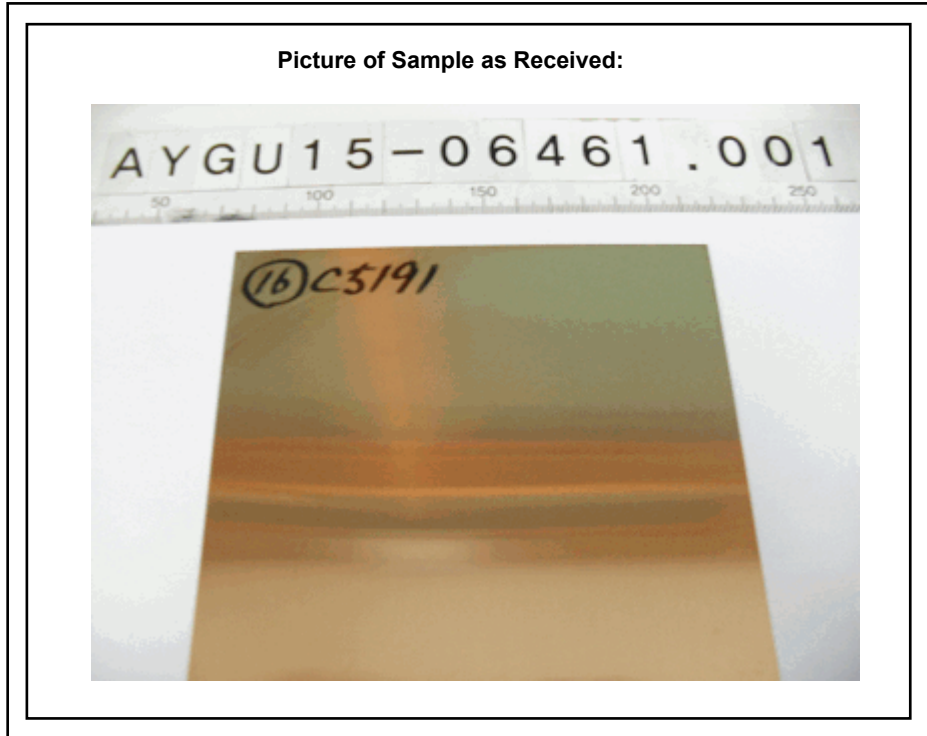
Sample No. : AYGU15-06461.001
Sample Description : C5191
Item No./Part No. : Phospher Bronze
Materials : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013(Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013(Determination of Lead by ICP-OES)	5	37.0
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013(Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI) By boiling water extraction*	**	with reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis)	-	Negative

- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) Negative = Undetectable / Positive = Detectable
 - (6) ** = Qualitative analysis (No Unit)
 - (7) * = Boiling-water-extraction:
 - Negative = Absence of CrVI coating
 - Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

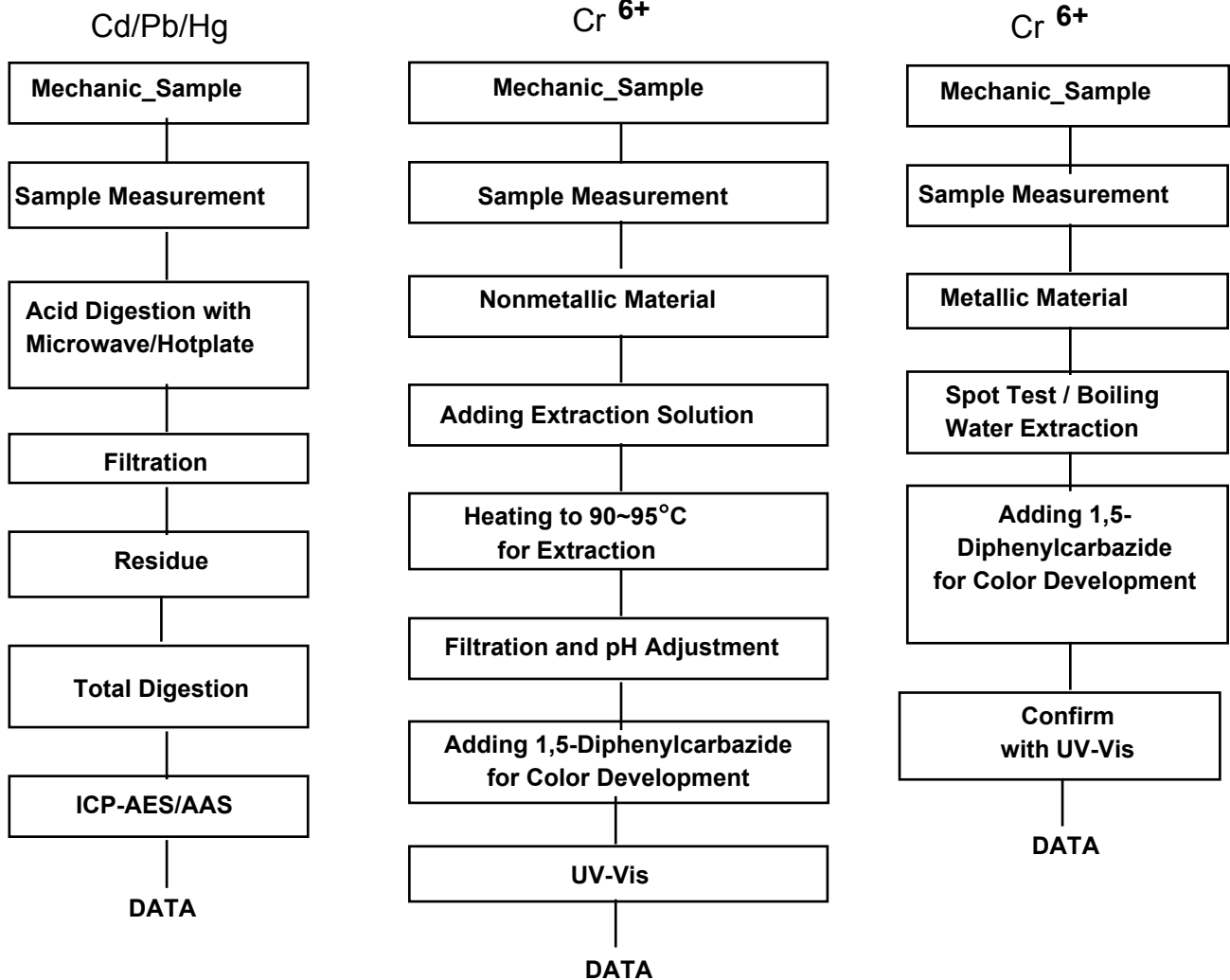
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Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr⁶⁺ Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.
Section Chief : Sharpless Park

*** End of Report ***

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SAFETY DATA SHEET

TECHNYL[®] 2413GW2 BRT

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Date : 2009/12/01

Version : A.01

Cancels and replaces version : 5.1

1. Product and company identification

- a. Product Name: TECHNYL[®] 2413GW2 BRT
- b. Usage and Restriction
- o Recommended usage: Injection molding (Semi-processed products)
 - o Restriction: Industrial use only
- c. Maker/Supplier/Distributor
- o Maker: RHODIA POLYAMIDE Co., LTD
 - o Address: 3F Kangnam B/D, 1321-1, Seocho-Dong, Seocho-Gu, Seoul, KOREA
 - o Emergency Number: +82 52 231 0900 / +82 2 2108 4901
 - o Responsible: PS team

2. Hazard identification

- a. Hazard classification
- Antimony trioxide
Carcinogenicity: IARC Category 2B
Target Organ Systemic Toxicity (1 time): Category 1 (Heart)
Target organ systemic toxicity (1 time): Category 2 (Respiratory organs)
Target organ systemic toxicity (Repeated): Category 1 (Respiratory organs)
- b. Hazard statement:
- o Pictogram: Not classified
 - o Signal Word: Warning
 - o Hazard Statement:
 - H351 Suspected of causing cancer
 - H372 Causes damage to organs through prolonged or repeated exposure
 - H412 Harmful to aquatic life with long lasting effects
 - o Precautionary statement
 - Prevention
 - P202 Do not handle until all safety precautions have been read and understood.
 - P260 Do not breathe dust/fume/gas/mist/vapors/spray.
 - P264 Wash hands thoroughly after handling
 - P270 Do not eat, drink or smoke when using this product.
 - P273 Avoid release to the environment.
 - P280 Wear protective gloves/protective clothing/eye protection/face protection
 - P284 Wear respiratory protection.
 - Response
 - P302+P352 IF ON SKIN: Wash with plenty of soap and water.
 - P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
 - P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present.
 - P332+P313 IF skin irritation occurs: Get medical advice/ attention

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- Storage

P410+P403

Protect from sunlight, Store in a well-ventilated place

- Disposal

P501

Follow achievable methods for the disposal of a substance and package.

c. Further information:

Although classified according to EC criteria (calculated by the conventional method), this product is exempt from labeling according to article 9.3 of Annex 6 of Directive 67/548/EEC, 28th ATP.

