

# SPECIFICATION

MODEL : SPHWHTS8N103EBR0M3



[Rank : Vf (E5, K7),  
CIE (R1, R2, R3, R4, R5, R6, R7, R8),  
Im (M1, P1, R1)]

## HIGH POWER LED - SUNNIX8

CUSTOMER		
CHECKED	CHECKED	APPROVED

SAMSUNG LED			
DRAWN	CHECKED(Sales)	CHECKED(Quality)	APPROVED

**SAMSUNG LED CO.,LTD.**

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# 1. Product Outline

## 1) Features

- Plastic Molded Lead Frame Type : 6.0 mm(L), 7.0 mm(W), 1.2 mm(T)
- Beam View Angle( $\Delta\theta$ )\* : 120 °
- High Power / Brightness Chip & Long Time Reliability

## 2) Applications

- General Lighting, Indoor Illumination, Refrigerator lighting etc.

※ View Angle describes the spatial intensity distribution and is the difference between the angles corresponding to 50% of the maximum intensity.

# 2. Absolute Maximum Rating

- Operation Forward Current<sup>(1)</sup> ..... 700 mA
- Peak Pulsed Forward Current ..... 800 mA  
(Duty 1/10 and Pulse Width 10 msec)
- Reverse Current<sup>(2)</sup> ..... 20 mA
- Thermal Resistance ( $R_{th\ j-s}$ ) .....  $\cong$  5 °C/W
- Operating Temperature Range ( $T_{OPR}$ ) ..... -40 °C ~ 85 °C
- Storage Temperature Range ( $T_{STG}$ ) ..... -40 °C ~ 110 °C
- LED Junction Temperature ( $T_j$ ) ..... 125 °C

(1) Refer to derating curve in the page 6.

(2) Does not operate in the reverse direction.

# 3. Characteristics

## 1) Electrical properties ( $T_a = 25\text{ °C}$ )

Parameter	Symbol	Condition	Rank	Min.	Typ.	Max.	Unit
Reverse Voltage	$V_R$	$I_R = 10\text{ mA}$	-	0.5	0.8	2.0	V
Forward Voltage	$V_F$	$I_F = 350\text{ mA}$	EB	E5		3.15	
				K7	3.15		

## 2) Color Rendering Index ( $T_a = 25\text{ °C}$ )

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Color Rendering	$R_a$	$I_F = 350\text{ mA}$	70	73	-	-

### 3) Chromaticity Coordinates ( $T_a = 25 \text{ }^\circ\text{C}$ )

Item	Condition	Rank	x				y				
Chromaticity Coordinate (*)	$I_F = 350 \text{ mA}$	R0	R1	0.3366	0.344	0.3451	0.3371	0.3369	0.3427	0.3554	0.349
			R2	0.344	0.3515	0.3533	0.3451	0.3427	0.3487	0.362	0.3554
			R3	0.3371	0.3451	0.3463	0.3376	0.349	0.3554	0.3687	0.3616
			R4	0.3451	0.3533	0.3551	0.3463	0.3554	0.362	0.376	0.3687
			R5	0.3361	0.3429	0.344	0.3366	0.3245	0.33077	0.3428	0.3369
			R6	0.3429	0.3495	0.3515	0.344	0.3307	0.3339	0.3487	0.3428
			R7	0.3376	0.3463	0.348	0.3381	0.3616	0.3687	0.384	0.3762
			R8	0.3463	0.3551	0.3571	0.348	0.3687	0.376	0.3907	0.384

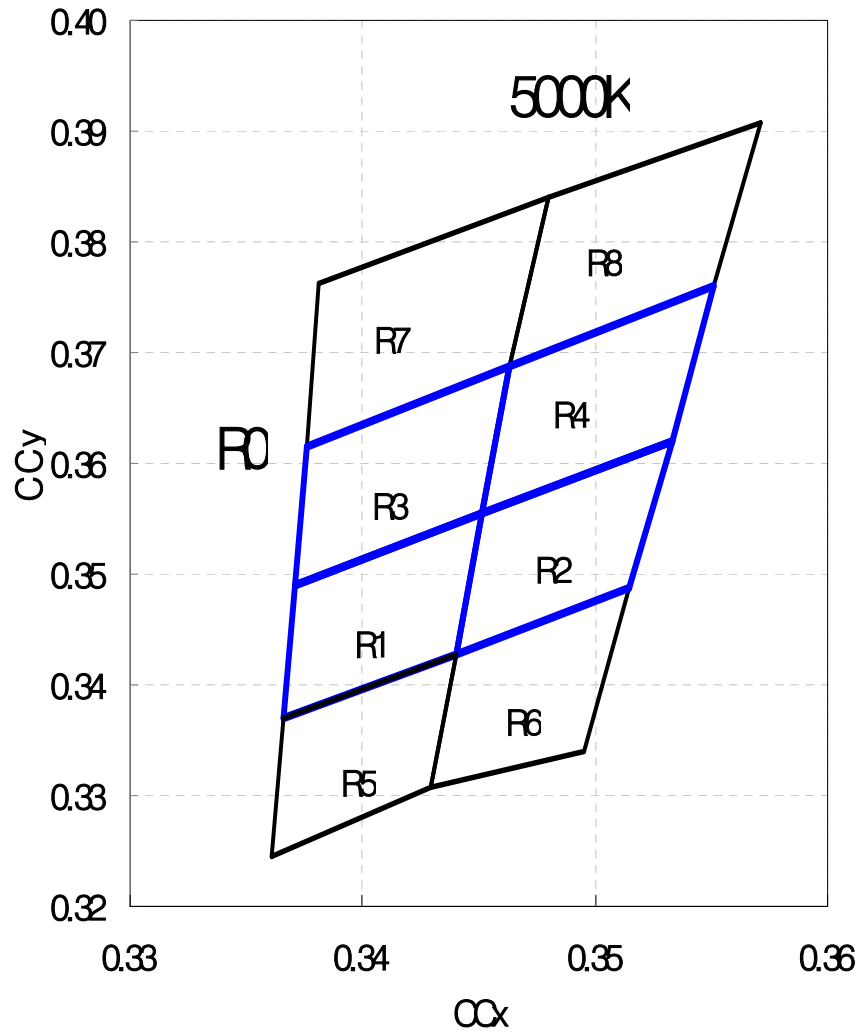
### 4) Luminous Flux ( $T_a = 25 \text{ }^\circ\text{C}$ )

