



SPECIFICATION

Surface Acoustic Wave Filter

USER




USER PART No.

SEMCO PART No. **SFHG60PA002**

DOC. No. SMS-51-L-SFT FX-31

DATE Jan 23, 2014

REVISION 000

WISOL					
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User					
ISSUED BY		CHECKED BY		APPROVED BY	

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Gyeonggi-do, KOREA, 447-210
<http://www.wisol.co.kr>

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▶ **A TABLE OF CONTENTS**

1. REVISION HISTORY	3
2. DEFINITION	4
3. PRECAUTIONS	4
4. OUTLINE DRAWING & DIMENSIONS	5
5. MARKING	6
6. PERFORMANCE	7
6-1. MAXIMUM RATINGS	7
6-2. ELECTRICAL CHARACTERISTICS	8
7. RELIABILITY	10
7-1. ENGINEERING SAMPLE FLOW CHART	10
7-2. TEST ITEM & CONDITION	11
8. REFLOW CONDITION	12
9. RECOMMENDED PCB DIMENSIONS	12
10. CAUTION	13
11. PACKING	14
11-1. DIMENSIONS	14
11-2. REELING QUANTITY	15
11-3. TAPING STRUCTURE	15
11-4. INNER BOX(Reel Packing) STRUCTURE	16
11-5. OUTER BOX STRUCTURE	17
12. TAPE SPECIFICATIONS	18
13. RoHS DATA	19

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1. REVISION HISTORY

000	Jan 23, 2014	All Page	Make specification
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2. DEFINITION

2-1. PART No.

S F H G 6 0 P A 0 0 2

① ② ③ ④ ⑤ ⑥

No.	EXPLANATION
①	SAW Filter
②	Design Type
③	Center Frequency :1960.0MHz(1930 ~ 1990)
④	Input:50ohm,Output:150ohm
⑤	Package size: 1.1×0.9mm ²
⑥	Design Revision (02 : Molding Type)

2-2. APPLICATION : Band-Pass Filter for GSM1900 Rx etc (UMTS Band II)

3. PRECAUTIONS

3-1. This device should not be used in any type of fluid such as water, oil, organic solvent, etc.

3-2. This is a hermetic device.

MSL(Moisture Sensitive Level) is the '2a' level.

3-3. Ultrasonic cleaning shall be avoided.

3-4. Isopropyl Alcohol and Ethyl Alcohol can be used for cleaning. Contact us before using other cleaning solvents than above

3-5. This is an electrostatic sensitive device.

Please avoid static voltage during operation and storage.

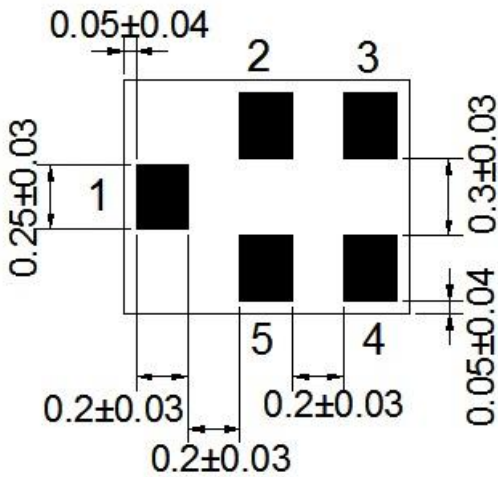
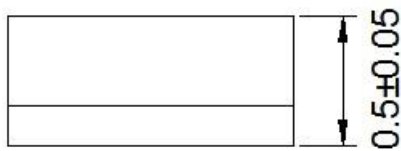
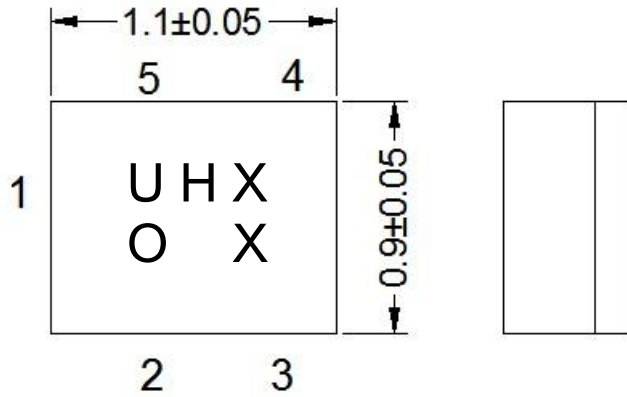
3-6. Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.

3-7. If any malfunction due to designing or manufacturing which is out of specification occurs within one year after the products have been delivered, the maker should exchange the defective products.

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4. OUTLINE DRAWING & DIMENSIONS

[Unit: mm]



No.	Function
2, 5	Ground
1	Unbalanced Input
3, 4	Balanced Output

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5. MARKING



5-1. U H X X

- The 1st 2nd character 'UH' indicates the model name of SAW Filter SFHG60PA002.
- The 3rd character 'X' indicates the year and the month of manufacture.

Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
2013	P	Q	R	S	T	U	V	W	X	Y	Z	a
2014	1	2	3	4	5	6	7	8	9	A	B	C
2015	D	E	F	G	H	I	J	K	L	M	N	O
2016	P	Q	R	S	T	U	V	W	X	Y	Z	a

※ This rotates by the 3 years.

- The 4th character 'X' indicates Lot No.

