SPECIFICATION

Surface Acoustic Wave Filter

USER	
USER PART No.	
SEMCO PART No.	SFHG52PA002
DOC. No.	SMS-51-L-SFT FX-45
DATE	November 4, 2013
REVISION	000

WISOL					
ISSUED BY	Kim,Young-Hun	APPROVED BY (R&D)	Hong, Seong-Su	APPROVED BY (QC)	Choi, jae-hyung
User					
ISSUED BY		CHECKED BY		APPROVED BY	

WISOL CO., LTD.
373-7, GAJANG-DONG, OSAN-SI,
GYUNGGI-DO, KOREA, 447-210
http://www.wisol.co.kr

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1. REVISION HISTORY

000	November 3, 2013	All Page	Make specification

2. DEFINITION

2-1. PART No.

S F H G 5 2 P A 0 0 2

① ② ③ ④ ⑤ ⑥

No.	EXPLANATION
①	SAW Filter
②	Design Type
③	Center Frequency : 2350MHz(2300 ~ 2400)
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 LTE Band 40 Rx etc.

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

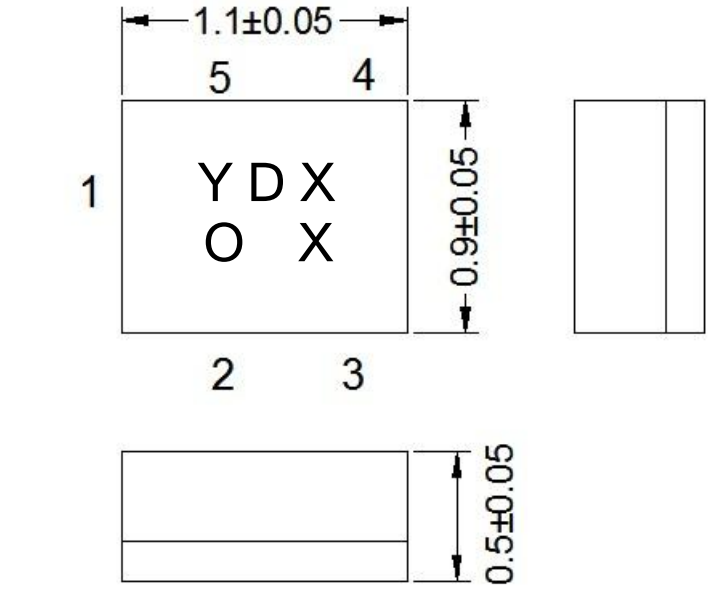
3-5. This is an electrostatic sensitive device.
Please avoid static voltage during operation and storage.

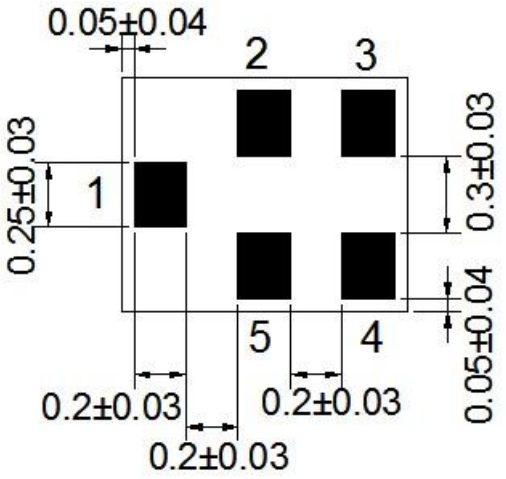
3-6. Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.

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.

4. OUTLINE DRAWING & DIMENSIONS

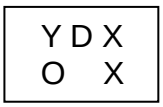
[Unit: mm]





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

5. MARKING



5-1. Y D X X

- The 1st 2nd character 'YD' indicates the model name of SAW Filter SFHG52PA002.
- 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

6. PERFORMANCE

6-1. MAXIMUM RATINGS

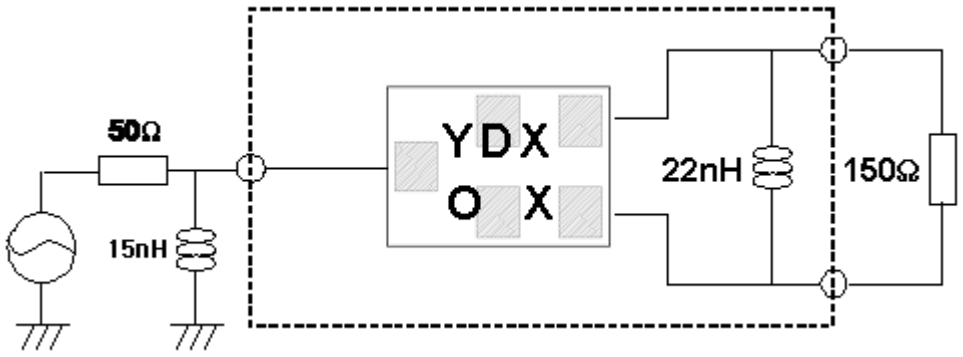
CHARACTERISTICS	RATINGS	UNITS
DC Permissive Voltage	5	V
Maximum Input Power	15	dBm
Operating Temperature Range	−30 ~ +85	℃
Storage Temperature Range	−40 ~ +85	℃