Parameter	Symbol	Condition	Rank	Min.	Typ.	Max.	Unit
Luminous Flux	$\Phi_V$	$I_F = 350 \text{ mA}$	M3	M1	105		115
				P1	115		125
				R1	125		-

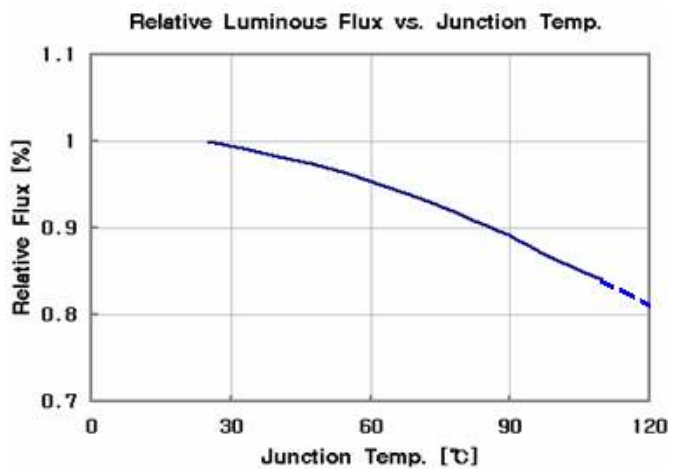
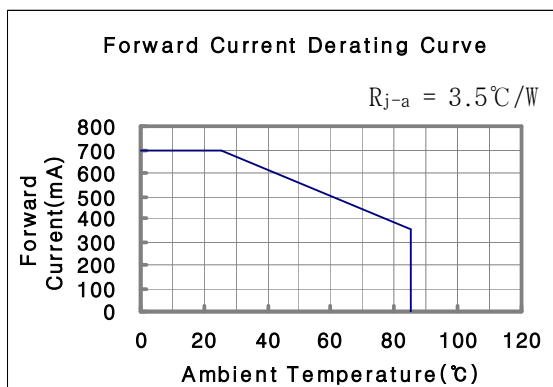
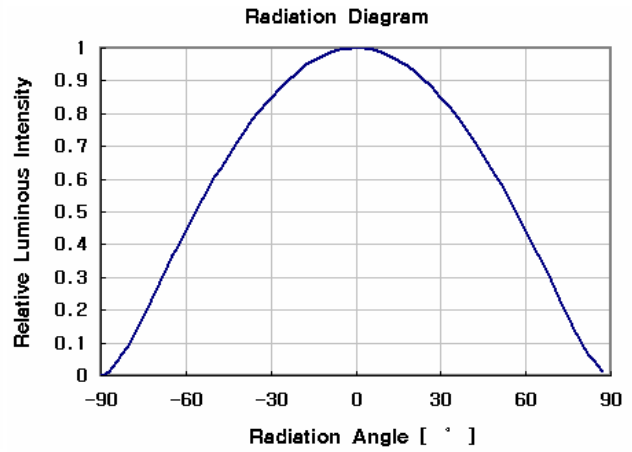
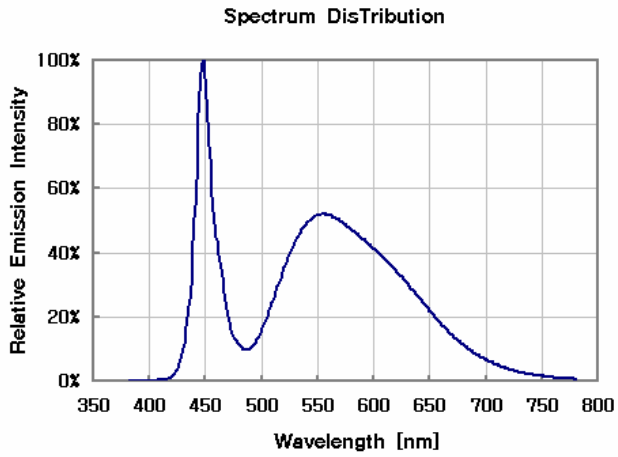
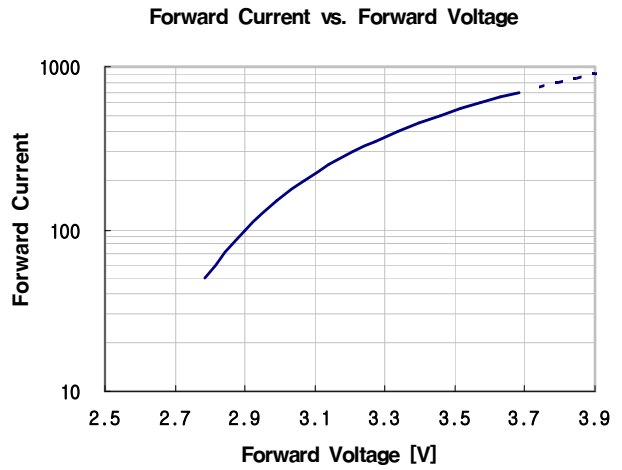
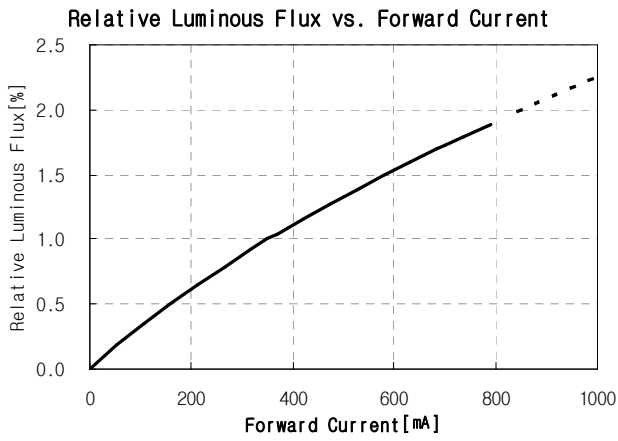
※ Tolerance :  $V_F : \pm 0.1$ ,  $\Phi_V : \pm 7 \%$ ,  $CCx \text{ } CCy : \pm 0.02$ ,  $R_a : \pm 5.0$