5-2. ○

- This symbol indicates input pin 1.
- This indicates the producing center
 - : China

5-3. Marking : Laser Marking

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6. PERFORMANCE

6-1. MAXIMUM RATINGS

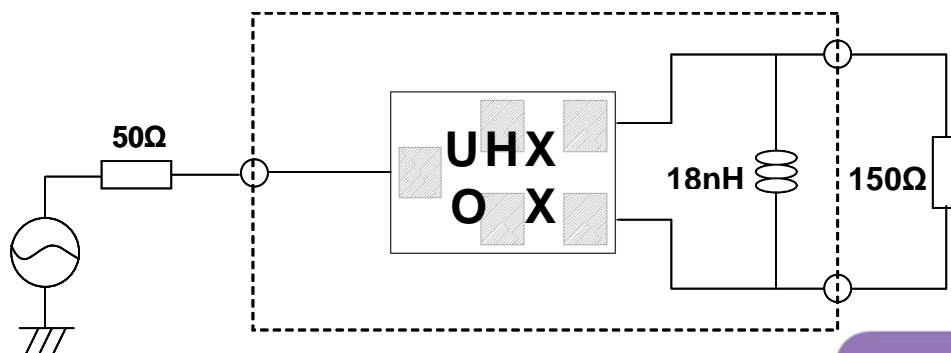
CHARACTERISTICS	RATINGS	UNITS
DC Permissive Voltage	5	V
Maximum Input Power	15	dBm
Operating Temperature Range	- 30 ~ +85	℃
Storage Temperature Range	- 40 ~ +85	℃

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6-2. ELECTRICAL CHARACTERISTICS
6-2-1. TABLE

Ta = - 30 ~ +85℃

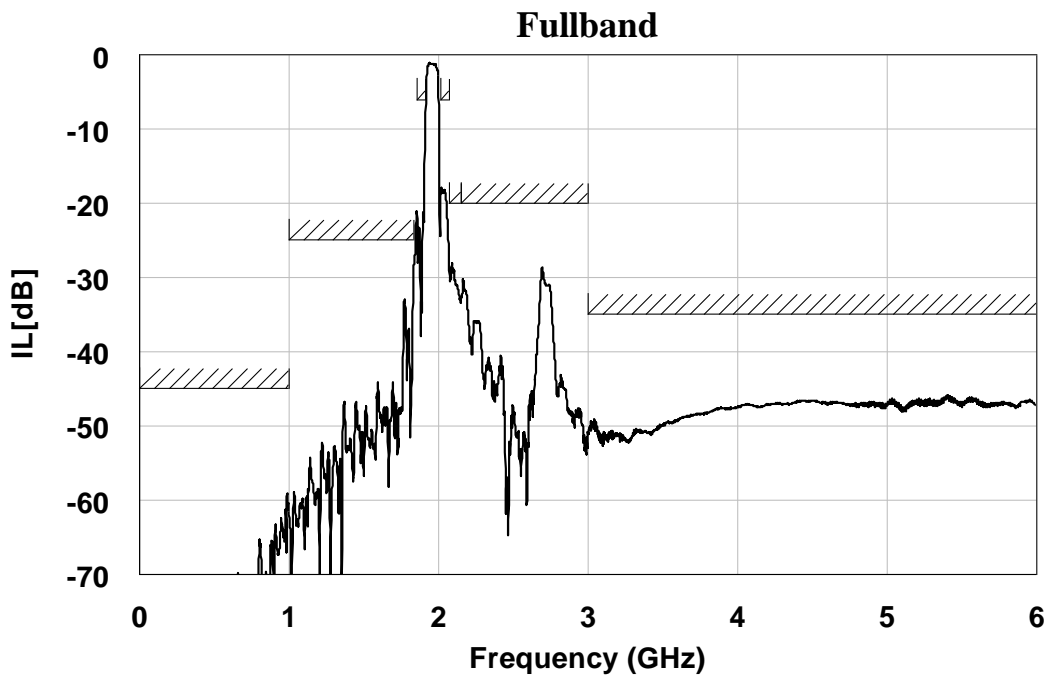
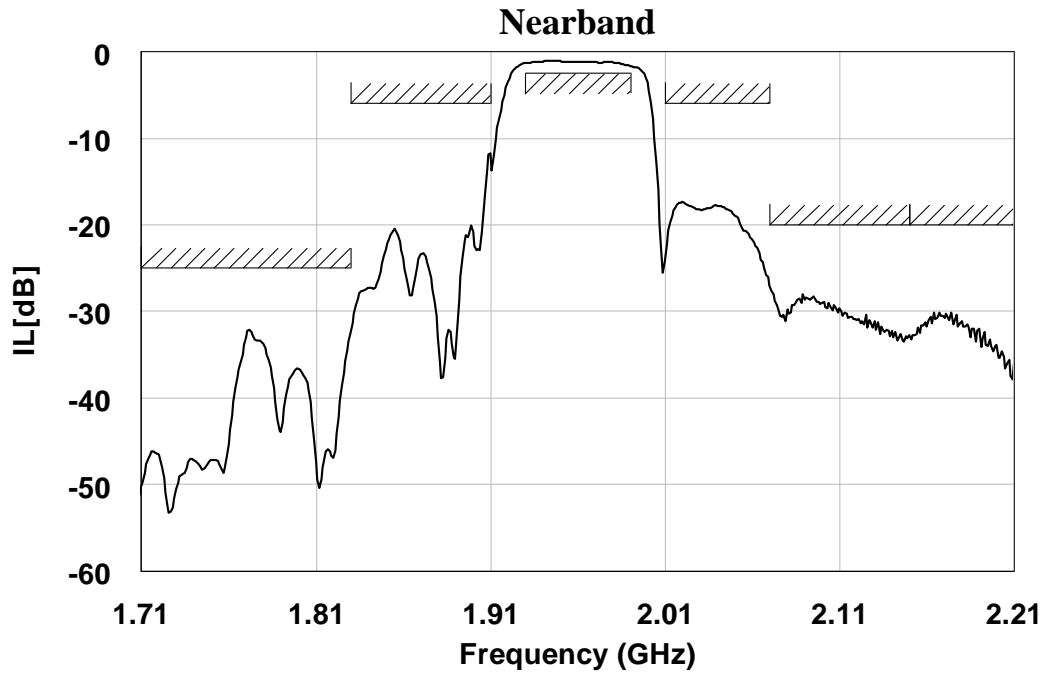
Item	FREQUENCY RANGE [MHz]	UNIT	SPECIFICATION		
			Min.	Typ. (25℃)	Max.
Insertion Loss	1930 ~ 1990	dB	-	1.5	2.5
Inband Ripple	1930 ~ 1990	dB	-	0.5	1.5
Input VSWR	1930 ~ 1990	-	-	1.6	2.2
Output VSWR	1930 ~ 1990	-	-	1.6	2.2
Amplitude Imbalance	1930 ~ 1990	dB	-2.0.	-	+2.0
Phase Imbalance	1930 ~ 1990	degree	-20	-	+20
Absolute Attenuation	DC ~ 1000	dB	45	59	-
	1000 ~ 1830	dB	25	32	-
	1830 ~ 1910	dB	6	15	-
	2010 ~ 2070	dB	6	17	-
	2070 ~ 2150	dB	20	25	-
	2150 ~ 3000	dB	20	28	-
	3000 ~ 6000	dB	35	45	-
Termination Impedance	Input: Unbalanced 50 ohm Output: Balanced 150 ohm // 18nH				