3. Composition / information on ingredients

Chemical Substances	CAS no	EINECS no	Content (%)	Remark
Polyamide 66	32131-17-2	-	> 57	
Glass Fiber	65997-17-3	266-046-0	10	
Brominated flame retardant	Secret	-	< 20	
Antimony trioxide	1309-64-4	215-175-0	< 10	Carcinogen Cat.2B
Other additives	Secret	-	< 3	
Sum			100	

4. First-aid measures

- a. Inhalation: Quickly move the person away from the contaminated area.
Make the affected person rest. If necessary seek medical advice.
- b. Skin contact: Remove all contaminated clothing and footwear. Wash immediately and thoroughly for a prolonged period (at least 15 minutes). In case of inflammation (redness, irritation, ...) obtain medical attention.
- c. Eye contact: Immediately rinse with plenty of running water for a prolonged period, (at least 15 minutes) whilst keeping the eyes wide open if irritation persists, consult a doctor.
- d. Ingestion: NEVER attempt to induce vomiting. Do not give anything to drink. If necessary seek medical advice.
- e. Major symptoms/effect of acute and Chronic toxicity: No data
- f. Information for emergency measure and doctor: No data

5. Fire-fighting measures

- a. Extinguishing method:
- o Suitable: All extinguishable agents can be used - water, foam, powders, carbon dioxide, sand, etc

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-
- Not suitable: None. If there is a fire close by, use suitable extinguishing agent
 - b. Specific hazards: Toxic vapors (halogen compounds) are released.
Combustible product, melts on heating.
Risk of fire spreading due to the flow of liquid which is already alight
 - c. Specific fire fighting methods: Cool the molten products.
 - d. Protection of fire-fighters: Self-contained breathing apparatus
-

6. Accidental release measures

- a. Personal precautions: Do not breathe fumes
 - b. Environmental precautions: This product does not present any particular risk for the environment.
 - c. Method for cleaning up
 - Recovery: Recover the product by vacuuming/shoveling or swelling.
 - Cleaning/Decontamination: Sweep
-

7. Handling and storage

- a. HANDLING
 - Suitable: Earth the equipment used to transfer the product.
 - Technical measure: Does not require any specific or particular measures.
 - Safe handling advice: Handle and use in accordance with good occupational hygiene and safety practice.
 - b. STORAGE
 - Technical measure: Does not require any specific or particular technical measures.
 - Storage condition:
 - Away from any flames.
 - Protected from humidity and bad weather conditions.
 - Incompatible products: Oxidizing materials
-

8. Exposure controls / personal protection

- a. Limit of exposure

Chemical substance	ACGHI
Antimony trioxide	TWA - 0.5 mg/m ³
- b. Engineering measures: Extract to remove vapors at their source
- c. Personal protection equipments
 - Respiratory: Use dust protective mask
 - Eye: Wear safety goggle.
 - Hand: Wear chemically protective gloves
 - Body: Wear dust protective wear

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- d. Work Practice Controls: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:
- Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
 - Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet
 - Wash exposed skin promptly to remove accidental splashes or contact with this material.

9. Physical and chemical properties

- | | |
|--|---|
| a. Surface aspect | White color pellet |
| b. Smell | N/A |
| c. pH | N/A |
| d. Melting range | 255~265 °C |
| e. Boiling temp. | N/A |
| f. Flash point | 350 °C (CC) |
| g. Vaporized rate | N/A |
| h. Inflammability. | Product will burn under fire conditions |
| i. Ignition / Exposure range | N/A |
| j. Vapor pressure | N/A |
| k. Solubility | Insoluble in water / organic solvent |
| l. Vapor density | N/A |
| m. Specific gravity | 1.43 |
| n. n-Octanol/water distribution factor | N/A |
| o. Self ignition temp. | > 450 °C |
| p. Degradation temp. | > 350 °C |
| q. Viscosity | 2.5 |
| r. Molecular weight | No evidence |

10. STABILITY AND REACTIVITY

- | | |
|---|--|
| a. Stability: | Stable under normal conditions of use |
| b. Possibility of hazard reaction: | Don't polymerize |
| c. Conditions to be avoided: | Remove heat, fire, and heat sources |
| d. Materials/Chemicals to be avoided: | Oxidizing material |
| e. Hazardous substances from decomposition (Thermal): | Bromine, Hydrobromic acid, Oxides of antimony, Carbon oxides (CO + CO ₂) |

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11. Toxicological information

- | | |
|----------------------------------|---|
| a. Acute Eye Irritation: | Not classified (by calculation according to the GHS method) |
| b. Acute Skin Irritation: | Not classified (by calculation according to the GHS method) |
| c. Acute Respiratory Irritation: | Not classified (by calculation according to the GHS method) |
| d. Acute Inhalation Toxicity: | Not classified (by calculation according to the GHS method) |
| e. Acute Oral Toxicity: | Not classified (by calculation according to the GHS method) |
| f. Chronic Toxicity: | No test data found for product. |

12. Ecological information

- a. Mobility
 - o Precipitation: Slightly soluble product, readily forms deposits.
 - o Expected behavior of the product: Ultimate destination of the product: SOIL and SEDIMENT.
- b. Biodegradability
 - o Ultimate aerobic biodegradability: Not biodegradable (internal evaluation)
- c. Bioaccumulation
 - o Octanol/Water partition coefficient: Not potentially bioaccumulable (internal evaluation)
- d. Eco-toxicity
 - o Effect on the aquatic environment: Due to its physical state, this product does not have any known adverse effect on the aquatic organism

13. Disposal considerations

- a. Residue from product
 - o Destruction/Disposal: Recycle the material as far as possible. If it proves necessary to grind the product in order to recycle it, take all necessary precautions to prevent the formation and spread of dust.
 - o Non recycled product: May be disposed of with non hazardous industrial waste. Incinerate at a licensed installation.
Dispose of in accordance with relevant local regulations.
- b. NOTE: The user's attention is drawn to the possible existence of local regulations regarding disposal

14. Transport information

- a. International regulations
 - o Rail/road (RID/ADR): NOT restricted
 - o Sea (IMO/IMDG): NOT restricted

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- o Air (ICAO-IATA): NOT restricted
- b. NOTE: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transport regulations for hazardous materials, it would be advisable to check their validity with your sales office.

15. Regulatory information

- a. Labeling:
 - o Korea regulations: Mandatory labeling (self-classification) of hazardous preparations:
NOT APPLICABLE
 - o EC regulations: Mandatory labeling (self-classification) of hazardous preparations:
NOT APPLICABLE
- b. R Phases: R40: Limited evidence for carcinogen
- c. S Phases: S2, S13, S36/37/39
- d. Further data: Although classified according to EC criteria (calculated by conventional method), this product is exempt from labeling according to article 9.3 of Annex 6 of Directive 67/548/EEC, 28th ATP.
- e. Further information: Packing confirms to Directive 94/62/EEC et to Decree 98-638.
- f. NOTE: The regulatory information given above only indicators the principle regulations specifically applicable to the product described in the Safety Data Sheet. The user's attention is drawn to the possible existence of additional provisions which complete these regulations. Refer to all applicable national, international and local regulations or provisions.