※ Luminous Intensity measuring equipment : CAS140CT

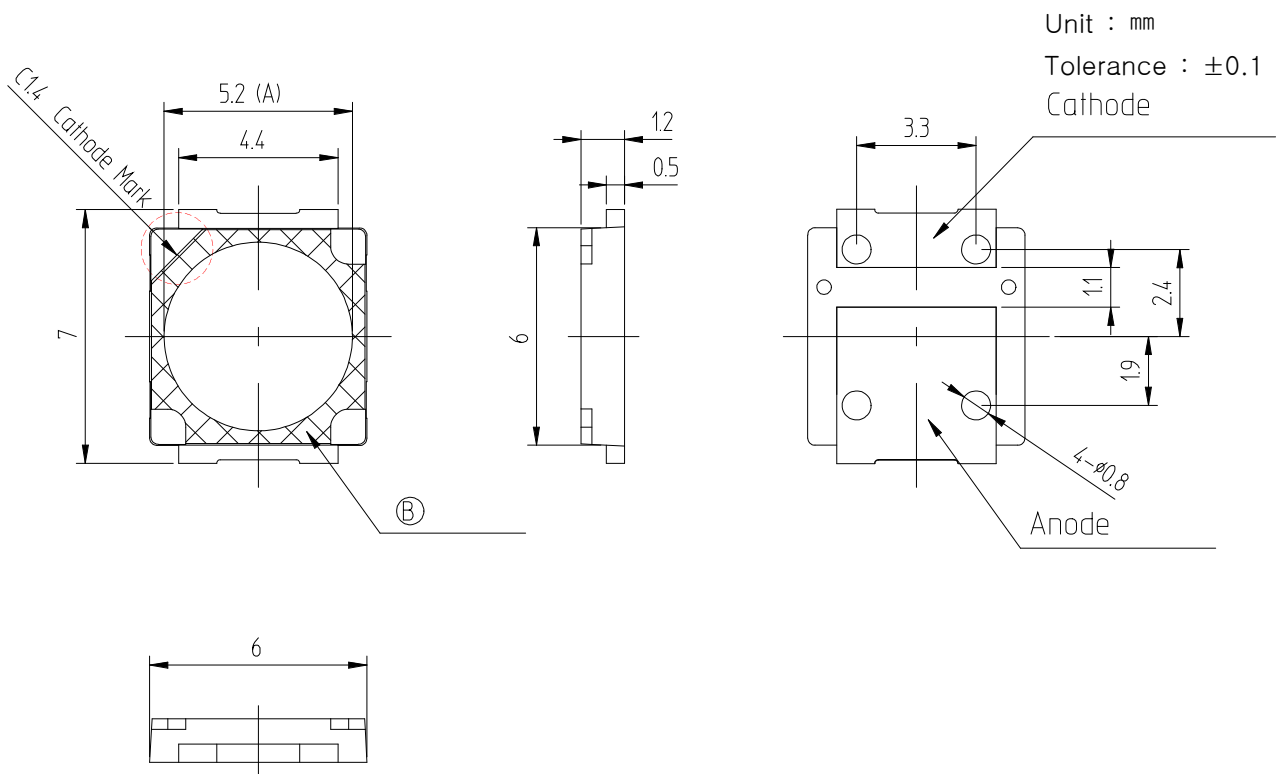
#### 4. Chromaticity Diagram



# 5. Typical Characteristic Graphs



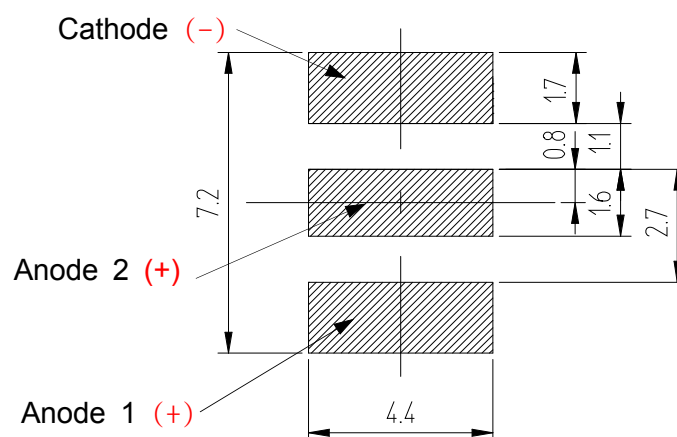
## 6. Outline Drawing and Dimension



### Pick and Place

1. Do not place pressure on the encapsulating resin ("A")  
It is recommended to use a pick&place nozzle with inside diameter at 5.2mm
2. The maximum compressing force is 15N on the polymer ("B")

### Solder Pattern for Surface Mount



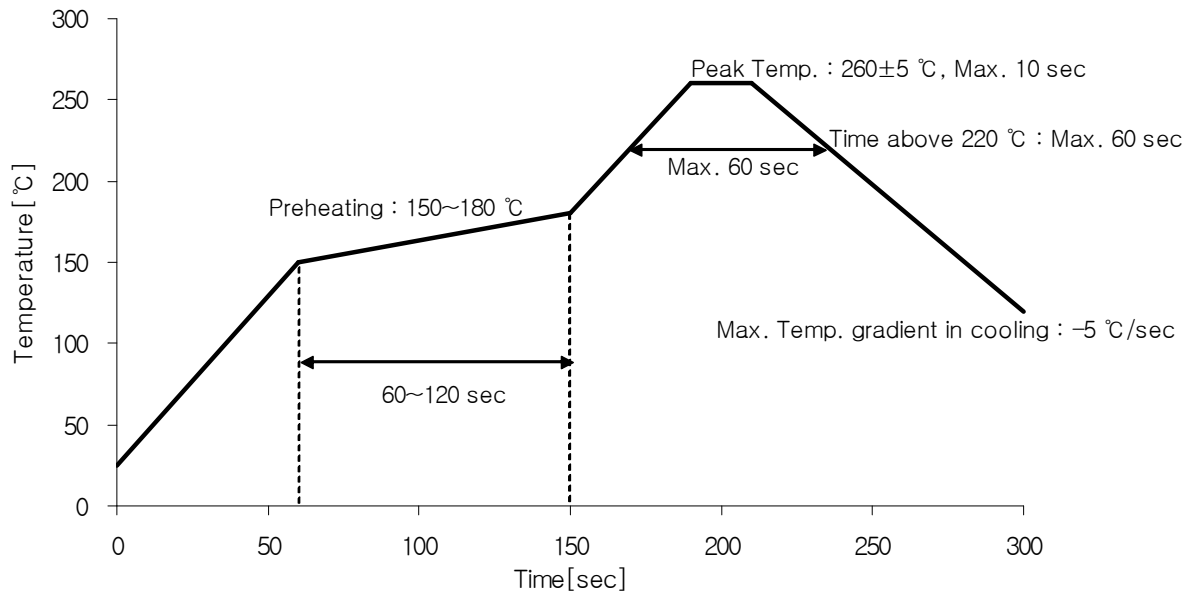
### Remarks

- \* Make sure that Anode 2 is electrically connected to the Anode 1.
- \* Anode 2 is to be soldered, If not, use the heat conductive adhesive.
- \* This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).

## 7. Solder Conditions

### 1) Reflow Conditions (Pb-Free)

Reflow Frequency : 2 time max.



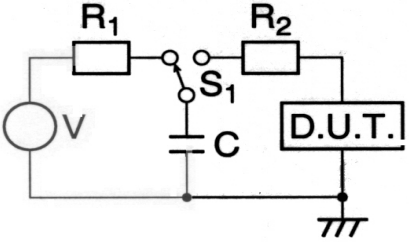
### 2) For Manual Soldering

Not more than 5 seconds @Max. 300 °C, under soldering iron.



## 8. Reliability Test Items and Conditions

### 1) Test Items

Test Items	Test Conditions	Test Hours/Cycles
Room Temperature life test	25 °C, $I_F = \text{Max DC}^*$	1,000 h
High Temperature humidity life test	85 °C, 85 % RH, $I_F = \text{Max DC}^*$	1,000 h
High Temperature life test	85 °C, $I_F = \text{Max DC}^*$	1,000 h
Low Temperature life test	-40 °C, $I_F = \text{Max DC}^*$	1,000 h
High Temperature Storage	110 °C	1,000 h
Low Temperature Storage	-40 °C	1,000 h
Thermal Shock	-40 / 120 °C, each 30 min	200 cycles
Temperature humidity Cycle On/Off test	-40 / 85 °C, each 20 min, 100 min transfer Power On/off each 5 min, DC 350 mA	100 cycles
Reflow (Pb-Free)	Peak 260±5 °C for 10 sec	3 times
ESD(HBM)	 <p>R1 : 10 MΩ , R2 : 1.5 kΩ , C : 100 pF</p>	3 times (± 5 kV)