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

Ta = －30 ~ +85℃

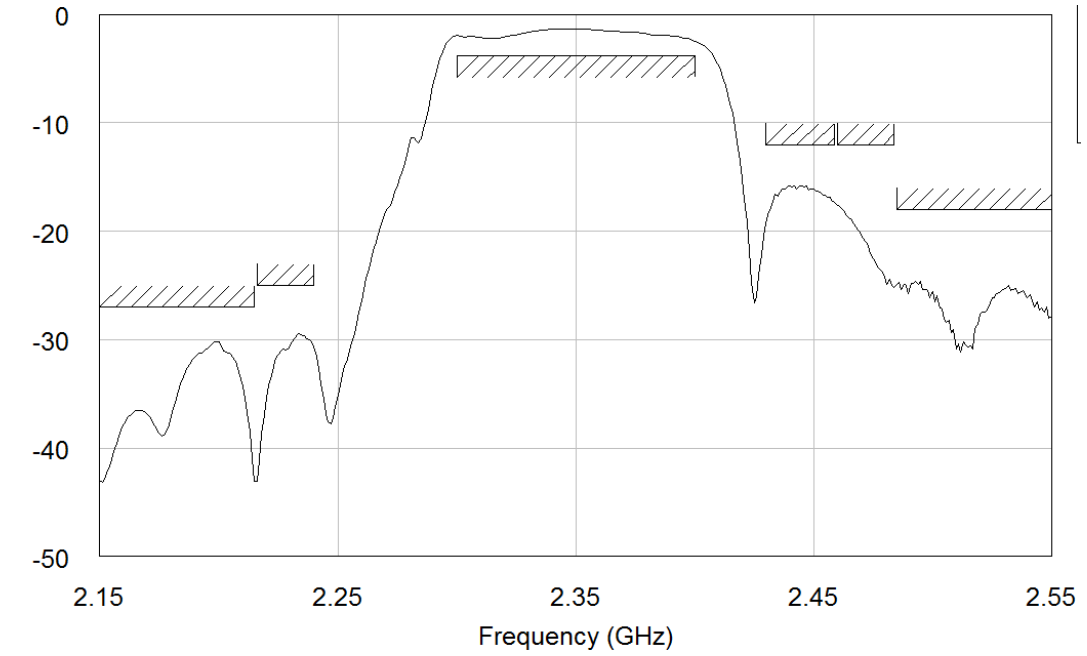
Item	FREQUENCY RANGE [MHz]	UNIT	SPECIFICATION		
			Min.	Typ. (25℃)	Max.
Insertion Loss	2300 ~ 2400	dB	-	2.5	3.8
Inband Ripple	2300 ~ 2400	dB	-	1.2	2.5
Input VSWR	2300 ~ 2400	-	-	2.0	2.5
Output VSWR	2300 ~ 2400	-	-	2.0	2.5
Amplitude Imbalance	2300 ~ 2400	dB	-2.5	-	+2.5
Phase Imbalance	2300 ~ 2400	degree	-20	-	+20
Absolute Attenuation	1981 ~ 2185	dB	27	33	
	2185 ~ 2215	dB	27	30	
	2216 ~2240	dB	25	30	
	2430 ~2459	dB	12	16	
	2460 ~2484	dB	12	18	
	2485 ~ 2550	dB	18	25	
Termination Impedance		Input: Unbalanced 50 ohm//15nH Output: Balanced 150 ohm // 22nH			