16. Other information

- a. Uses
 - o Prohibited use: For special application e.g. in medicine, surgery, or the food industry, obtain further information form the manufacturer.
 - o Registration numbers: The polymers are not listed in the EINECS inventory. All the constituent of this preparation are registered in EINECS inventory.
- b. Update: This sheet was updated (below paragraph was changed) to meet KOREA Government law and GHS guidelines.
 - 2. Hazard identification
 - 3. Composition / information on ingredients
 - 4. First-aid measures
 - 8. Exposure controls / personal protection
 - 9. Physical and chemical properties
 - 11. Toxicological information
 - 12. Ecological information

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13. Disposal considerations

15. Regulatory information

This safety data sheet should be used in conjunction with technical sheets. It does not replace them. The Information given is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all precautions required in handling the products. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products. This information is not exhaustive. This does not exonerate the user from ensuring that legal obligations, other than those mentioned, relating to the use and storage of the products, do not exist. This is solely his responsibility

	MATERIAL SAFETY DATA SHEET	Version: R0001.0001
		Date of issue: 2014-09-02
	DGN1001BF	Revision date: 2014-09-02
		Change List:

1. IDENTIFICATION

A. Product name

- DGN1001BF

B. Recommended use and restriction on use

- General use : Not available
 - Restriction on use : Not available

C. Manufacturer / Supplier / Distributor information

o Manufacturer information

- Company name : LG Chem, Ltd.
 - Address : 99, Seokam-ro, Iksan-si, Jeonbuk, 570-350, Korea
 - Dept. : EP Technology Team
 - Telephone number : 82-63-830-4101
 - Emergency telephone number : 82-63-830-4101
 - Fax number : 82-63-830-4809
 - E-mail address :

o Supplier/Distributor information

- Company name : LG Chem, Ltd.
 - Address : LG Twin Towers 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, 150-721, Korea
 - Dept. : EP Division
 - Telephone number : 82-2-3773-3517
 - Emergency telephone number :
 - Fax number : 82-2-3773-7983
 - E-mail address : webmaster@lgchem.com

2. HAZARD IDENTIFICATION

A. GHS Classification

- Skin corrosion/irritation : Category2
 - Serious eye damage/irritation : Category2
 - Specific target organ toxicity(Single exposure) : Category3(Respiratory tract irritation)

B. GHS label elements

o Hazard symbols



o Signal words

- Warning

o Hazard statements

- H315 Causes skin irritation
 - H319 Causes serious eye irritation
 - H335 May cause respiratory irritation.

o Precautionary statements

1) Prevention

- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 - P264 Wash hands thoroughly after handling.
 - P271 Use only outdoors or in a well-ventilated area.

- P280 Wear protective gloves/protective clothing/eye protection/face protection.

2) Response

- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P321 Specific treatment
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P362 Take off contaminated clothing and wash before reuse.

3) Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification : (NFPA Classification)

o NFPA grade (0 ~ 4 level)

- Health : 2, Flammability : 0, Reactivity : 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Poly[imino(1,6-dioxo-1,6-hexanediy)imino-1,6-	-	32131-17-2	70~80
Poly[imino(1-oxo-1,6-hexanediy)]	Polycaprolactam	25038-54-4	15~25
1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)	-	37640-57-6	5~15
Others	-	-	≤5

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms (flare, irritate) occur.
- Remove contact lenses if worn.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Laundering enough contaminated clothing before reuse.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms (flare, irritate) occur.
- Wash thoroughly after handling.

C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.
- Get medical attention immediately.

D. Ingestion contact

- About whether I should induce vomiting Take the advice of a doctor.
- Rinse your mouth with water immediately.
- Get medical attention immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

5. FIREFIGHTING MEASURES**A. Suitable (Unsuitable) extinguishing media**

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

B. Specific hazards arising from the chemical

- Not available

C. Special protective actions for firefighters

- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Using a unattended and water devices in case of large fire and leave alone to burn if you do not imperative.
- Avoid inhalation of materials or combustion by-products.
- Do not access if the tank on fire.
- Use appropriate extinguishing measure suitable for surrounding fire.
- Keep containers cool with water spray.

6. ACCIDENTAL RELEASE MEASURES**A. Personal precautions, protective equipment and emergency procedures**

- Wear proper personal protective apparatus as indicated in Section 8 and avoid skin contact and inhalation.
- Ventilate closed spaces before entering.
- Do not touch spilled material. Stop leak if you can do it without risk.
- Handling the damaged containers or spilled material after wearing protective equipment.
- Avoid skin contact and inhalation.

B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notification to central government, local government. When emissions at least of the standard amount
- Dispose of waste in accordance with local regulation.
- Appropriate container for disposal of spilled material collected.
- Small liquid state spills: Appropriate container for disposal of spilled material collected.
- For disposal of spilled material in appropriate containers collected and clear surface.

7. HANDLING AND STORAGE**A. Precautions for safe handling**

- Avoid direct physical contact.
- Since emptied containers retain product residue(vapor, liquid, solid) follow all MSDS and label warnings even after container is emptied.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.

B. Conditions for safe storage, including any incompatibilities

- Save in cool, dry and well ventilated place.
- Do not apply direct heat.
- Do not apply any physical shock to container.
- Keep in the original container.
- Prevent static electricity and keep away from combustible materials or heat sources.
- Collected them in sealed containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

- **ACGIH TLV**
 - Not available

B. Engineering controls

- A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. The use of local exhaust ventilation is recommended to control emissions near the source.

C. Personal protective equipment

- **Respiratory protection**
 - Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
 - Respiratory protection is ranked in order from minimum to maximum.
 - Consider warning properties before use.
 - Dust, mist, fume-purifying respiratory protection
 - Any air-purifying respirator with a corpuscle filter of high efficiency
 - Any respiratory protection with a electromotion fan(for dust, mist, fume-purifying)
 - Self-contained breathing apparatus with a corpuscle filter of high efficiency
 - For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- **Eye protection**
 - Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
 - Provide an emergency eye wash station and quick drench shower in the immediate work area.
- **Hand protection**
 - Wear appropriate glove.
- **Skin protection**
 - Wear appropriate clothing.
- **Others**
 - Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Solid(Pellets)
- Color	Not available
B. Odor	Not available
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	260
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	Not available
L. Solubility	Not available
M. Vapour density	Not available
N. Specific gravity	Not available
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	Not available

10. STABILITY AND REACTIVITY

A. Chemical stability

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

C. Conditions to avoid

- Avoid contact with incompatible materials and condition.
- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

- **(Respiratory tracts)**
 - May cause respiratory irritation.
- **(Oral)**
 - Not available
- **(Eye/Skin)**
 - Causes serious eye irritation
 - Causes skin irritation

B. Delayed and immediate effects and also chronic effects from short and long term exposure

- **Acute toxicity**
 - * **Oral**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : LD50 = 2500 mg/kg Rat
 - * **Dermal**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : LD50 = 5520 mg/kg Rat
 - * **Inhalation**
 - [Poly[imino(1,6-dioxo-1,6-hexanediy)imino-1,6-hexanediy]] : LC50 7.26 mg/ℓ 4 hr Rat
 - [Poly[imino(1-oxo-1,6-hexanediy)]] : LC50 0.011 mg/L Mouse
- **Skin corrosion/irritation**
 - Causes skin irritation
- **Serious eye damage/irritation**
 - Causes serious eye irritation
- **Respiratory sensitization**
 - Not available
- **Skin sensitization**
 - Not available
- **Carcinogenicity**
 - * **IARC**
 - [Poly[imino(1-oxo-1,6-hexanediy)]] : Group 3
 - * **OSHA**
 - Not available
 - * **ACGIH**
 - Not available
 - * **NTP**
 - Not available
 - * **EU CLP**
 - Not available
- **Germ cell mutagenicity**

- Not available
- **Reproductive toxicity**
 - Not available
- **STOT-single exposure**
 - May cause respiratory irritation.
- **STOT-repeated exposure**
 - Not available
- **Aspiration hazard**
 - Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

- **Fish**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : LC50 = 25042.387 mg/ℓ 96 hr
- **Crustaceans**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : LC50 = 40.299 mg/ℓ 48 hr
- **Algae**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : EC50 = 11.563 mg/ℓ 96 hr

B. Persistence and degradability

- **Persistence**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : log Kow = -1.37
- **Degradability**
 - Not available

C. Bioaccumulative potential

- **Bioaccumulative potential**
 - [1,3,5-Triazine-2,4,6(1H,3H,5H)-trione compd. with 1,3,5-triazine-2,4,6-triamine (1:1)] : BCF = 3
- **Biodegradation**
 - Not available

D. Mobility in soil

- Not available

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre-process with Water separation process.
- Dispose by incineration.

B. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN number, (IMDG)

- Not available

B. Proper shipping name

- Not available

C. IMDG Class

- Not available

D. IMDG Packing group

- Not available

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : Not available
- EmS SPILLAGE SCHEDULE : Not available

15. REGULATORY INFORMATION**A. National and/or international regulatory information**

- **POPs Management Law**
 - Not applicable
- **Information of EU Classification**
 - * **Classification**
 - Not applicable
 - * **Risk Phrases**
 - Not applicable
 - * **Safety Phrase**
 - Not applicable
- **U.S. Federal regulations**
 - * **OSHA PROCESS SAFETY (29CFR1910.119)**
 - Not applicable
 - * **CERCLA Section 103 (40CFR302.4)**
 - Not applicable
 - * **EPCRA Section 302 (40CFR355.30)**
 - Not applicable
 - * **EPCRA Section 304 (40CFR355.40)**
 - Not applicable
 - * **EPCRA Section 313 (40CFR372.65)**
 - Not applicable
- **Rotterdam Convention listed ingredients**
 - Not applicable
- **Stockholm Convention listed ingredients**
 - Not applicable
- **Montreal Protocol listed ingredients**
 - Not applicable

16. OTHER INFORMATION**A. Reference**

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2014-09-02

C. Revision number and Last date revised

- 2 times, 2014-09-02

D. Other

- This MSDS is prepared according to the Globally Harmonized System (GHS).

