

# Surface Acoustic Wave Filter

---

USER

USER PART No.

WISOL PART No.

**SFDG35AQ102**

DOC. No.

**SMS-51-L-SFT FN-76**

DATE

June 14, 201

▶ **A TABLE OF CONTENTS**

<b>1. REVISION HISTORY</b> .....	<b>3</b>
<b>2. DEFINITION</b> .....	<b>4</b>
<b>3. PRECAUTIONS</b> .....	<b>4</b>
<b>4. OUTLINE DRAWING &amp; DIMENSIONS</b> .....	<b>5</b>
<b>5. MARKING</b> .....	<b>6</b>
<b>6. PERFORMANCE</b> .....	<b>7</b>
6-1. MAXIMUM RATINGS .....	7
6-2. ELECTRICAL CHARACTERISTICS .....	8
<b>7. RELIABILITY</b> .....	<b>10</b>
7-1. ENGINEERING SAMPLE FLOW CHART .....	10
7-2. TEST ITEM & CONDITION .....	11
<b>8. REFLOW CONDITION</b> .....	<b>12</b>
<b>9. RECOMMENDED PCB DIMENSIONS</b> .....	<b>12</b>
<b>10. CAUTION</b> .....	<b>13</b>
<b>11. PACKING</b> .....	<b>14</b>
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
<b>12. TAPE SPECIFICATIONS</b> .....	<b>18</b>
<b>13. RoHS DATA</b> .....	<b>19</b>

## 1. REVISION HISTORY

000	June 14, 2017	All Page	Make specification
-----	---------------	----------	--------------------

## 2. DEFINITION

2-1. PART No.

**S F D G 3 5 A Q 1 0 2**

①      ②      ③      ④      ⑤      ⑥

No.	EXPLANATION
①	SAW Filter
②	Design Type
③	Center Frequency: 2350MHz (2300~2400MHz)
④	Unbalanced filter, output 50ohm
⑤	Package size: 1.4×1.1mm <sup>2</sup>
⑥	Design Revision (02 : Molding Type)

2-2. APPLICATION: LTE BAND 40 TRx

## 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.

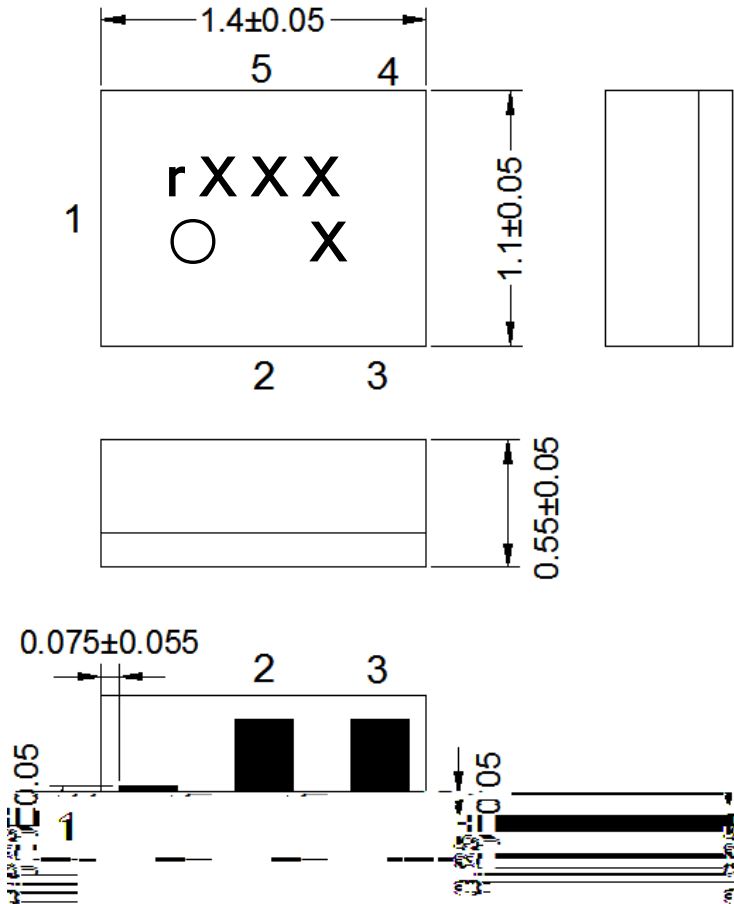
Please avoid static voltage during operation and storage.