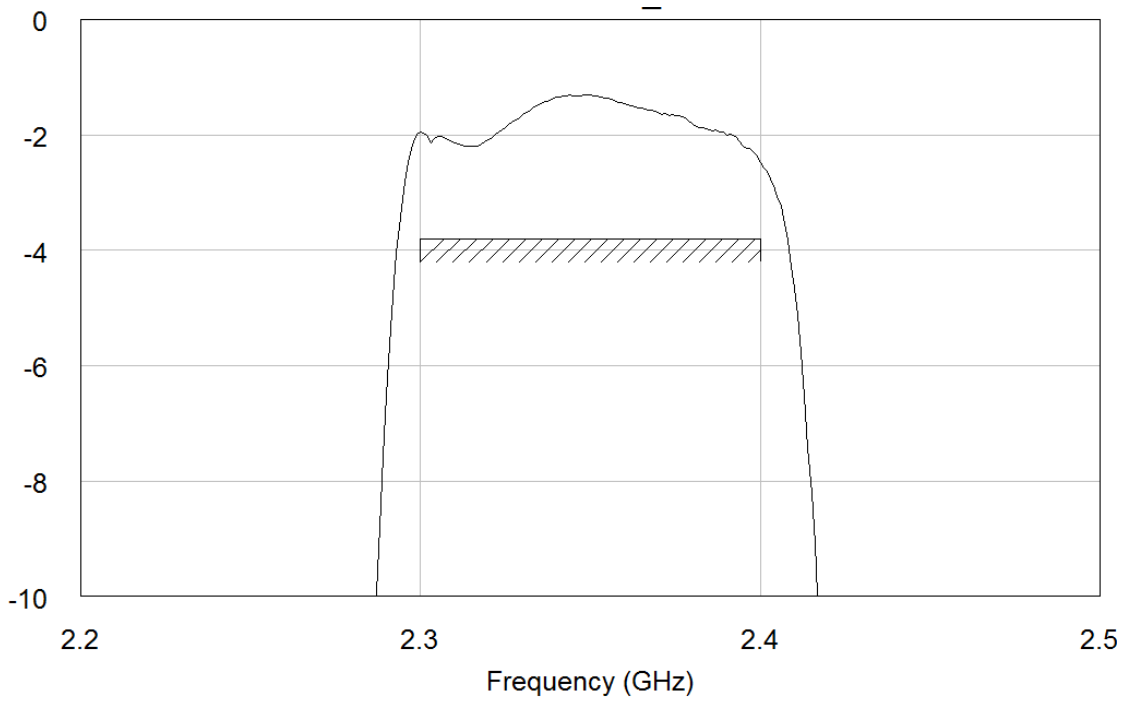
6-2-2. TEST FIXTURE



[X–Ray Top View]

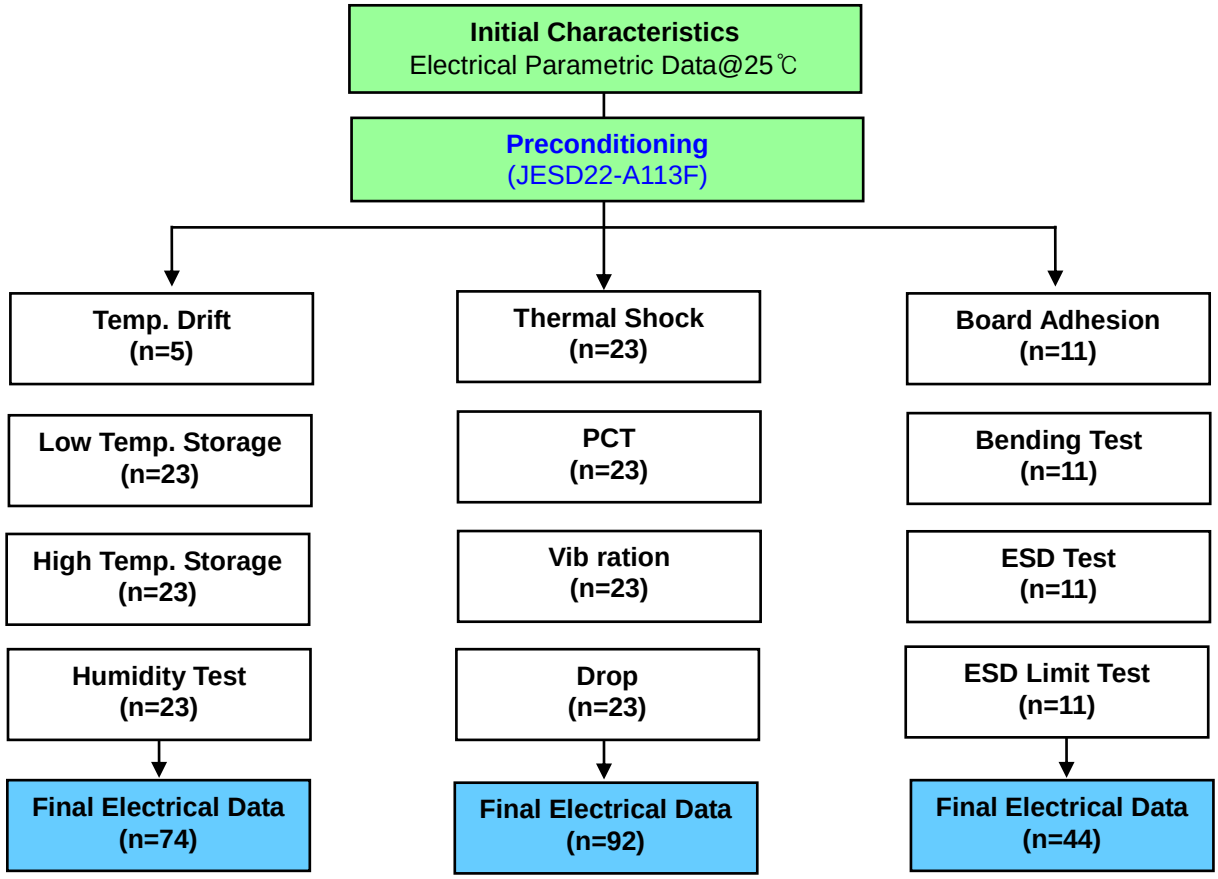
6-2-3. GRAPH


0
-10
-20
-30
-40
-50
2.15
2.25
2.35
2.45
2.55
Frequency (GHz)


0
-2
-4
-6
-8
-10
2.2
2.3
2.4
2.5
Frequency (GHz)