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TECHNYL[®] 2413GW2 RED

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Version : A.01

Cancels and replaces version : 1.1

1. Product and company identification

- a. Product Name: TECHNYL[®] 2413GW2 RED
- b. Usage and Restriction
- o Recommended usage: Injection molding (Semi-processed products)
 - o Restriction: Industrial use only
- c. Maker/Supplier/Distributor
- o Maker: RHODIA POLYAMIDE Co., LTD
 - o Address: 3F Kangnam B/D, 1321-1, Seocho-Dong, Seocho-Gu, Seoul, KOREA
 - o Emergency Number: +82 52 231 0900 / +82 2 2108 4901
 - o Responsible: PS team

2. Hazard identification

- a. Hazard classification
- Antimony trioxide
Carcinogenicity: IARC Category 2B
Target Organ Systemic Toxicity (1 time): Category 1 (Heart)
Target organ systemic toxicity (1 time): Category 2 (Respiratory organs)
Target organ systemic toxicity (Repeated): Category 1 (Respiratory organs)
- b. Hazard statement:
- o Pictogram: Not classified
 - o Signal Word: Warning
 - o Hazard Statement:
 - H351 Suspected of causing cancer
 - H372 Causes damage to organs through prolonged or repeated exposure
 - H412 Harmful to aquatic life with long lasting effects
 - o Precautionary statement
 - Prevention
 - P202 Do not handle until all safety precautions have been read and understood.
 - P260 Do not breathe dust/fume/gas/mist/vapors/spray.
 - P264 Wash hands thoroughly after handling
 - P270 Do not eat, drink or smoke when using this product.
 - P273 Avoid release to the environment.
 - P280 Wear protective gloves/protective clothing/eye protection/face protection
 - P284 Wear respiratory protection.
 - Response
 - P302+P352 IF ON SKIN: Wash with plenty of soap and water.
 - P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
 - P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present.
 - P332+P313 IF skin irritation occurs: Get medical advice/ attention

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- Storage

P410+P403

Protect from sunlight, Store in a well-ventilated place

- Disposal

P501

Follow achievable methods for the disposal of a substance and package.

c. Further information:

Although classified according to EC criteria (calculated by the conventional method), this product is exempt from labeling according to article 9.3 of Annex 6 of Directive 67/548/EEC, 28th ATP.

3. Composition / information on ingredients

Chemical Substances	CAS no	EINECS no	Content (%)	Remark
Polyamide 66	32131-17-2	-	> 57	
Glass Fiber	65997-17-3	266-046-0	10	
Brominated flame retardant	Secret	-	< 20	
Antimony trioxide	1309-64-4	215-175-0	< 10	Carcinogen Cat.2B
Other additives	Secret	-	< 3	
Sum			100	

4. First-aid measures

- a. Inhalation: Quickly move the person away from the contaminated area.
Make the affected person rest. If necessary seek medical advice.
- b. Skin contact: Remove all contaminated clothing and footwear. Wash immediately and thoroughly for a prolonged period (at least 15 minutes). In case of inflammation (redness, irritation, ...) obtain medical attention.
- c. Eye contact: Immediately rinse with plenty of running water for a prolonged period, (at least 15 minutes) whilst keeping the eyes wide open if irritation persists, consult a doctor.
- d. Ingestion: NEVER attempt to induce vomiting. Do not give anything to drink. If necessary seek medical advice.
- e. Major symptoms/effect of acute and Chronic toxicity: No data
- f. Information for emergency measure and doctor: No data

5. Fire-fighting measures

- a. Extinguishing method:
- o Suitable: All extinguishable agents can be used - water, foam, powders, carbon dioxide, sand, etc

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-
- Not suitable: None. If there is a fire close by, use suitable extinguishing agent
 - b. Specific hazards: Toxic vapors (halogen compounds) are released.
Combustible product, melts on heating.
Risk of fire spreading due to the flow of liquid which is already alight
 - c. Specific fire fighting methods: Cool the molten products.
 - d. Protection of fire-fighters: Self-contained breathing apparatus
-

6. Accidental release measures

- a. Personal precautions: Do not breathe fumes
 - b. Environmental precautions: This product does not present any particular risk for the environment.
 - c. Method for cleaning up
 - Recovery: Recover the product by vacuuming/shoveling or swelling.
 - Cleaning/Decontamination: Sweep
-

7. Handling and storage

- a. HANDLING
 - Suitable: Earth the equipment used to transfer the product.
 - Technical measure: Does not require any specific or particular measures.
 - Safe handling advice: Handle and use in accordance with good occupational hygiene and safety practice.
 - b. STORAGE
 - Technical measure: Does not require any specific or particular technical measures.
 - Storage condition:
 - Away from any flames.
 - Protected from humidity and bad weather conditions.
 - Incompatible products: Oxidizing materials
-

8. Exposure controls / personal protection

- a. Limit of exposure

Chemical substance	ACGHI
Antimony trioxide	TWA - 0.5 mg/m ³
- b. Engineering measures: Extract to remove vapors at their source
- c. Personal protection equipments
 - Respiratory: Use dust protective mask
 - Eye: Wear safety goggle.
 - Hand: Wear chemically protective gloves
 - Body: Wear dust protective wear

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- d. Work Practice Controls: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:
- Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
 - Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet
 - Wash exposed skin promptly to remove accidental splashes or contact with this material.

9. Physical and chemical properties

- | | |
|--|---|
| a. Surface aspect | RED color pellet |
| b. Smell | N/A |
| c. pH | N/A |
| d. Melting range | 255~265 °C |
| e. Boiling temp. | N/A |
| f. Flash point | 350 °C (CC) |
| g. Vaporized rate | N/A |
| h. Inflammability. | Product will burn under fire conditions |
| i. Ignition / Exposure range | N/A |
| j. Vapor pressure | N/A |
| k. Solubility | Insoluble in water / organic solvent |
| l. Vapor density | N/A |
| m. Specific gravity | 1.43 |
| n. n-Octanol/water distribution factor | N/A |
| o. Self ignition temp. | > 450 °C |
| p. Degradation temp. | > 350 °C |
| q. Viscosity | 2.5 |
| r. Molecular weight | No evidence |

10. STABILITY AND REACTIVITY

- | | |
|---|--|
| a. Stability: | Stable under normal conditions of use |
| b. Possibility of hazard reaction: | Don't polymerize |
| c. Conditions to be avoided: | Remove heat, fire, and heat sources |
| d. Materials/Chemicals to be avoided: | Oxidizing material |
| e. Hazardous substances from decomposition (Thermal): | Bromine, Hydrobromic acid, Oxides of antimony, Carbon oxides (CO + CO ₂) |

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11. Toxicological information

- | | |
|----------------------------------|---|
| a. Acute Eye Irritation: | Not classified (by calculation according to the GHS method) |
| b. Acute Skin Irritation: | Not classified (by calculation according to the GHS method) |
| c. Acute Respiratory Irritation: | Not classified (by calculation according to the GHS method) |
| d. Acute Inhalation Toxicity: | Not classified (by calculation according to the GHS method) |
| e. Acute Oral Toxicity: | Not classified (by calculation according to the GHS method) |
| f. Chronic Toxicity: | No test data found for product. |

12. Ecological information

- a. Mobility
 - Precipitation: Slightly soluble product, readily forms deposits.
 - Expected behavior of the product: Ultimate destination of the product: SOIL and SEDIMENT.
- b. Biodegradability
 - Ultimate aerobic biodegradability: Not biodegradable (internal evaluation)
- c. Bioaccumulation
 - Octanol/Water partition coefficient: Not potentially bioaccumulable (internal evaluation)
- d. Eco-toxicity
 - Effect on the aquatic environment: Due to its physical state, this product does not have any known adverse effect on the aquatic organism

13. Disposal considerations

- a. Residue from product
 - Destruction/Disposal: Recycle the material as far as possible. If it proves necessary to grind the product in order to recycle it, take all necessary precautions to prevent the formation and spread of dust.
 - Non recycled product: May be disposed of with non hazardous industrial waste. Incinerate at a licensed installation.
Dispose of in accordance with relevant local regulations.
- b. NOTE: The user's attention is drawn to the possible existence of local regulations regarding disposal

14. Transport information

- a. International regulations
 - Rail/road (RID/ADR): NOT restricted
 - Sea (IMO/IMDG): NOT restricted

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- Air (ICAO-IATA): NOT restricted
- b. NOTE: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transport regulations for hazardous materials, it would be advisable to check their validity with your sales office.