6-2-2. TEST FIXTURE


[X-Ray Top View]

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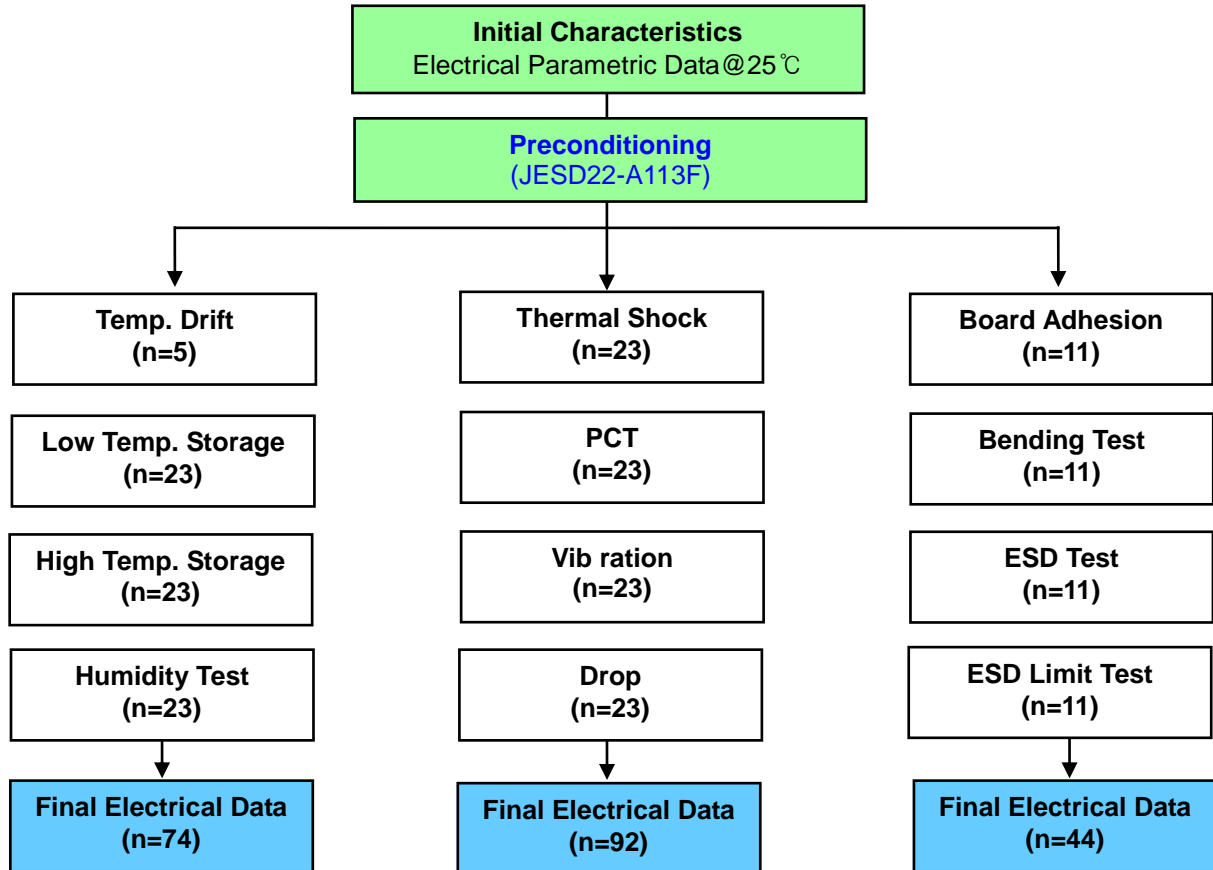
6-2-3. GRAPH