7. RELIABILITY

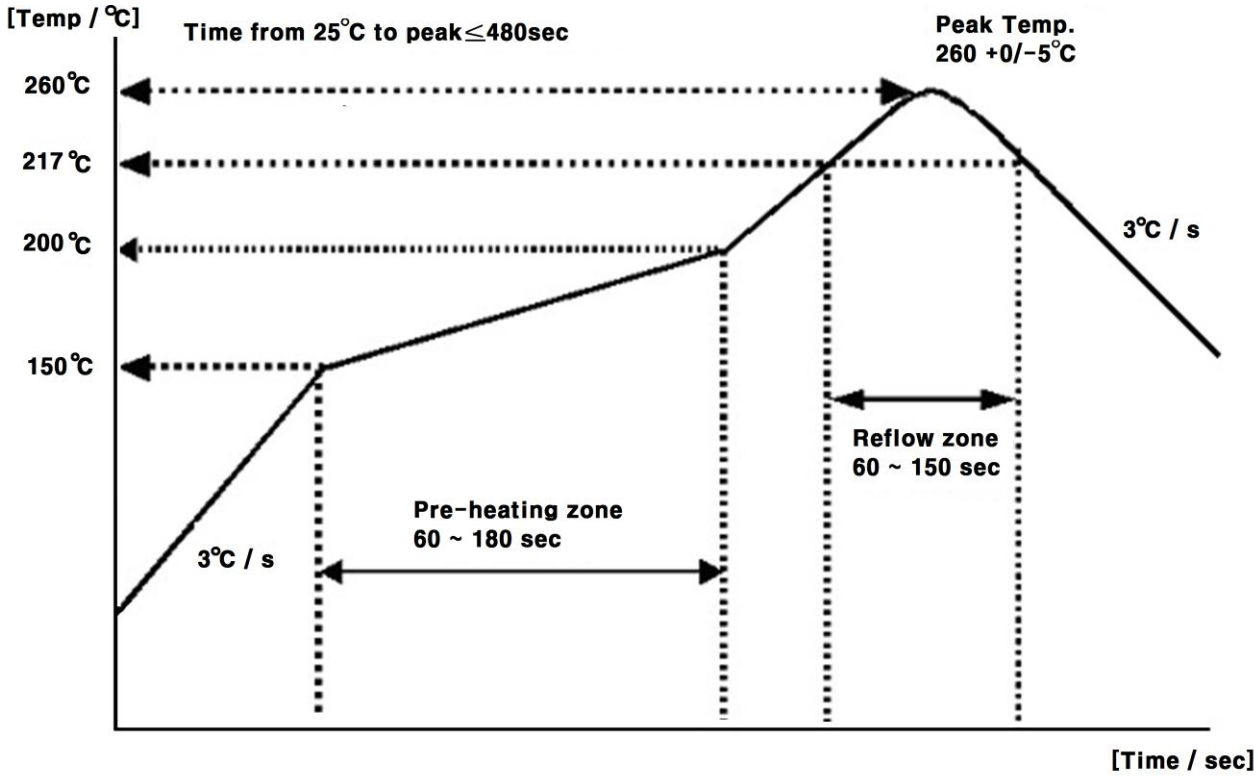
7-1. ENGINEERING SAMPLE FLOW CHART



7-2. TEST ITEM & CONDITION

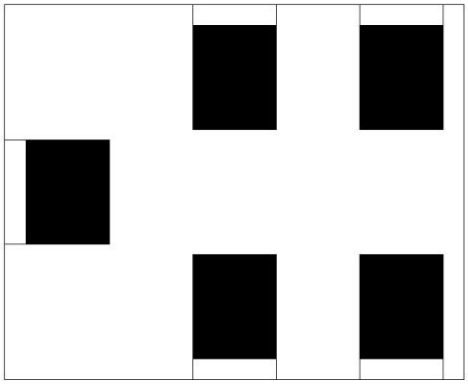
CATEGORY	TEST ITEM	TEST CONDITION	REMARK
Preconditioning		+125℃ 24hr Baking → +60℃ 60%RH 120hr → Reflow Test(3times)	JESD22A113F
Environment Test	Temp. Drift	-30℃ → +25℃→ +85℃	description
	High Temp. Storage	+85℃ 240hr	JESD22-A103C
	Low Temp. Storage	-40℃ 240hr	JESD22-A119
	High Temp. High Humidity Storage	+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㎐~2000㎐,0.053G²/Hz or 8g's RMS,15min/plane	IEC 68-2-36 Fdb
	Drop Test	152㎝ 12times Steel floor JIG(110g~150g)	IEC 1178-1.4.8.9
	Board Adhesion	0.5㎜/sec 1point push	IEC 68-2-21 Ue3
	Bending Test	0.5㎜/sec 3times -PCB : FR4 , PCB SIZE : 100*40㎜	IEC 68-2-21 Ue3
Physical Test	Solder Heat Resistance	±250V,C=100pF,R=1.5㏀,1times	IEC 68-2-21 Ue3
	static marginal test	C=100pF,R=1.5㏀,1times(demand of customer)	JESD22-A114F