15. Regulatory information

- a. Labeling:
 - Korea regulations: Mandatory labeling (self-classification) of hazardous preparations:
NOT APPLICABLE
 - EC regulations: Mandatory labeling (self-classification) of hazardous preparations:
NOT APPLICABLE
- b. R Phases: R40: Limited evidence for carcinogen
- c. S Phases: S2, S13, S36/37/39
- d. Further data: Although classified according to EC criteria (calculated by conventional method), this product is exempt from labeling according to article 9.3 of Annex 6 of Directive 67/548/EEC, 28th ATP.
- e. Further information: Packing confirms to Directive 94/62/EEC et to Decree 98-638.
- f. NOTE: The regulatory information given above only indicators the principle regulations specifically applicable to the product described in the Safety Data Sheet. The user's attention is drawn to the possible existence of additional provisions which complete these regulations. Refer to all applicable national, international and local regulations or provisions.

16. Other information

- a. Uses
 - Prohibited use: For special application e.g. in medicine, surgery, or the food industry, obtain further information form the manufacturer.
 - Registration numbers: The polymers are not listed in the EINECS inventory. All the constituent of this preparation are registered in EINECS inventory.
- b. Update: This sheet was updated (below paragraph was changed) to meet KOREA Government law and GHS guidelines.
 - 2. Hazard identification
 - 3. Composition / information on ingredients
 - 4. First-aid measures
 - 8. Exposure controls / personal protection
 - 9. Physical and chemical properties
 - 11. Toxicological information
 - 12. Ecological information

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13. Disposal considerations

15. Regulatory information

This safety data sheet should be used in conjunction with technical sheets. It does not replace them. The Information given is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all precautions required in handling the products. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products. This information is not exhaustive. This does not exonerate the user from ensuring that legal obligations, other than those mentioned, relating to the use and storage of the products, do not exist. This is solely his responsibility

<h1>MSDS</h1> <h2>(MATERIAL SAFETY DATA SHEET)</h2>	Control No	MSDS-PS-ENG-005
	Date Issued	JUNE 29th,2013
	Revision No	4 (GHS)
Product Names	Brass Strip, Bar, Wire, Coin	

SECTION 1	Product and company identification
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a. Product Name	Copper & Brass Strip, Bar, Wire, Coin
Item Names	C2500, C2600, C2680, C2700, C2720, C2730, C2800, C2801 (Contain : Tin plating material)
b. Recommended use and restrictions on use	
Item recommended use	Electricity, Drawing, Decoration, Coin, Other Parts
Item restrictions on use	No data
c. Manufacturer/Supplier/Distributor Information	
Company's Name	POONGSAN CORPORATION Ulsan Plant
Company's Address	94, Sanam-ro, Onsan -eup, Ulju-gun, Ulsan, Korea
Phone / Fax Number	+82-52-231-9114 / +82-52-231-9400

SECTION 2	Harmfulness · riskiness
------------------	--------------------------------

a. Classification of harmfulness and riskiness	Acute toxicity(oral) : classification 3 Specific Target Organ Toxicity (Single Exposure) : classification 3--respiratory tract irritation Specific Target Organ Toxicity (Repeated Exposure) : classification 1 Acute aquatic toxicity: classification 1 Chronic aquatic toxicity : classification 1
b. GHS labels, including precautionary statements	

Hazard Symbols



Signal word	Statements
Health Hazards	H301 Toxic if swallowed H335 May cause respiratory irritation H372 Causes damage to organs through prolonged or repeated exposure H400 Very toxic to aquatic life H410 Very toxic to aquatic life with long lasting effects

Precautionary statements

Prevention	P260 Do not breathe dust/fume/gas/mist/vapos/spray. P264 Wash ... thoroughly after handling P270 Do not eat, drink or smoke when using this product.
Response	P301+P310 If swallowed: Immediately call a poison center or doctor/physician. P304+P340 If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P312 Call a poison center or doctor/physician if you feel unwell P314 Get medical advice/attention if you feel unwell
Storage	P403+P223 Store in a well-ventilated place.
Disposal	P501 Dispose of contents/container to Waste Management Act

c. Other hazards which do not result in classification(NFPA)

Division	Health	Fire	Reactivity
Copper	2	3	0
Zinc	1	1	1

SECTION 3 Composition/Information on ingredients

Component	Synonyms	CAS number	Content (%)
Copper	-	7440-50-8	60.1-72.5
Zinc	-	7440-66-6	27.5-39.9

SECTION4 First aid measures

a. Eye contact	<p>Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open.</p> <p>If the chemicals is entering the eyes, immediately should receive the examination and treatment.</p>
b. Skin contact	<p>remove the chemicals immediately with soap and water for at the least 15minutes.</p> <p>If skin irritation persists or a rash develops as a result of excessive contact, see a doctor.</p>
c. Inhalation	<p>Give artificial respiration if victim is not breathing.</p> <p>avoid away from area of a risk.</p>
d. Ingestion	<p>If person is unconscious, do not feed anything and do not induce vomit.</p> <p>If person is vomiting spontaneously, Head place lower than hips in order to avoid possibility of inspiration in the lungs.</p> <p>If unconscious, turn head to side to prevent airway obstruction.</p> <p>contact the emergency medical treatment organization and evacuate immediately to the hospital.</p>
e. Indication of immediate medical attention and notes for physician	<p>consider gastric lavage when ingested chemicals.</p> <p>If breathing is difficult, give oxygen and continue to monitor</p> <p>antidote(copper) : potassium, natrium, edetate/glucose, intravenous administration : penicillamine, oral administration</p>

SECTION 5 Fire-fighting measures

a. Suitable (and unsuitable) extinguishing media

Suitable	Dolomite, dry chemical powder for metal fire, sand, graphite, soda ash, sodium chloride, lime
unsuitable	Foam extinguisher, Water
Large fire	No data

b. Specific hazards arising from the chemical

Toxicant from combustion	Zinc oxide
Fire and Explosion Hazards	<p>in case of general conditions, you can ignore fire and explosion.</p> <p>but mixture of dust and air may have explosion or ignition.</p>

c. Special protective equipment and precautions for fire-fighters

Protective equipment	Protective clothing
Prevention measure	<p>Prevent people unconcerned from getting close to risk area, isolate and must prohibit approach.</p> <p>use appropriate extinguishing agent in surrounding fire.</p> <p>Avoid inhalation of combustion products</p> <p>Avoid direct contact with the water</p>

SECTION 6 Accidental release measures

A. For personal precautions, protective equipment and emergency procedures	Avoiding direct contact, wear suitable protective equipment.
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B. Environmental precautions and protective procedures

Air	No data
Soil	Dispose of leaked substances what put into a suitable container.
Water	Please be Collected using vacuum pump. absorb leaked substance with activated carbon.
	accumulated substance in activated carbon must be handled after inpour at waste water disposal plant using hose.

C. Methods and materials for containment and cleaning up

Small leak	Please be collected in a suitable container leak substance. implement cleaning by only those who have been trained about riskiness of leaked substance. Avoid direct contact with the water and leaked substance.
Large leak	Please notify the contents of the discharge to state and local government agencies when the recommended dose or more.

SECTION 7 Handling and storage

A. Precautions for safe handling	prevent a dust's creation and spread. residue in the container is dangerous, so dispose of container in accordance with safety instruction.
B. Conditions for safe storage (including any incompatibilities)	Please avoid contact with oxidizing substances. Be stored in a cool and dry place. please use and store in accordance with given laws from Government departments and local governments.