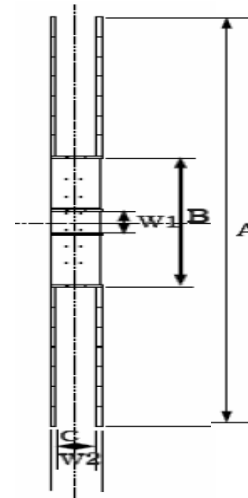
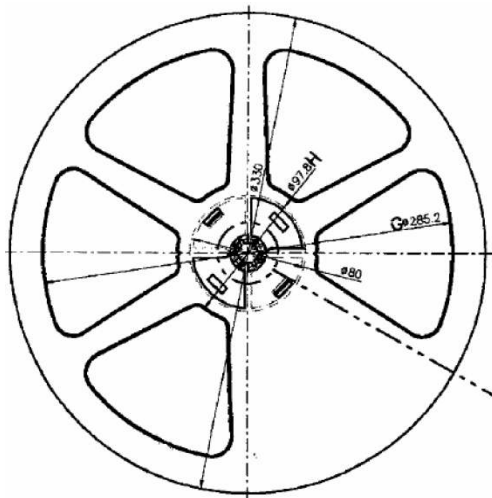
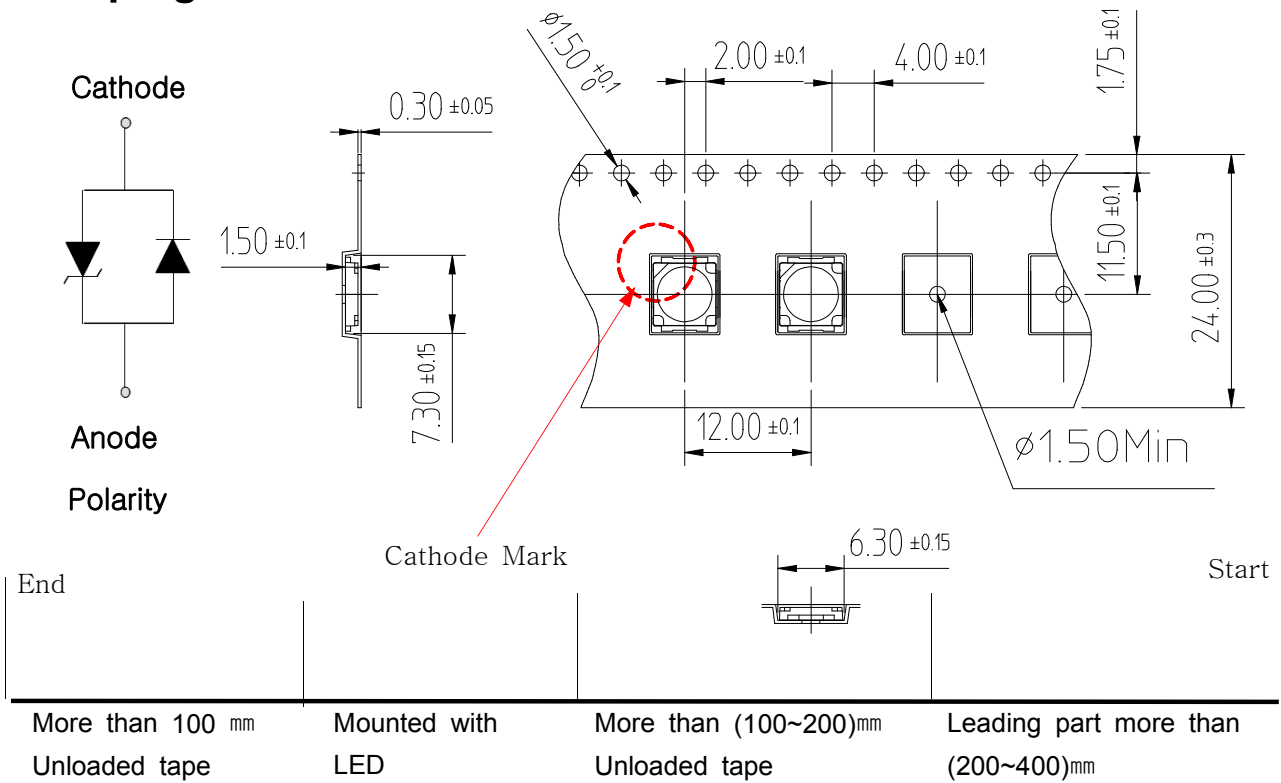
\* Max. DC current is depending on maximum current derating curve.

### 2) Criteria for Judging the Damage

Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	$V_F$	$I_F = 350 \text{ mA}$	-	U.S.L.*1.1
Luminous Flux	$\Phi_V$	$I_F = 350 \text{ mA}$	L.S.L.*0.7	-