8. REFLOW CONDITION

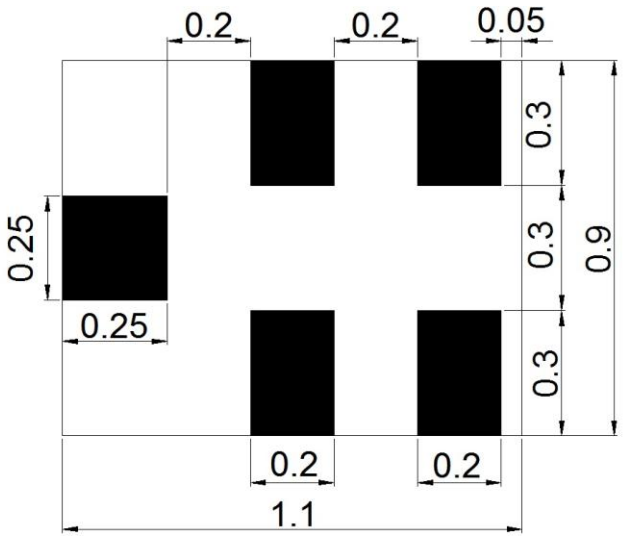


9. RECOMMENDED PCB DIMENSIONS

[unit : mm]



[SAW, X-ray Top view]



[PCB, X-ray Top view]

10. CAUTION

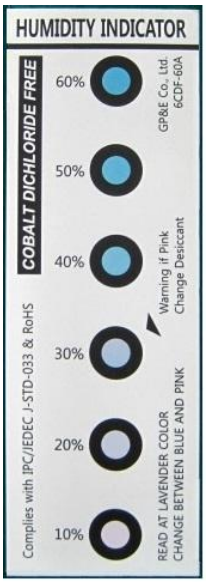
Moisture Sensitivity Device Caution (MSL LEVEL=2a)

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)

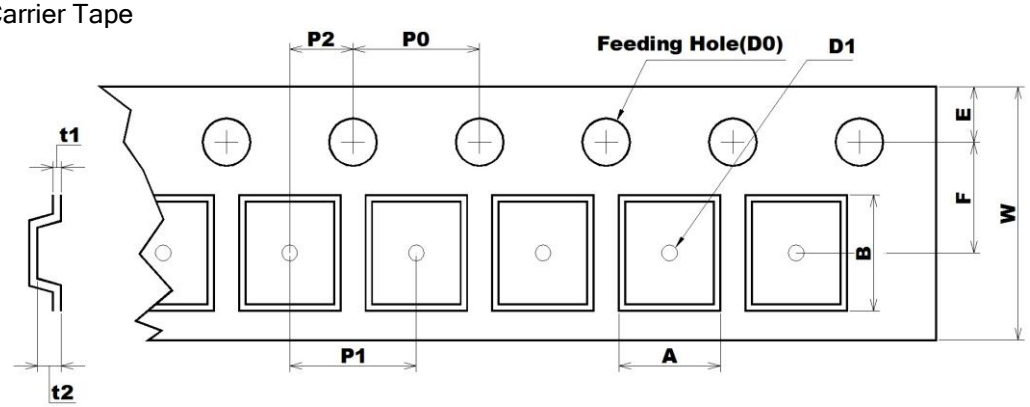


10 to 60% RH

11. PACKING

11-1. DIMENSIONS

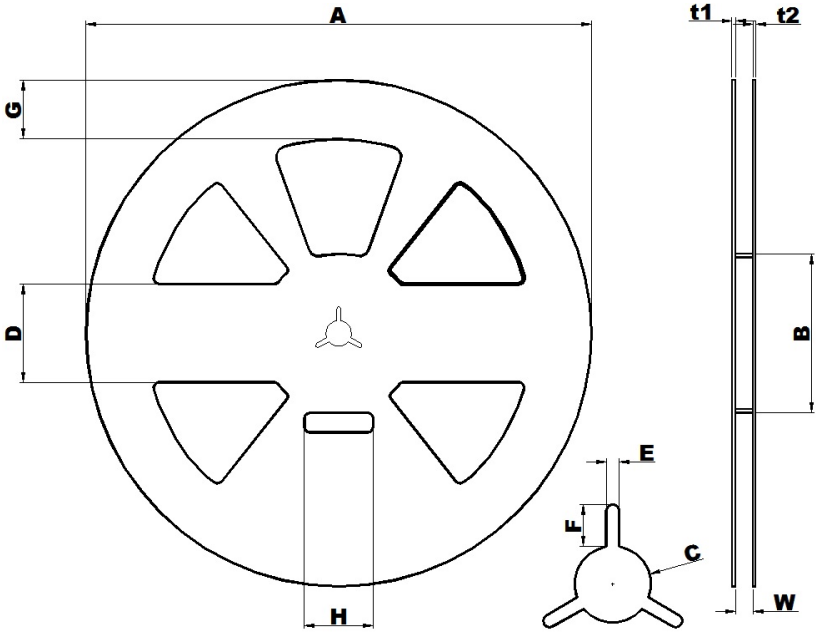
- Carrier Tape



[Unit: mm]

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

- Reel



[Unit: mm]