SECTION 8 Exposure controls & personal protection
A. Control parameters(e.g. occupational exposure limit values, biological limit values)

KOSHA	
Copper	Copper(Dusts and mists, as Cu) TWA - 1mg/m ³ ,Copper(Dusts and mists, as Cu) STEL - 2mg/m ³ Copper(Fume)TWA - 0.1mg/m ³
Zinc	No data
ACGIH	
Copper	TWA 0.2 mg/m ³ , 1 mg/m ³ Copper(Fume), Copper(Dusts and mists, as Cu)
Zinc	Not applicable
Biological exposure limits	No data

B. Appropriate engineering controls

Engineering management	If the chemicals is a risk of explosion, Install ventilator equipped with explosion proof system. install ventilator (local ventilation system, etc) and wind speed must maintain appropriately.
-------------------------------	---

C. Personal protective equipment

Respiratory protection	respiratory protection is unnecessary in general state, If dust or fumes are generated, use only respiratory equipment certified by KOSHA.
Eye protection	Install the emergency washing facilities so that workers use easily. You must use safety glasses to protect your eyes from dust or fumes.
Hands protection	You must use safety gloves to avoid direct contact.
Body protection	If there is exposed skin directly, you must wear protective clothing to protect your skin.

SECTION 9	Physical and chemical properties
-----------	----------------------------------

a. appearance		j. Upper/lower flammability or explosive limits	No data
physical state	Solid	k. Vapor pressure	No data
color	Yellow	l. Solubility	(Insoluble)
b. Odor	Odorless	m. Vapor density	No data
c. Odor threshold	No data	n. Relative density	8.47
d. pH	No data	o. Partition coefficient: n-octanol/water	
e. Melting point/freezing point	1,045 °C	p. Auto-ignition temperature	No data
f. Initial boiling point and boiling range		q. Decomposition temperature	No data
g. Flash point	No data	r. Viscosity	No data
h. Evaporation rate:	No data	s. Molecular mass	
i. Flammability (solid, gas):	No data		

SECTION 10	Stability and reactivity
------------	--------------------------

a. Chemical stability and possibility of hazardous reactions	it is stabilized in the room temperature and normal pressure. no polymerization. minute particle(zinc) may react with water.
b. Conditions to avoid	Inhibit dust creation. Avoid heat, flames, sparks and other of ignition source. Be stored in dry place.
c. Materials to avoid	Incompatible materials : acid, base, metal, oxidizer, reducer, halogen-carbon compound, metallic salts, halogen, combustibles, amine, metallic oxide.
d. Hazardous decomposition products	Pyrolysate : decomposition materials, etc.

SECTION 11	Toxicological information
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a. Information on the likely routes of exposure	
routes of exposure	Oral/Inhalation : respiratory inhalation or ingestion of dust,mist,hume Absorption : absorption of skin or eyeball of dust,mist,hume

b. Information on the likely routes of exposure	
Acute toxic	
Oral	LD50 237 mg/kg Rat(zinc)
Dermal	No data
Inhalation	No data
Skin corrosive/irritant	Human body/Unstimulated(zinc)
Serious eye damage/eye irritation	No data
Respiratory sensitization	No data
Skin sensitization	No data
Carcinogenicity	
Occupation Safety and Health Acts	No data
Ministry of Labor Notice	No data
IARC	No data
OSHA	No data
ACGIH	No data
NTP	No data

Germ Cell Mutagenicity	No data
Reproductive toxicity	No data
Specific target organ toxicity (single exposure)	Hume stimulate the upper airway (Copper)
Specific target organ toxicity (repeated exposure)	Cause liver damage in people(Copper)
Aspiration hazard	No data

SECTION 12 Ecological Information
a. Aquatic and terrestrial ecotoxicity

Fish	
Copper	LC50 0.37 mg/l 96 hr
Zinc	LC50 0.24 mg/l 96 hr Oncorhynchus mykiss (ecotoxicity is only applicable to water-soluble zinc salt.)
Crustacea	
Copper	EC50 0.0318 mg/l 48 hr
Zinc	LC50 0.12 mg/l 48 hr Ceriodaphnia dubia (0.12mg/l(101-162))
Algae	
Copper	LC50 0.092 mg/l 15 hr
Zinc	No data

b. Persistence and degradability

Persistence	
Copper	log Kow -0.57 (estimation)
Zinc	log Kow -0.47
Degradability	No data

c. Bioaccumulative potential

Biodegradability	
Copper	BCF 5830
Zinc	(bioaccumulation : 7100 μm 2Hour BCFD (Residue) duckweed 3.06 μm)
Bioaccumulation	
Copper	No data
Zinc	(Can not test use of biodegradable)

d. Mobility in soil No data

e. Other adverse effects No data

SECTION 13 Disposal considerations

a. Disposal method	Classify and dispose of waste in accordance with Waste Control Act and characteristic. Please entrust with company licensed in accordance with Wastes Control Act.
b. Disposal precaution	Please comply with the standard and methods about waste's collection, transportation, storage, handling specified by Waste Control Act.

SECTION 14 Transport information
a. UN number

Copper	3089
Zinc	1436

b. UN proper shipping name Not applicable

c. Transport hazard class

Copper	4.1
Zinc	4.3

d. Packing group, if applicable

Copper	II
Zinc	I

e. Environmental hazards

No data

f. Special precautions for user

Emergency management type of fire

Copper	F-G
Zinc	F-G

Emergency management type of leak

Copper	S-G
Zinc	S-O

SECTION 15

Regulatory information

a. Industrial Safety and Health Act

Copper	<p>Controlled substances : Rules on occupational health (Asterisk 7)</p> <p>Material working environment measurement (Measurement cycle : 6Months) : Occupation safety and health Acts enforcement regulations (Asterisk 11-4)</p> <p>Special medical examination material (Measurement cycle : 12 Months) : Occupation safety and health Acts enforcement regulations (Asterisk 12-2)</p> <p>Substance exposure limits set : Exposure standard to physical agents and chemical (Ministry of Labor Notice)</p>
Zinc	<p>Controlled substances : Rules on occupational health (Asterisk 7)</p> <p>Material working environment measurement (Measurement cycle : 6Months) : Occupation safety and health Acts enforcement regulations (Asterisk 11-4)</p> <p>Special medical examination material (Measurement cycle : 12Months) : Occupation safety and health Acts enforcement regulations (Asterisk 12-2)</p> <p>Substance exposure limits set : Exposure standard to physical agents and chemical (Ministry of Labor Notice)</p>

b. Toxic Chemical Control Act

Not applicable

c. Dangerous Material Safety Control Act

Not applicable

d. Wastes Control Act

Not applicable

e. Other requirements in domestic and other countries

No data

SECTION 16**Other information****a. Information source and references**

1. National Institute of Environmental Health Sciences Country hazardous materials information system : NCIS
2. National Emergency Management chemical substances information system
3. POONGSAN CORP. Test Data(Ulsan Plant Q.A)
4. Ministry of Labor Notice
5. Others Regulations and Notice

b. first version of the MSDSApril 17th, 2006**c. Revision number and date****Revised frequency**

2th

latest version of the MSDSJune 29th, 2013**d. Others**

material safety data sheet(MSDS) was written in accordance with Chemical classification and indication and MSDS standard from Korea Occupational Safety and Health Agency refer to MSDS Editing Program.

this document is not quality assurance about products, but which described about safety, health, environment at the normal situation. if characteristics change by heating and processing, you should use after check a additional Health and Safety Act. Also, this information may be revised without notice, and you can be provided in our company's website. Other details, please contact us at Safety & Environment Team or Quality Assurance.

MSDS (MATERIAL SAFETY DATA SHEET)	Control No	MSDS-PS-ENG-013
	Date Issued	JUNE 29th,2013
	Revision No	4 (GHS)
Product Names	Phosphorus bronze	

SECTION 1 Product and company identification

a. Product Name	Phosphorus bronze
Item Names	C5100R, C5101R, C5102R, C5103R, C5111R, C5191R, C5210R, C5212R, C5240R
b. Recommended use and restrictions on use	
Item recommended use	Electricity,Socket, Decoration, Structure, Other Parts
Item restrictions on use	No data
c. Manufacturer/Supplier/Distributor Information	
Company's Name	POONGSAN CORPORATION Ulsan Plant
Company's Address	94, Sanam-ro, Onsan -eup, Ulju-gun, Ulsan, Korea
Phone / Fax Number	+82-52-231-9114 / +82-52-231-9400

SECTION 2 Harmfulness · riskiness

a. Classification of harmfulness and riskiness	Inflammable material : classification 2 Acute toxicity(oral) : classification 2 Acute toxicity(percutaneous) : classification 2 Specific target organ – toxicity(single exposure) : classification 3–respiratory tract irritation Specific target organ – toxicity(repeated exposure) : classification 1 Acute aquatic toxicity : classification 1 Chronic aquatic toxicity : classification 1
--	--

b. GHS labels, including precautionary statements

Hazard Symbols



Signal word	Risk
Health Hazards	H228 Inflammable material H300 Toxic if swallowed H310 If contact with skin, be fatal. H335 May stimulate respiratory organs. H372 Liver may damage with long-term or repeated exposure. H400 Very toxic to aquatic H410 Very toxic to aquatic life with long lasting effects