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7. RELIABILITY

7-1. ENGINEERING SAMPLE FLOW CHART



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7-2. TEST ITEM & CONDITION

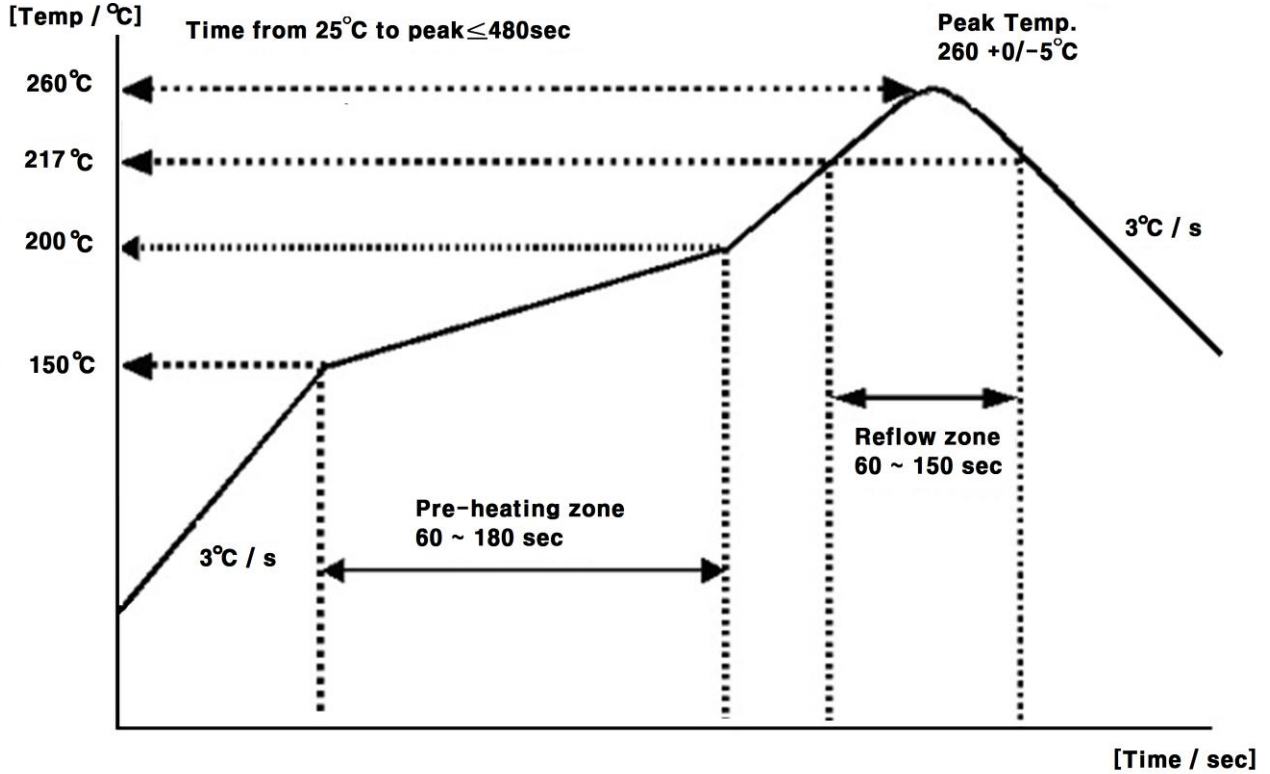
CATEGORY	TEST ITEM	TEST CONDITION	REMARK
	Preconditioning	+125℃ 24hr Baking → +60℃ 60%RH 120hr → Reflow Test(3times)	JESD22A113F



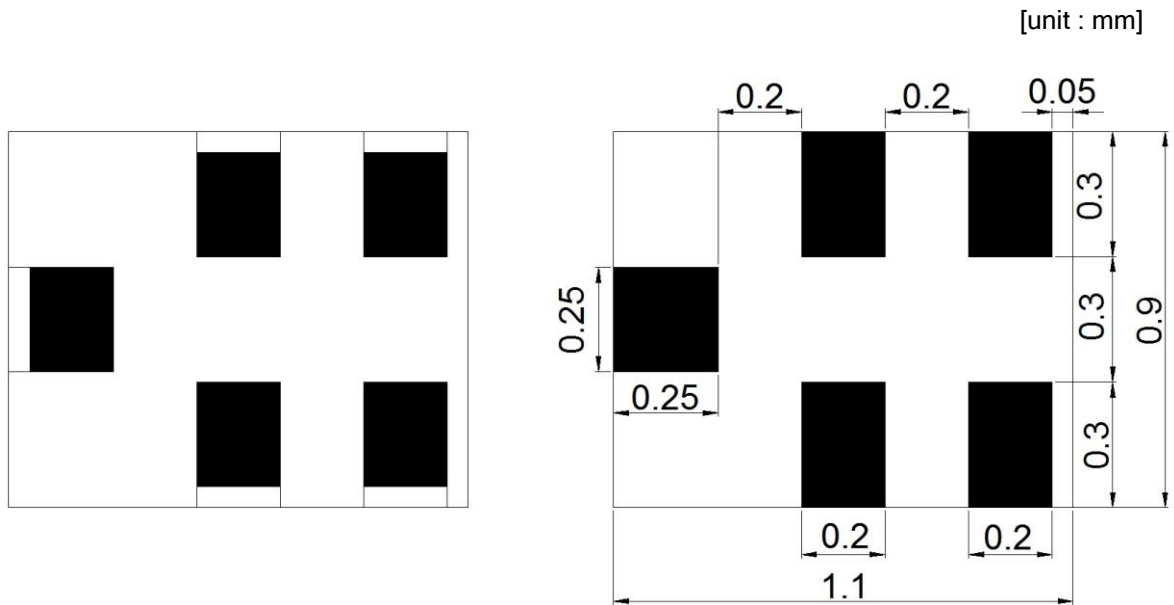
Environment Test	Temp. Drift	-30℃ → +25℃ → +85℃	description
	High Temp. Storage	+85℃ 240hr	JESD22-A103C
	Low Temp. Storage	-40℃ 240hr	JESD22-A119
	High Temp. High Humidity Storage	+85℃ 85%RH 240hr	JESD22-A106B
	Thermal Shock	-40℃/30min ⇔ +85℃/30min , 100cycle	JESD22-A106A
	High Temp. Operating	+121℃ 100%RH 96hr	JESD22-A102C
Mechanical Test	Vibration Test (Random)	20 Hz~2000 Hz,0.053G ² /Hz or 8gs RMS,15min/plane	IEC 68-2-36 Fdb
	Drop Test	152 cm 12times Steel floor JIG(110g~150g)	IEC 1178-1.4.8.9
	Board Adhesion	0.5 mm/sec 1point push	IEC 68-2-21 Ue3
	Bending Test	0.5 mm/sec 3times -PCB : FR4 , PCB SIZE : 100*40 mm	IEC 68-2-21 Ue3
Physical Test	Solder Heat Resistance	±250V,C=100pF,R=1.5 kΩ, 1times	IEC 68-2-21 Ue3
	static marginal test	C=100pF,R=1.5 kΩ, 1times(demand of customer)	JESD22-A114F