\* U.S.L : Upper Standard Level, L.S.L : Lower Standard Level

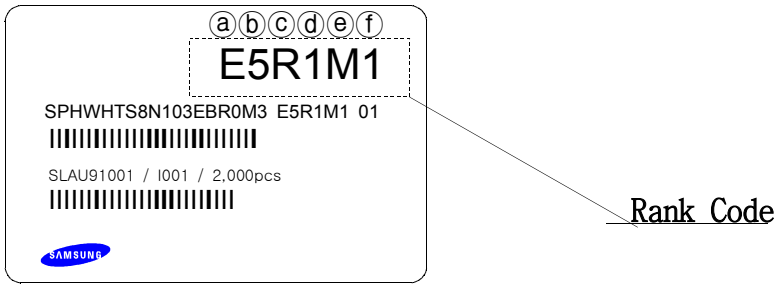
## 9. Taping Dimension



Symbol	A	B	C	W1	W2
Dimension(mm)	330 ± 1	80 ± 1	25 ± 0.5	13 ± 0.3	29.5 ± 1

- (1) Quantity : 2,000 Pcs / 13" Reel.
- (2) Cumulative Tolerance : Cumulative Tolerance/10 pitches is less than  $\pm 0.2$  mm
- (3) Adhesion Strength of Cover Tape : Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at 10 °C angle to be the carrier tape.
- (4) Packaging : P/N, Manufacturing data Code No. and quantity to be indicated on a damp proof Package

## 10. Label Structure



### Rank Code

- Ⓐ Ⓑ : VF Rank (refer to page 3)
- Ⓒ Ⓓ : Chromaticity Coordinate Rank, CIE (refer to page 4)
- Ⓔ Ⓕ : Luminous Flux (refer to page 4)

## 11. Lot Number

The Lot number is composed of the following characters

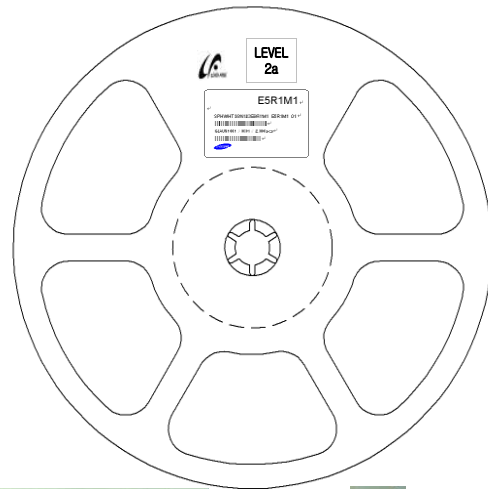
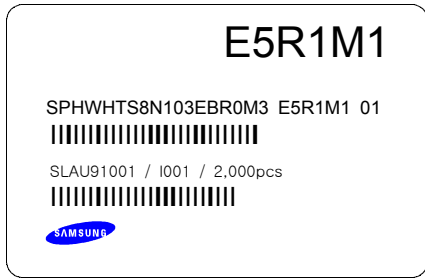


● ◎ ◇ ◆ □ ■ ▲ ▲ ▲ / | ▲ ▲ ▲ / 2000PCS

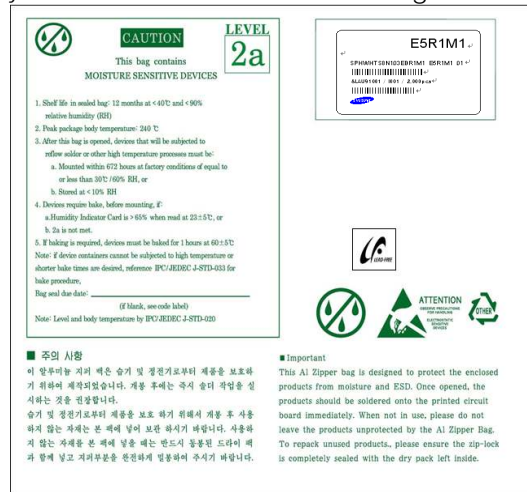
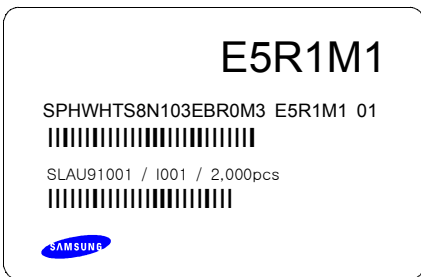
- : Production Site (S:SAMSUNG LED, G:Gosin China)
- ◎ : L (LED)
- ◇ : Product State (A:Normality, B:Bulk, C:First Production, R:Reproduction, S:Sample)
- ◆ : Year (S:2008, T:2009, U:2010...)
- : Month (1 ~ 9, A, B)
- : Day (1 ~ 9, A, B ~ V)
- ▲ : SAMSUNG LED Product Number (1 ~ 999)
- ▲ : Reel Number (1 ~ 999)

# 12. Reel Packing Structure

## 1) Reel



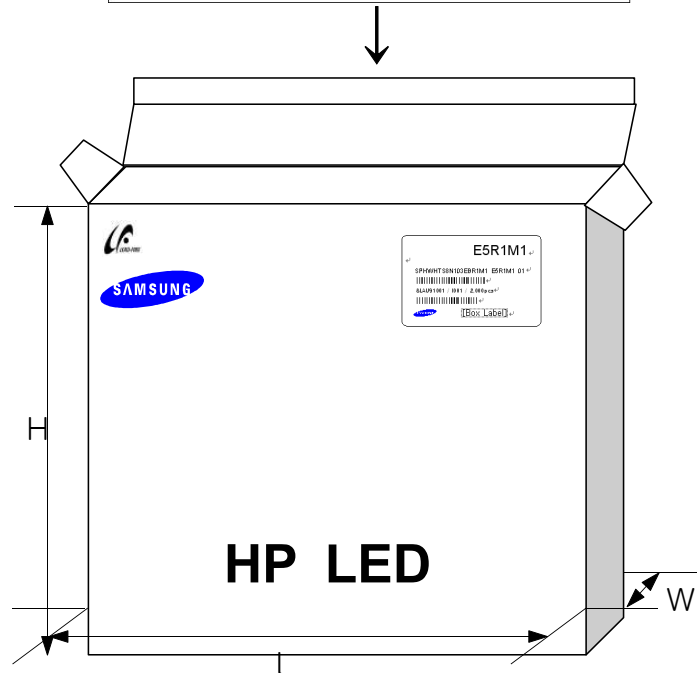
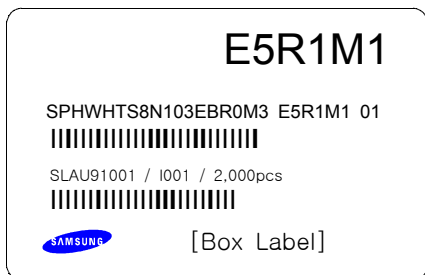
## 2) Aluminum Bag