Precautionary statements

Prevention	P260 If dust and fumes is leaked, do not breathe and smoking. P262 Not be stained.(eyes, skin, clothes) P264 Wash the hand thoroughly after handling product. P270 When using the product, do not breathe and smoking.
Response	P301+P310 If swallowed, Immediately see a doctor. P302+P352 If contact with skin, wash cleanly. P314 Get medical advice/attention if you feel unwell P361 All polluted clothes are remove.
Storage	P403+P223 Container should be Stored hardly in a well-ventilated place.
Disposal	P501 Dispose of container to Waste Management Act

c. Other hazards which do not result in classification(NFPA)

Division	Health	Fire	Reactivity
Copper	2	3	0
Tin	1	3	0
Phosphorus	3	1	1

SECTION 3

Composition/Information on ingredients

Component	Synonyms	CAS number	Content (%)
Copper	-	7440-50-8	89.3-96.9
Tin	-	7440-31-5	3.0-10.5
Phosphorus	-	7723-14-0	0.1-0.2

SECTION4

First aid measures

a. Eye contact	Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. Immediately wash the eyes when be exposed. If the chemicals is entering the eyes, immediately should receive the examination and treatment.
b. Skin contact	remove the chemicals immediately with soap and water for at the least 15minutes. Polluted clothes and shoes in chemicals, should wash before used again. If skin ailment is developed, see a doctor.
c. Inhalation	If affected about exposure, move a patient into non pollution area. If inhaled chemicals, immediately see a doctor.
d. Ingestion	If person is unconscious, do not feed anything and do not induce vomit. If person is conscious, rinse one's mouth and slowly feeds water or milk 2 to 4 cups If unconscious, turn head to side to prevent airway obstruction. contact the emergency medical treatment organization and evacuate immediately to the hospital.
e. Indication of immediate medical attention and notes for physician	consider gastric lavage when ingested chemicals. If breathing is difficult, give oxygen and continue to monitor antidote(copper) : potassium, natrium, edetate/glucose, intravenous administration : penicillamine, oral administration

SECTION 5 Fire-fighting measures
a. Suitable (and unsuitable) extinguishing media

Suitable	Dolomite, dry chemical powder for metal fire, sand, graphite, soda ash, sodium chloride, lime
unsuitable	No data
Large fire	Use a fine water spray and fire extinguishing agent

b. Specific hazards arising from the chemical

Toxicant from combustion	Tin oxide
Fire and Explosion Hazards	in case of general conditions, you can ignore fire and explosion. but mixture of dust and air may have explosion or ignition.

c. Special protective equipment and precautions for fire-fighters

Protective equipment	Protective clothing
Prevention measure	Prevent people unconcerned from getting close to risk area, isolate and must prohibit approach. use appropriate extinguishing agent in surrounding fire. Avoid inhalation of combustion products Avoid direct contact with the water

SECTION 6 Accidental release measures
A. For personal precautions, protective equipment and emergency procedures

Avoiding direct contact, wear suitable protective equipment.

B. Environmental precautions and protective procedures

Air	No data
Soil	Dispose of leaked substances what put into a suitable container.
Water	Please be Collected using vacuum pump. absorb leaked substance with activated carbon. accumulated substance in activated carbon must be handled after inpour at waste water disposal plant using hose.

C. Methods and materials for containment and cleaning up

Small leak	Please be collected in a suitable container leak substance. implement cleaning by only those who have been trained about riskiness of leaked substance. Avoid direct contact with the water and leaked substance.
Large leak	Please notify the contents of the discharge to state and local government agencies when the recommended dose or more.

SECTION 7 Handling and storage
A. Precautions for safe handling

prevent a dust's creation and spread.

B. Conditions for safe storage (including any incompatibilities)

Be stored in a cool and dry place.
Avoid contact with ignition source.
please use and store in accordance with given laws from Government departments and local governments.
Please avoid contact with oxidizing substances.

SECTION 8 Exposure controls & personal protection
A. Control parameters(e.g. occupational exposure limit values, biological limit values)

KOSHA

Phosphorus	Phosphorus TWA – 0.1mg/m ³
Copper	Copper(Dusts and mists, as Cu) TWA – 1mg/m ³ Copper(Fume) TWA – 0.1 mg/m ³
Tin	Tin(Metal)TWA –2mg/m ³

ACGIH

Phosphorus	No data
Copper	TWA 0.2mg/m ³ , 1mg/m ³ Copper(Fume) Copper(Dusts and mists, as Cu)
Tin	TWA 2 mg/m ³
Biological exposure limits	No data

B. Appropriate engineering controls

Engineering management	If dust or hume are generated, close up the working process or install ventilator. And manage in order that keep the appropriate wind speed. If dust or hume are generated, check working process which be allowable for standard and leakage threshold of Labor Department.
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C. Personal protective equipment

Respiratory protection	respiratory protection is unnecessary in general state, If dust or fumes are generated, use only respiratory equipment certified by KOSHA.
Eye protection	Install the emergency washing facilities so that workers use easily. You must use safety glasses to protect your eyes from dust or fumes.
Hands protection	You must use safety gloves to avoid direct contact.
Body protection	If there is exposed skin directly, you must wear protective clothing to protect your skin.

SECTION 9

Physical and chemical properties

a. appearance		j. Upper/lower flammability or explosive limits	No data
physical state	Solid	k. Vapor pressure	No data
color	Red	l. Solubility	(Insoluble)
b. Odor	Odorless	m. Vapor density	No data
c. Odor threshold	No data	n. Relative density	8.8
d. pH	No data	o. Partition coefficient: n-octanol/water	
e. Meting point/freezing point	1,230 °C	p. Auto-ignition temperature	No data
f. Initial boiling point and boiling range		q. Decomposition temperature	No data
g. Flash point	No data	r. Viscosity	No data
h. Evaporation rate:	No data	s. Molecular mass	
i. Flammability (solid, gas):	No data		

SECTION 10

Stability and reactivity

a. Chemical stability and possibility of hazardous reactions	it is stabilized in the room temperature and normal pressure. no polymerization.
b. Conditions to avoid	Inhibit dust creation. Avoid heat, flames, sparks and other of ignition source.

c. Materials to avoid	Incompatible materials : acid, base, metal, oxidizer, reducer, halogen-carbon compound, metallic salts, halogen, combustibles, amine, metallic oxide.
d. Hazardous decomposition products	Pyrolysate : tin oxide, decompositon materials, etc.

SECTION 11 Toxicological information
a. Information on the likely routes of exposure

routes of exposure	Oral/Inhalation : respiratory inhalation or ingestion of dust,mist,hume Absorption : absorption of skin or eyeball of dust,mist,hume
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b. Information on the likely routes of exposure

Acute toxic	
Oral	LD50 11.5 mg/kg Rat(Phosphorus)
Dermal	LD50 100 mg/kg Rat(Phosphorus)
Inhalation	No data
Skin corrosive/irritant	Unstimulated(Phosphorus)
Serious eye damage/eye irritation	No data
Respiratory sensitization	No data
Skin sensitization	No data
Carcinogenicity	
Occupation Safety and Health Acts	No data
Ministry of Labor Notice	No data
IARC	No data
OSHA	No data
ACGIH	A4(Tin)
NTP	No data
Germ Cell Mutagenicity	No data
Reproductive toxicity	No data
Specific target organ toxicity (single exposure)	Hume stimulate the upper airway (Copper)
Specific target organ toxicity (repeated exposure)	Cause liver damage in people(Copper) Lung damage appears Workers who handle a metal Tin (Tin)
Aspiration hazard	No data

SECTION 12 Ecological Information
a. Aquatic and terrestrial ecotoxicity

Fish	
Phosphorus	LC50 0.006 mg/l 96 hr
Copper	LC50 0.37 mg/l 96 hr

Tin	No data
Crustacea	
Phosphorus	EC50 0.03 mg/l 48 hr
Copper	EC50 0.0318 mg/l 48 hr
Tin	No data
Algae	
Phosphorus	No data
Copper	LC50 0.092 mg/l 15 hr
Tin	No data

b. Persistence and degradability

Persistence	
Phosphorus	No data
Copper	log Kow -0.57 (estimation)
Tin	No data
Degradability	No data

c. Bioaccumulative potential

Condenasability	
Phosphorus	BCF 281000
Copper	BCF 5830
Tin	No data
Biodegradability	No data

d. Mobility in soil

No data

e. Other adverse effects

No data

SECTION 13**Disposal considerations**

a. Disposal method	Classify and dispose of waste in accordance with Waste Control Act and characteristic. Please entrust with company licensed in accordance with Wastes Control Act.
b. Disposal precaution	Please comply with the standard and methods about waste's collection, transportation, storage, handling specified by Waste Control Act.