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8. REFLOW CONDITION



9. RECOMMENDED PCB DIMENSIONS



[SAW, X-ray Top view]

[PCB, X-ray Top view]

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10. CAUTION

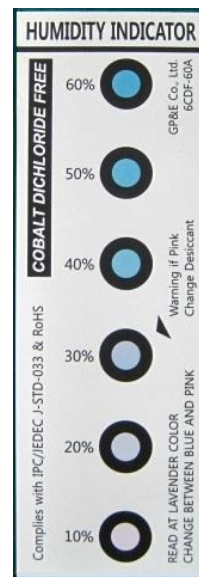
Moisture Sensitivity Device Caution (MSL LEVEL=2a)

1. Calculated shelf life in sealed bag : 12 month at < 40℃ and < 90% relative Humidity(RH)
 2. Peak package body temperature : **260℃**
 3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be
 - (a) Mounted within : 672 hours of factory conditions ≤30℃/60% RH, or
 - (b) Stored per J-STD-033
 4. Device require bake, before mounting, if :
 - (a) Humidity Indicator Card reads > 60% when read at 23±5℃
 - (b) 3(a) or 3(b) are not met
 5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure
- Note : Level and body temperature defined by IPC/JEDEC J-STD-020

Aluminum Pack (310mmX370mm)



HIC(Humidity Indication Card)



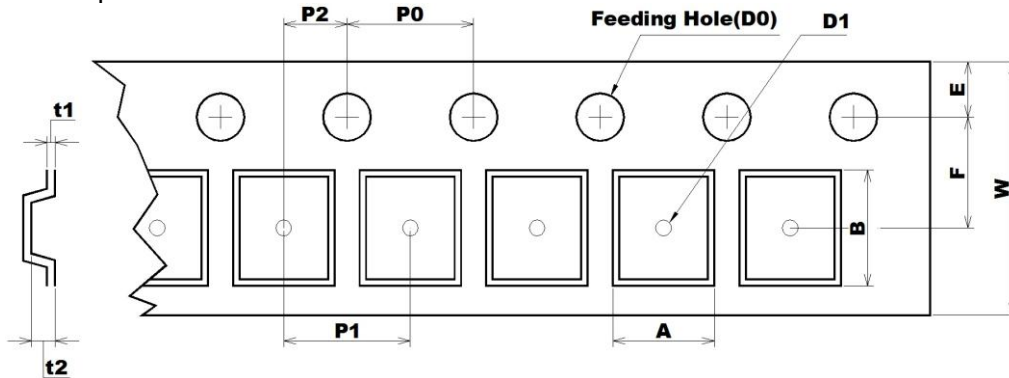
10 to 60% RH

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11. PACKING

11-1. DIMENSIONS

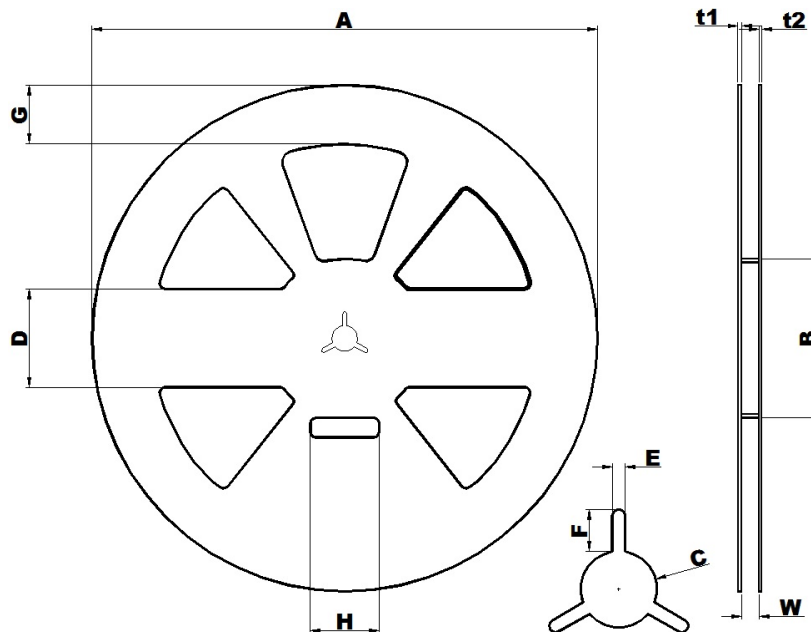
- Carrier Tape



[Unit: mm]