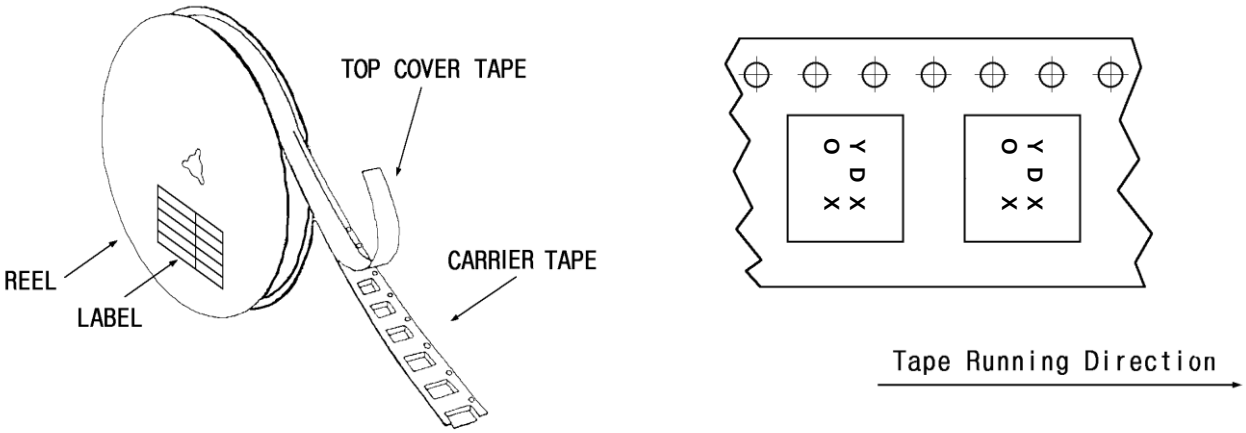
A	B	C	D	E	F	G	H	t1	t2	W
Ø258.0 +1.0 -0.5	Ø81.0 +1.0 -1.0	Ø13.0 +0.5 -0.5	50.0 +0.8 -0.8	2.2 +0.3 -0.3	7.0 +0.5 -0.5	30.0 +0.8 -0.8	35.0 +1.0 -1.0	1.8 +0.5 -0.5	1.5 +0.5 -0.5	9.0 +1.0 -0.5

- The product shall be packed properly not to damaged during transportation and storage.

11-2. REELING QUANTITY
10 inch reel : 10,000 pcs/reel

11-3. TAPING STRUCTURE

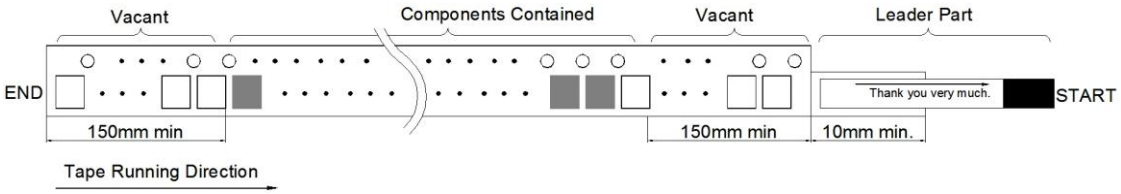
11-3-1. The tape shall be wound around the reel in direction shown below.



11-3-2. BAR CODE LABEL

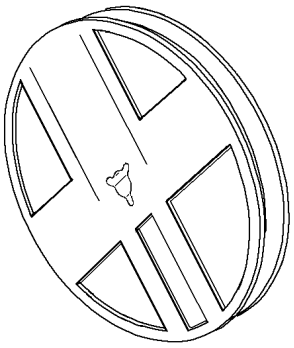
①		MODEL NAME BARCODE
②	SFH836AQ101	Model Name
③	RLYC12563	Reel number
④	8,000 / qAFYU	Quantity / Marking