SECTION 14**Transport information****a. UN number**

Phosphorus	1338
Copper	3089
Tin	3089

b. UN proper shipping name

Not applicable

c. Transport hazard class

Phosphorus	4.1
Copper	4.1
Tin	4.1

d. Packing group,

Phosphorus	3
Copper	II
Tin	2

e. Marine pollutant

No data

f. user knows or who is necessary special safety measure about transport and transport means.**Emergency management type of fire.**

Phosphorus	F-A
Copper	F-G
Tin	F-G

Emergency management type of leak

Phosphorus	S-G
Copper	S-G
Tin	S-G

SECTION 15**Regulatory information****a. Industrial Safety and Health Act**

Phosphorus	Substance exposure limits set : Exposure standard to physical agents and chemical (Ministry of Labor Notice)
Copper	Controlled substances : Rules on occupational health (Asterisk 7) Material working environment measurement (Measurement cycle : 6Months) : Occupation safety and health Acts enforcement regulations (Asterisk 11-4) Special medical examination material (Measurement cycle : 12 Months) : Occupation safety and health Acts enforcement regulations (Asterisk 12-2) Substance exposure limits set : Exposure standard to physical agents and chemical (Ministry of Labor Notice) Material limits set : Occupation safety and health Acts enforcement regulations (Asterisk 11-3)
Tin	Controlled substances : Rules on occupational health (Asterisk 7) Material working environment measurement (Measurement cycle : 6Months) : Occupation safety and health Acts enforcement regulations (Asterisk 11-4) Special medical examination material (Measurement cycle : 12Months) : Occupation safety and health Acts enforcement regulations (Asterisk 12-2) Substance exposure limits set (Zinc oxide) : Exposure standard to physical agents and chemical (Ministry of Labor Notice)

b. Toxic Chemical Control Act

Not applicable

c. Dangerous Material Safety Control Act

Not applicable

d. Wastes Control Act

Not applicable

e. Other requirements in domestic and other countries

No data

SECTION 16**Other information****a. Information source and references**

1. National Institute of Environmental Health Sciences Country hazardous materials information system : NCIS
2. National Emergency Management chemical substances information system
3. POONGSAN CORP. Test Data(Ulsan Plant Q.A)
4. Revised research project of labor department about chemical exposure limit _ copper, zinc(2005)
5. Others Regulations and Notice








b. first version of the MSDSApril 17th, 2006**c. Revision number and date****Revised frequency**








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latest version of the MSDSJune 29th, 2013**d. Others**

material safety data sheet(MSDS) was written in accordance with Chemical classification and indication and MSDS standard from Korea Occupational Safety and Health Agency refer to MSDS Editing Program.

this document is not quality assurance about products, but which described about safety, health, environment at the normal situation. if characteristics change by heating and processing, you should use after check a additional Health and Safety Act. Also, this information may be revised without notice, and you can be provided in our company's website. Other details, please contact us at Safety & Environment Team or Quality Assurance.

제정일자 ESTA. Date		2004. 03. 17		H O U S I N G Q C 공 정 도 P R O D U C T & P R O C E S S C H A R T (H O U S I N G) =====					결재 A P P R O V E D	작성 W R I T T N	검토 C H K ' D	승인 A P P R ' D		
개정일자 REV. Date										S.H.Y	B.J.S	S.S.S		
시행일자 EFFECT. Date		2004. 03. 17							작성일자 : 2004. 03. 17 작성부서 : 품질관리실 작성자 : 서흥엽			03/17	03/17	03/17
문서번호 FILE. NO		Q - M - 001							DATE : 2004. 03. 17 D E P T . : Q U A L I T Y C O N T R O L WRITTEN BY : MR.H Y SEO					
NO	공정명 PROCESS NAME	흐름도		사용설비 및 장비 EQUIPMENT	공정관리 (MGT OF PROCESS)		검사관리 (MGT OF INSPECTION)			관련표준 STANDARDIZE				
		부공정 SUB PROCESS	주공정 MAIN PROCESS		항목 I T E M	관리기준 MGT.RULE	검사항목 ITEM	검사방식 METHOD	판정기준 JUDGEMENT					
01	원자재 입고 INCOMING MATERIAL													
02	수입 검사 INCOMING INSPECTION							겉모양(Shape) 물성(Certificate of Propertied)	체크검사 CHECK	수입검사 규격 STD OF INCOMING INSPECTION	YSI-101-003			
03	INJECTION			사출기 EJECTOR	형체력(Shape) DRY HOPPER온도(DRY HOPPER Temp) OIL 온도(OIL Temp) OIL량(Quantity of Oil) AIR 공급량(Air Pressure)	작업표준 STD OF WORK					YSI-091-004			
04	공정 및 최종검사 Process & Final Test							겉모양(Shape)	체크검사 CHECK	공정 및 최종 검사 규격 STD OF PROCESS & FINAL TEST	YSI-102-001			
05	포장 PACKAGE			저울, SEALING기 Digital Scale Packer	수량(Quantity) 포장상태(State of Package)	포장관리 규칙 Package Regulation					YSP-152			
06	보관 STORAGE													
07	출하 검사 OUTGOING TEST			V/C, 공구현미경 V/C, TOOL M/S				겉모양(Shape) 치수(Dimension) 형합성(Matching)	체크검사(CHECK) 계수조정형샘플링 MIL-STD-105D	출하검사 규격 STD OF OUTGOING TEST	YSI-102-100			

제정일자 ESTA. Date	2004. 03. 17	T E R M I N A L Q C 공 정 도 P R O D U C T & P R O C E S S C H A R T (T E R M I N A L) =====						결 재	작 성 WRITEN	검 토 CHK'D	승 인 APR'D
개정일자 REV. Date								A P P R O V E D	S.H.Y 03/17	B.J.S 03/17	S.S.S 03/17
시행일자 EFFECT. Date	2004. 03. 17	작성일자 : 2004. 03. 17		작성부서 : 품질관리실		작성 자 : 서 흥 업					
문서번호 FILE. NO	Q - P - 001	D A T E : 2004. 03. 17		D E P T . : QUALITY CONTROL		WRITTEN BY : MR.H Y SEO					
NO	공정명 PROCESS NAME	흐름도		사용설비 및 장비 EQUIPMENT	공 정 관 리 (MGT OF PROCESS)		검 사 관 리 (MGT OF INSPECTION)				
		부공정 SUB PROCESS	주공정 MAIN PROCESS		항 목 I T E M	관리기준 MGT.RULE	검사항목 ITEM	검사방식 METHOD	판정기준 JUDGEMENT		
01	원자재 입고 INCOMING MATERIAL										
02	수입 검사 INCOMING INSPECTION						겉모양(Shape) 치수(Dimension) 도금두께 (Coating Thickness)	체크검사 CHECK	수입검사 규격 STD OF INCOMING INSPECTION	YSI-101-004	
03	PRESS			PRESS	유압 OIL량(Oil Pressure) AIR 공급량(Air Pressure) 원재료 및 간지 풀림(Winding) 수량 CHECK SENSOR(Counter Sensor)	작업표준 STD OF WORK	물성(Certificates of Propertied) 납땀성 (Solderability)			YSI-091-005	
04	공정 및 최종검사 Process & Final Test				금형 이상 유무(State of press Tool) 타발유 도포(Oil Injection) OIL 냉각장치(Oil Cooler)		겉모양(Shape) 치수(Dimension) 형합성(Matching)	체크검사 CHECK	공정 및 최종 검사 규격 STD OF PROCESS & FINAL TEST	YSI-102-002	
05	포 장 PACKAGE			저울, SEALING기 Digital Scale Packer	수량(Quantity) 포장상태(State of Package)	포장관리규칙 Package Regulation				YSP-152	
06	보 관 STORAGE										
07	출하 검사 OUTGOING TEST			V/C, 공구현미경 V/C, TOOL M/S			겉모양(Shape) 치수(Dimension) 형합성(Matching)	체크검사(CHECK) 계수조정형샘플링 MIL-STD-105D	출하검사 규격 STD OF OUTGOING TEST	YSI-102-100	