A	B	D0	D1	E	F	P0	P1	P2	t1	t2	W
1.10	1.35	Ø1.50	Ø0.50	1.75	3.50	4.00	4.00	2.00	0.25	0.70	8.00
+0.05	+0.05	+0.10	+0.05	+0.10	+0.05	+0.10	+0.10	+0.05	+0.02	+0.05	+0.30
-0.05	-0.05	-0.00	-0.05	-0.10	-0.05	-0.10	-0.10	-0.05	-0.02	-0.05	-0.10

- Reel



[Unit: mm]

A	B	C	D	E	F	G	H	t1	t2	W
Ø258.0	Ø81.0	Ø13.0	50.0	2.2	7.0	30.0	35.0	1.8	1.5	9.0
+1.0	+1.0	+0.5	+0.8	+0.3	+0.5	+0.8	+1.0	+0.5	+0.5	+1.0
-0.5	-1.0	-0.5	-0.8	-0.3	-0.5	-0.8	-1.0	-0.5	-0.5	-0.5

- The product shall be packed properly not to damaged during transportation. 400-655-8700

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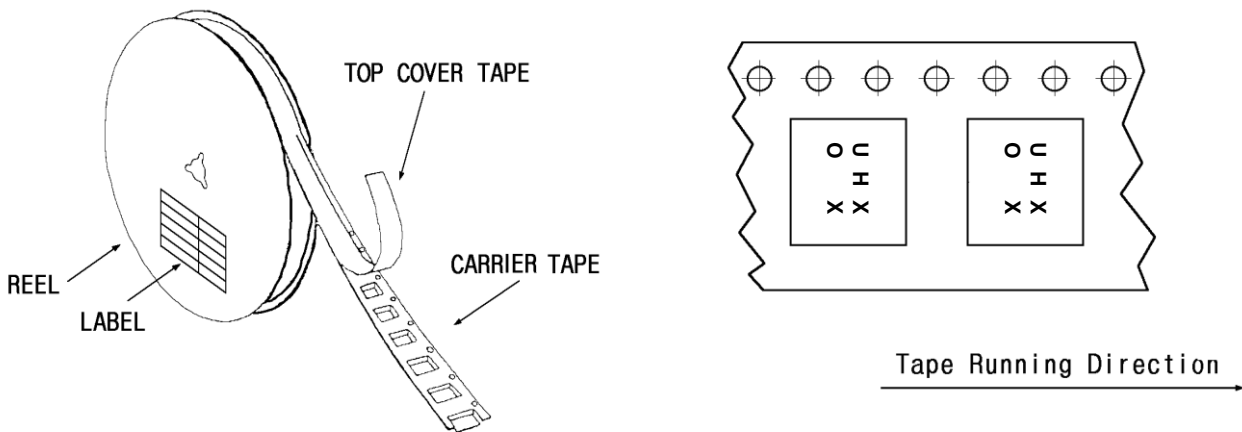
网址: www.denovocn.com

11-2. REELING QUANTITY

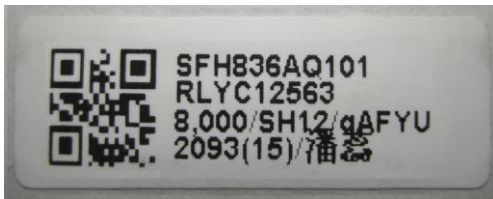
10 inch reel : 10,000 pcs/reel


11-3. TAPING STRUCTURE

11-3-1. The tape shall be wound around the reel in direction shown below.



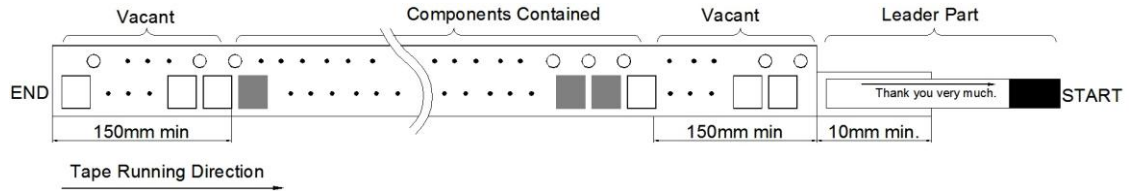
11-3-2. BAR CODE LABEL



- | | |
|--|--|
| <ul style="list-style-type: none"> ①  ② SFH836AQ101 ③ RLYC12563 ④ 8,000 / qAFYU | <p>MODEL NAME BARCODE</p> <p>Model Name</p> <p>Reel number</p> <p>Quantity / Marking</p> |
|--|--|

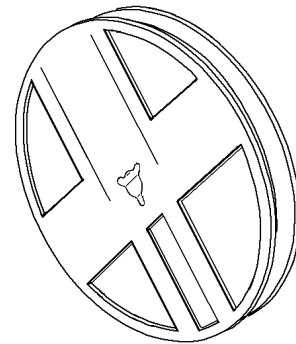
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1-3-3. Leader part and vacant position specifications.