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

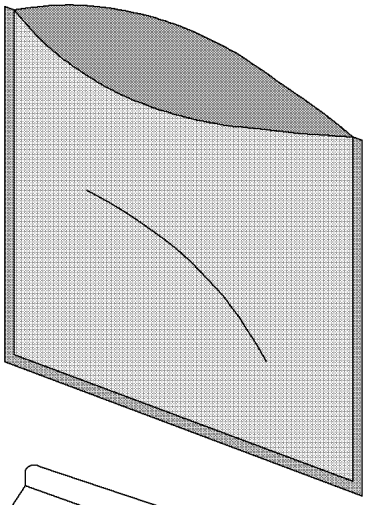


11-4. INNER BOX(Reel Packing) STRUCTURE

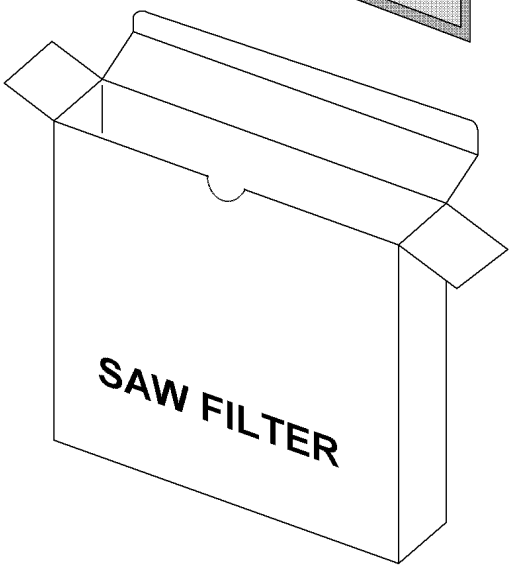
Material: Polycarbonate



Material : Polyethylene + Aluminium
Size : 310×370mm^2



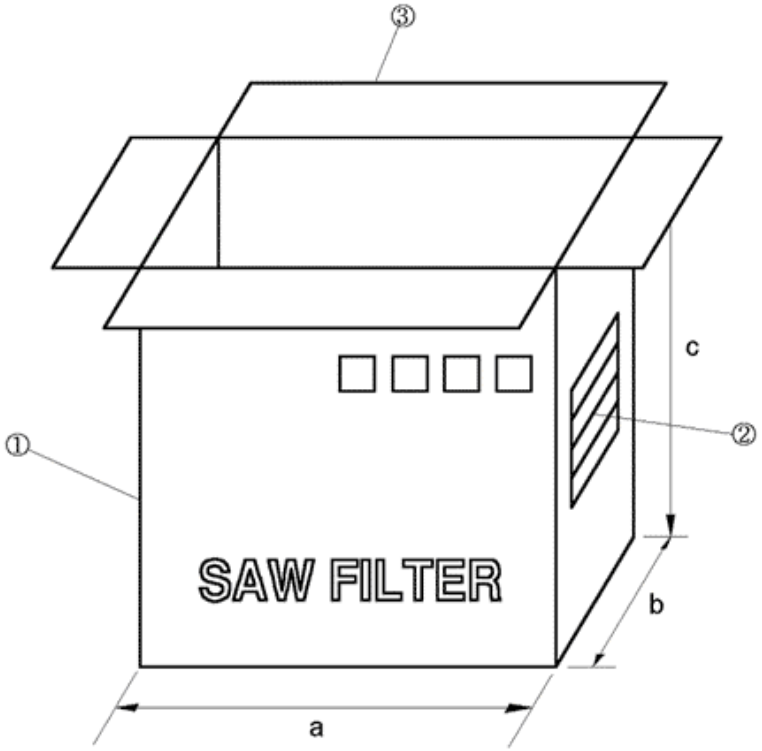
Material : Paper
Size: (D)260×(W)37×(H)265mm^3



11-5. OUTER BOX STRUCTURE

Material : Paper

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



SIDE ①

SIDE ②

MODEL	
Q'TY	EA
USER	
DATE	. .

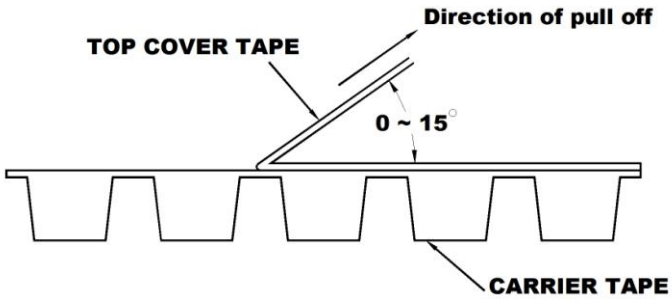
- SIDE is the same as front side.

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



13. RoHS DATA

SGS

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.

SGS Korea Co., Ltd.

Timothy Jeon
Jinhee Kim
Cindy Park
Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr

SGS Korea Co.,Ltd. 322, The O valley, 555-9, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-080
t +82 (0)31 4608 000 f +82 (0)31 4608 059 http://www.sgslab.co.kr www.kr.sgs.com/greenlab
Member of the SGS Group (Société Générale de Surveillance)

SGS

Test Report No. F690101/LF-CTSAYAA13-31939 Issued Date: 2013. 07. 08 Page 2 of 6

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.

SGS Korea Co.,Ltd. 322, The O valley, 555-9, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-080
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SGS

Test Report No. F690101/LF-CTSAYAA13-31939 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.

Picture of Sample as Received:

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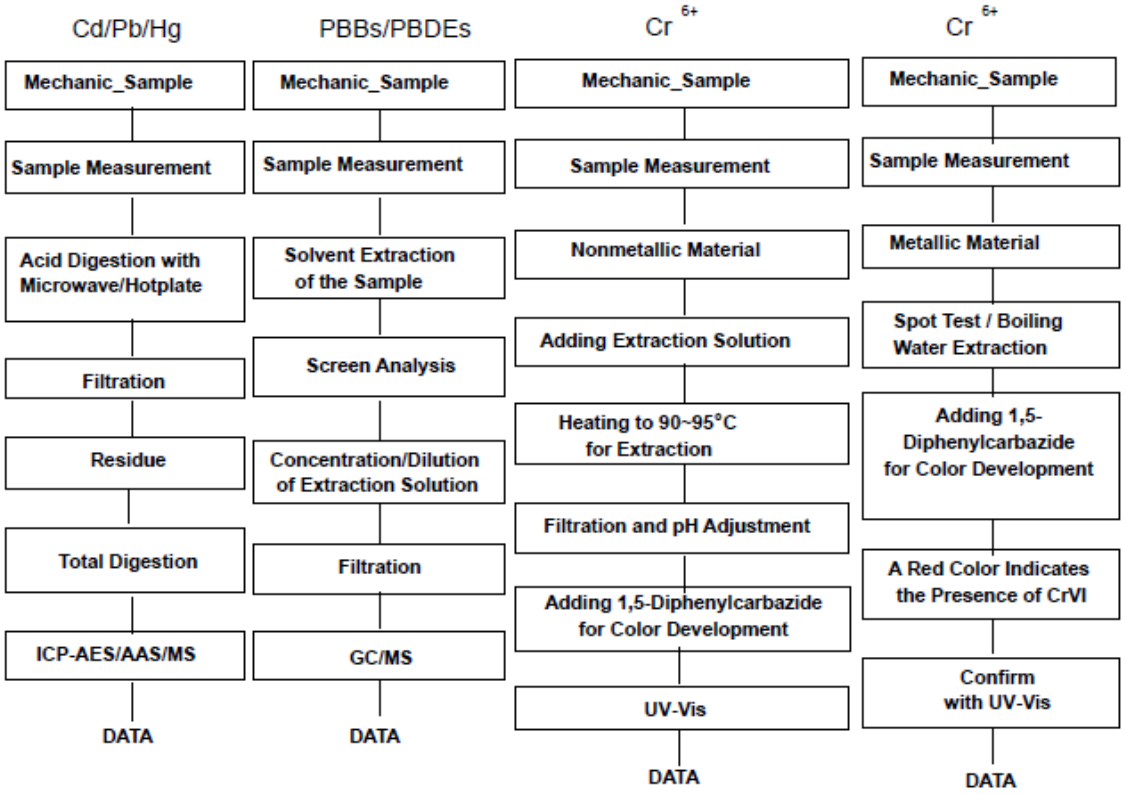
SGS

Test Report No. F690101/LF-CTSAYAA13-31939 Issued Date: 2013. 07. 08 Page 4 of 6

Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr^{6+} /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

NOTE:
(1) N.D. = Not detected.(<MDL)
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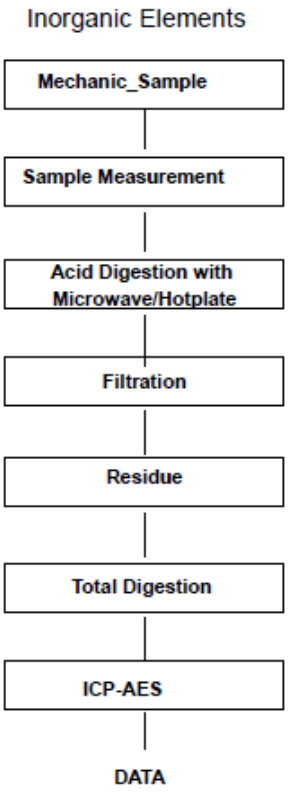
Flow Chart for Inorganic Elements Testing



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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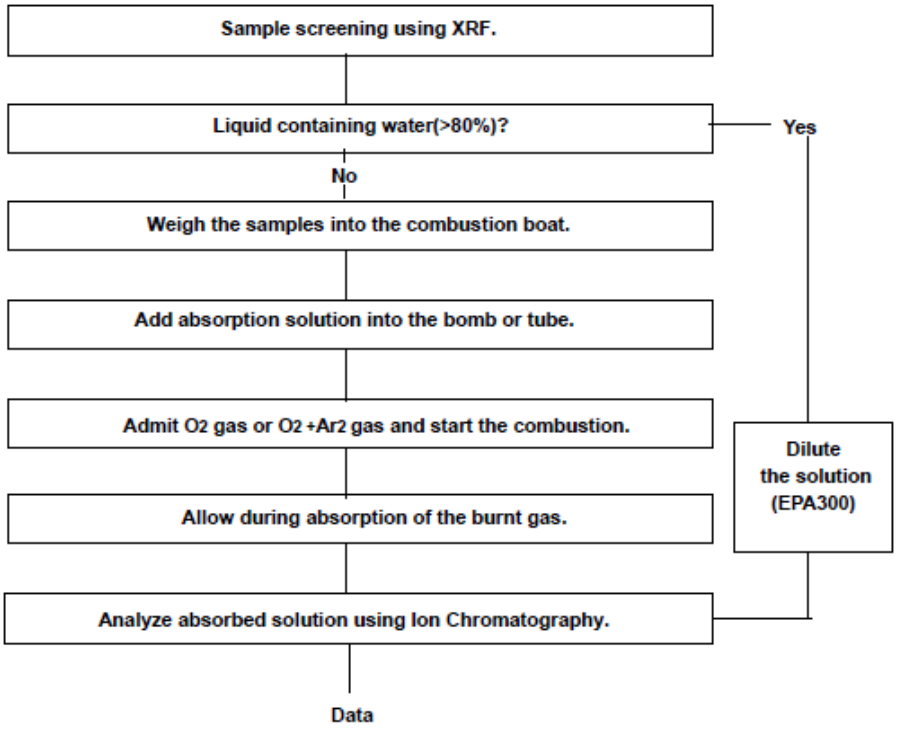
Flow Chart for Halogen Test



*** End ***

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