## 3) Inner Box

Material : Paper(SW3B(B))

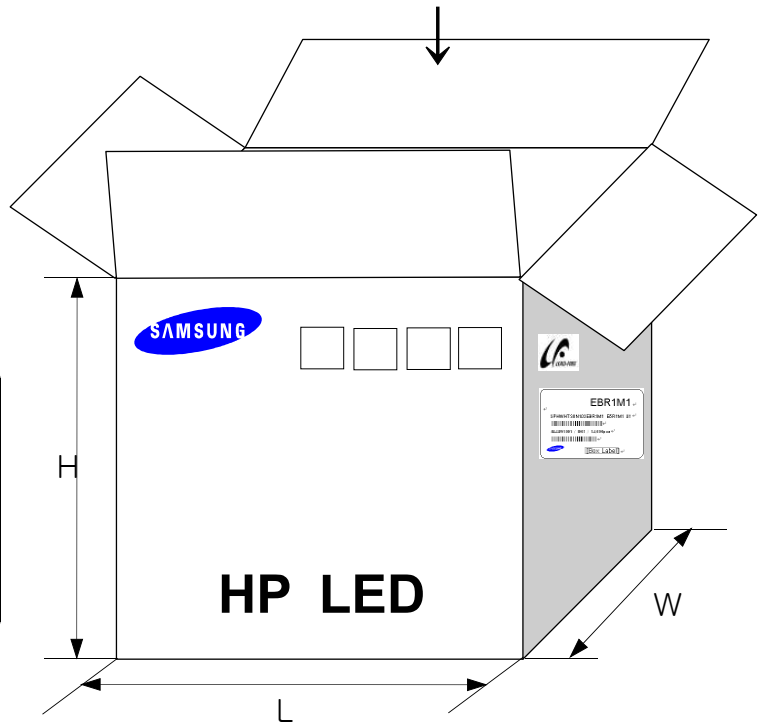
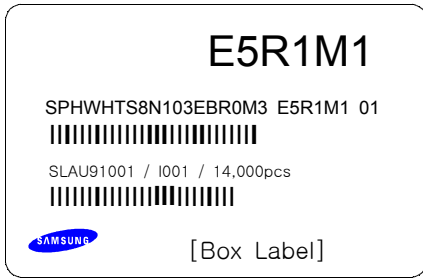
TYPE	SIZE(mm)		
	L	W	H
13inch	335	45	335




#### 4) Carton Box

Material : Paper(SW3B(B))

TYPE	SIZE(mm)		
	L	W	H
13inch	350	350	350



# 13. Aluminum Vinyl Bag



**CAUTION**

This bag contains  
**MOISTURE SENSITIVE DEVICES**

**LEVEL**  
**2a**

1. Shelf life in sealed bag: 12 months at <math>40^{\circ}\text{C}</math> and <math>90\%</math> relative humidity (RH)
2. Peak package body temperature: <math>240^{\circ}\text{C}</math>
3. After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be:
  - a. Mounted within 672 hours at factory conditions of equal to or less than <math>30^{\circ}\text{C}</math> / <math>60\%</math> RH, or
  - b. Stored at <math>10\%</math> RH
4. Devices require bake, before mounting, if:
  - a. Humidity Indicator Card is > <math>65\%</math> when read at <math>23 \pm 5^{\circ}\text{C}</math>, or
  - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at <math>60 \pm 5^{\circ}\text{C}</math>


Note: if device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure,

Bag seal due date: \_\_\_\_\_  
(if blank, see code label)


Note: Level and body temperature by IPC/JEDEC J-STD-020

**E5R1M1**

SPHWHTS8N103EBR0M3 E5R1M1 01



SLAU91001 / 1001 / 2,000 pcs



**SAV SUPP**



**주의 사항**

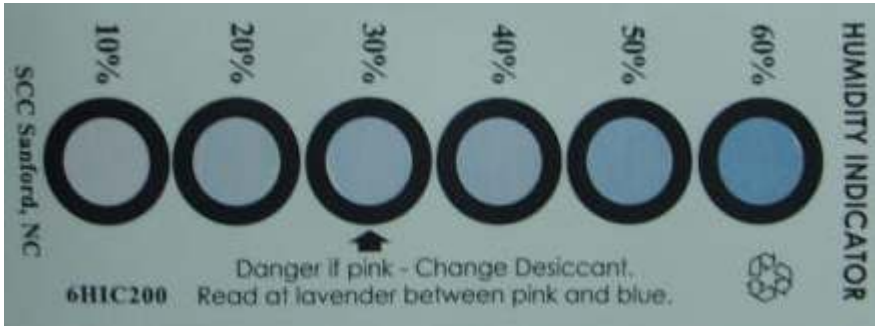
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재는 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

**Important**

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products., please ensure the zip-lock is completely sealed with the dry pack left inside.