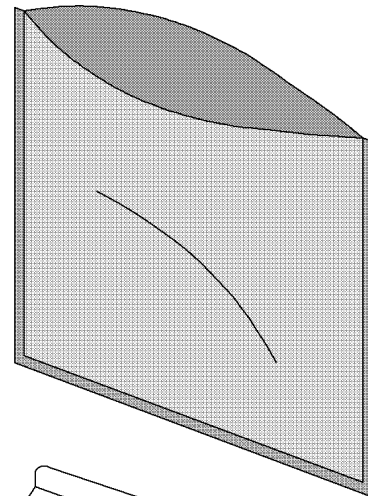


11-4. INNER BOX(Reel Packing) STRUCTURE

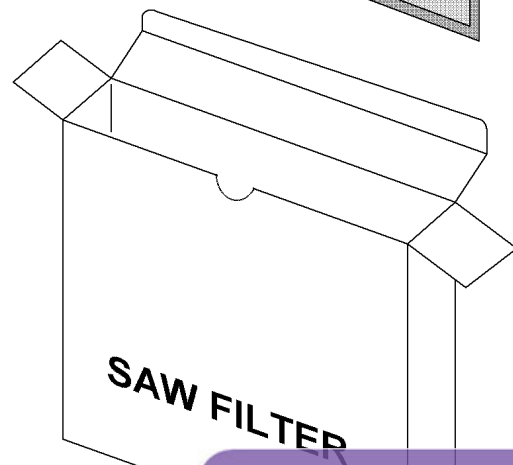
Material: Polycarbonate



Material : Polyethylene + Aluminium
Size : 310×370mm²



Material : Paper
Size: (D)260×(W)37×(H)265mm³

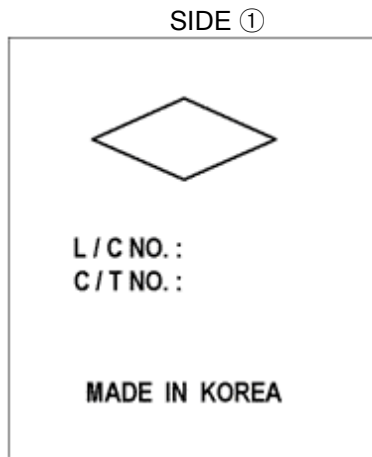
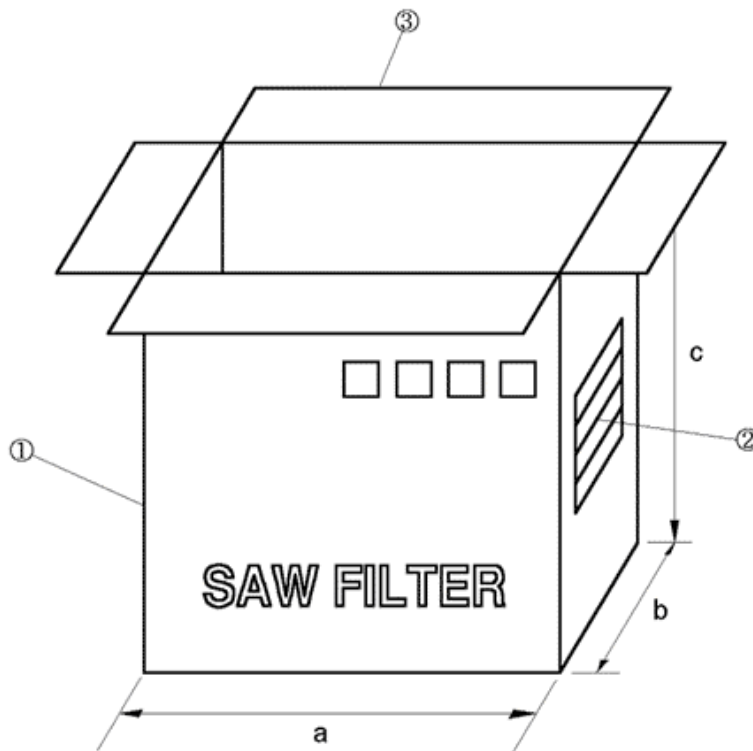


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11-5. OUTER BOX STRUCTURE

Material : Paper

TYPE	SIZE(mm)			Inner Box #
	a	b	c	
A	270	240	275	6 boxes



- SIDE is the same as front side.

SIDE ②

MODEL	
Q'TY	EA
USER	
DATE	. .

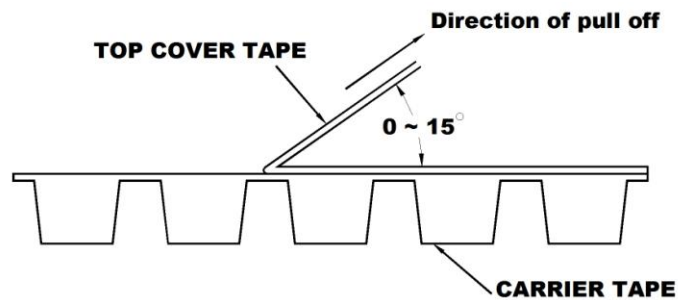
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12. TAPE SPECIFICATIONS

12-1. Tensile Strength of Carrier Tape: 4.4N/mm width

12-2. Top Cover Tape Adhesion (See the below figure)

- pull of angle: 0~15 degree
- speed: 300mm/min.
- force: 20~70g



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13. RoHS DATA



Test Report No. F690101/LF-CTSAYAA13-31939

Issued Date: 2013. 07. 08 Page 1 of 6

To: **WISOL CO., LTD.**
373-7
Gajang-dong
Osan-si
Gyeonggi-do
Korea

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

SGS File No.	: AYAA13-31939
Product Name	: SAW FILTER
Item No./Part No.	: N/A
Received Date	: 2013. 07. 03
Test Period	: 2013. 07. 04 to 2013. 07. 08
Buyer(s)	: SAMSUNG
Test Results	: For further details, please refer to following page(s)
Test Performed	: SGS Korea tested the sample(s) selected by applicant with following results.
Test 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 Korea Co., Ltd.



Jeff Jang / Chemical Lab Mgr

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052 Version5

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Test Report No. F690101/LF-CTSAYAA13-31939

Issued Date: 2013. 07. 08 Page 2 of 8

Sample No. : AYAA13-31939.001
Sample Description : SAW FILTER
Item No./Part No. : N/A
Materials : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, 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 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, 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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Issued Date: 2013. 07. 08 Page 3 of 6

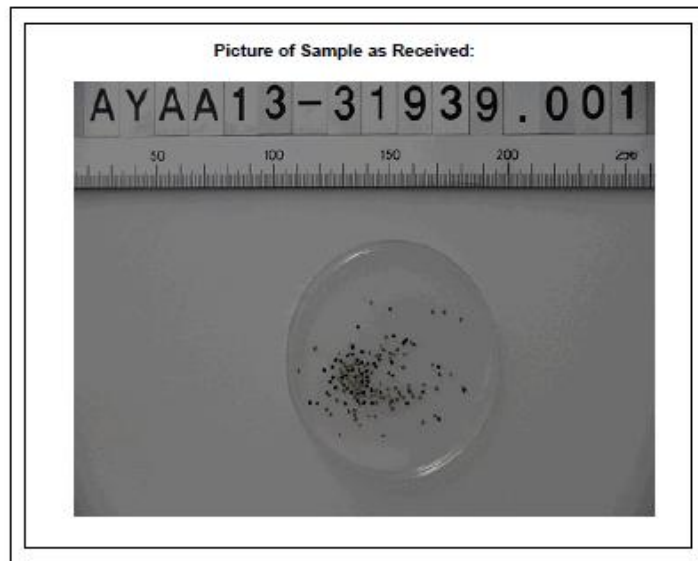
Sample No. : AYAA13-31939.001
Sample Description : SAW FILTER
Item No./Part No. : N/A
Materials : N/A

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

Halogen Content

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.



NOTE:

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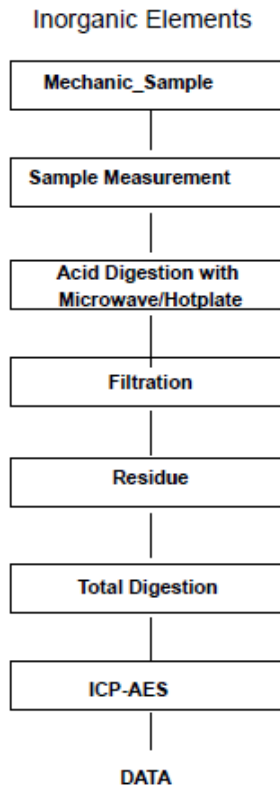
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Test Report No. F690101/LF-CTSAYAA13-31939

Issued Date: 2013. 07. 08 Page 5 of 6

Flow Chart for Inorganic Elements Testing



NOTE:

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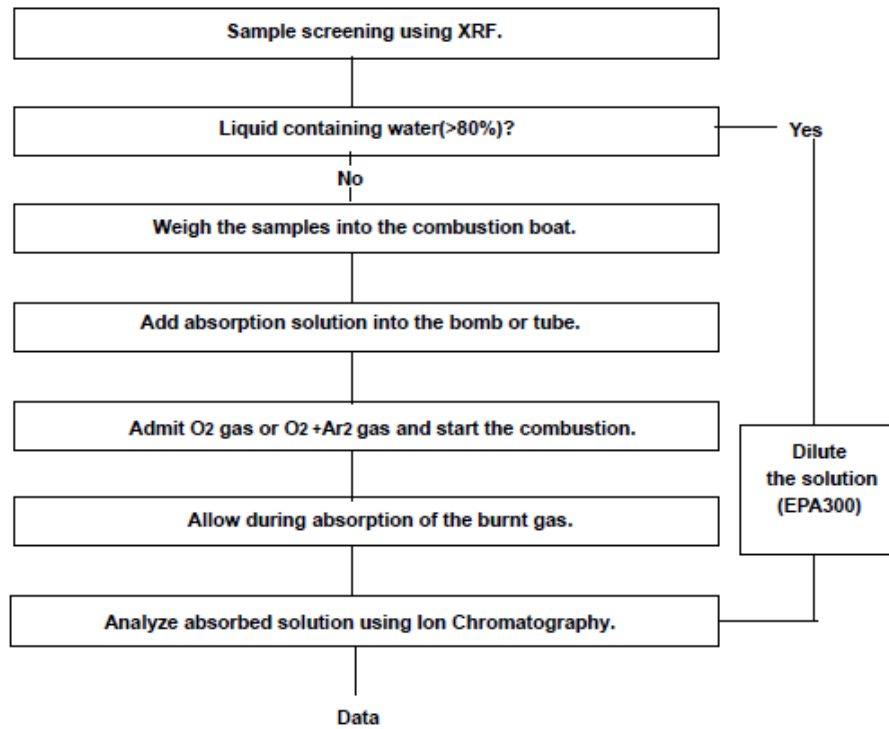
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Test Report No. F690101/LF-CTSAYAA13-31939

Issued Date: 2013. 07. 08 Page 6 of 6

Flow Chart for Halogen Test



*** End ***

NOTE:

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