## Silica gel & Humidity Indicator Card in Aluminum Vinyl Bag



## 14. Precaution for Use

- 1) For over-current-proof function, customers are recommended to apply resistors to prevent sudden change of the current caused by slight shift of the voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use.
- 3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.
- 4) LEDs must be stored in a clean environment. If the LEDs are to be stored for 3 months or more after being shipped from SAMSUNG LED, they should be packed by a sealed container with nitrogen gas injected. (Shelf life of sealed bags : 12 months, temp. 0~40℃, 20~70%RH)
- 5) After storage bag is open, device subjected to soldering, solder reflow, or other high temperature processes must be:
  - a. Mounted within 168 hours (7days) at an assembly line with a condition of no more than 30℃/60%RH,
  - b. Stored at <10% RH.
- 6) Repack unused Products with anti-moisture packing, fold to close any opening and then store in a dry place.
- 7) Devices require baking before mounting, if humidity card reading is >60% at 23±5℃.
- 8) Devices must be baked for 24hours at 65±5℃, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.

If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices.

Damaged LEDs may show some unusual characteristics such as increase in leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

- 10) When handling LED with tweezers, the LED Should only be held by the polymer body, not by the encapsulant or LENS.
- 11) The use of appropriate nozzle for the LED recommended. For the recommended nozzle size, refer to the figure at the below.  
Inner diameter of nozzle  $\geq \Phi 6.1\text{mm}$
- 12) Do not stack assembled PCBs together. Since silicone is a soft material, abrasion between two PCB assembled with silicone encapsulated LED might cause catastrophic failure of the LEDs due to damage to encapsulant and wire and LED detachment.



# 15. Hazard Substance Analysis



**Test Report No.** F690501/LF-CTSAYAA10-41879

**Issued Date:** December 22, 2010

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**To:** SAMSUNG LED CO.,LTD.  
314, Maetan-dong  
Yeongtong-gu  
Suwon-city  
Gyeonggi-do 443-370  
Korea

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

SGS File No. : AYAA10-41879  
Product Name : LED PKG  
Item No./Part No. : Sunnix8 PKG(White)  
Received Date : Dec 17, 2010  
Test Period : Dec 20, 2010 to Dec 22, 2010  
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results  
Test Results : For further details, please refer to following page(s)  
Comments : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.

Timothy Jeon  
Jinhee Kim  
Cindy Park  
Jerry Jung / Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr

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**Test Report No.** F690501/LF-CTSAYAA10-41879

**Issued Date:** December 22, 2010

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**Sample No.** : AYAA10-41879.001  
**Sample Description** : LED PKG  
**Item No./Part No.** : Sunnix8 PKG(White)

**Heavy Metals**

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2006, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2006, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2006, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2006, UV-VIS	1	N.D.

**Flame Retardants-PBBs/PBDEs**

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2006, GC-MS	5	N.D.

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

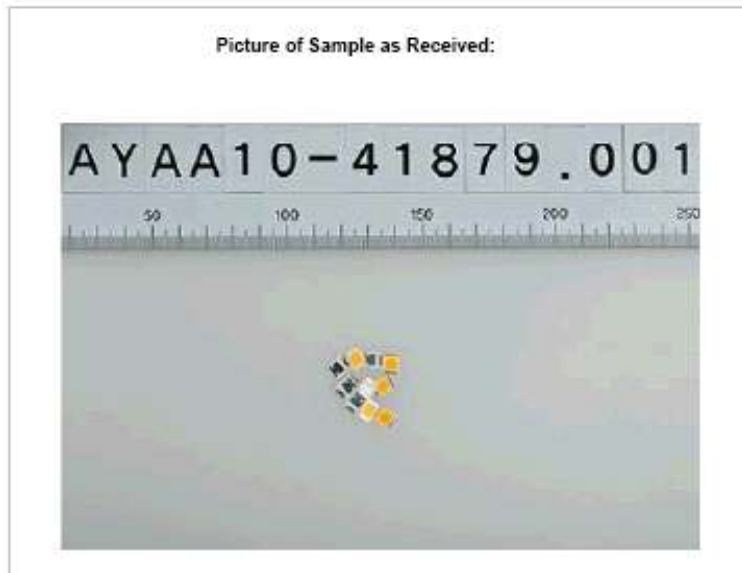
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Sample No. : AYAA10-41879.001  
 Sample Description : LED PKG  
 Item No./Part No. : Sunnix8 PKG(White)

**Halogen Contents**

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

Picture of Sample as Received:



- NOTE: (1) N.D. = Not detected.(<MDL)  
 (2) mg/kg = ppm  
 (3) MDL = Method Detection Limit  
 (4) - = No regulation  
 (5) \*\* = Qualitative analysis (No Unit)  
 (6) \* = 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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**Revision History**  
**(Model : SPHWHTS8N103EBR0M3)**

Date	Revision History	Author	
		Drawn	Approved
2011.01.06	Initial Edition	H.J. Park	K.T. Kim