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.

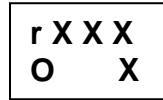
4. OUTLINE DRAWING & DIMENSIONS

[Unit: mm]



No.	Function
2, 3, 5	Ground
1	Unbalanced Input (Tx)
4	Unbalanced Output (ANT)

## 5. MARKING



### 5-1. rXXX

- The 1<sup>st</sup> 2<sup>nd</sup> character 'rX' indicates the model name of SAW Filter SFDG35AQ102.
- The 3<sup>rd</sup>, character 'X' indicates the year and the month of manufacture.

Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
<b>2017</b>	1	2	3	4	5	6	7	8	9	A	B	C
<b>2018</b>	D	E	F	G	H	I	J	K	L	M	N	O
<b>2019</b>	P	Q	R	S	T	U	V	W	X	Y	Z	a
<b>2020</b>	1	2	3	4	5	6	7	8	9	A	B	C

※ This rotates by the 3 years.

- The 4<sup>th</sup>, 5<sup>th</sup> 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

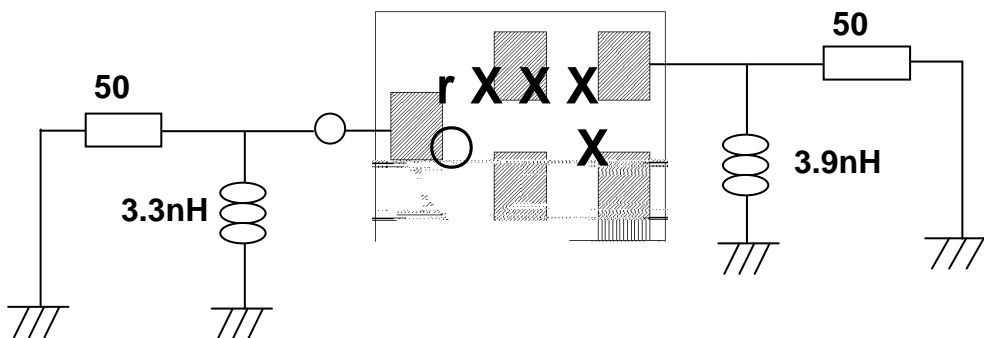
CHARACTERISTICS

RATINGS

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

Ta = - 30 ~ +85℃

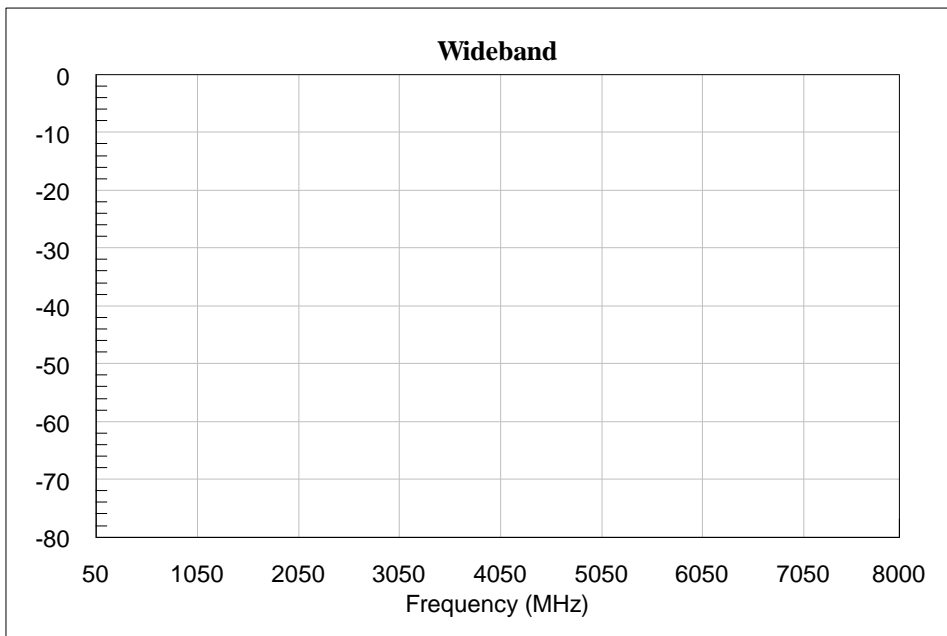
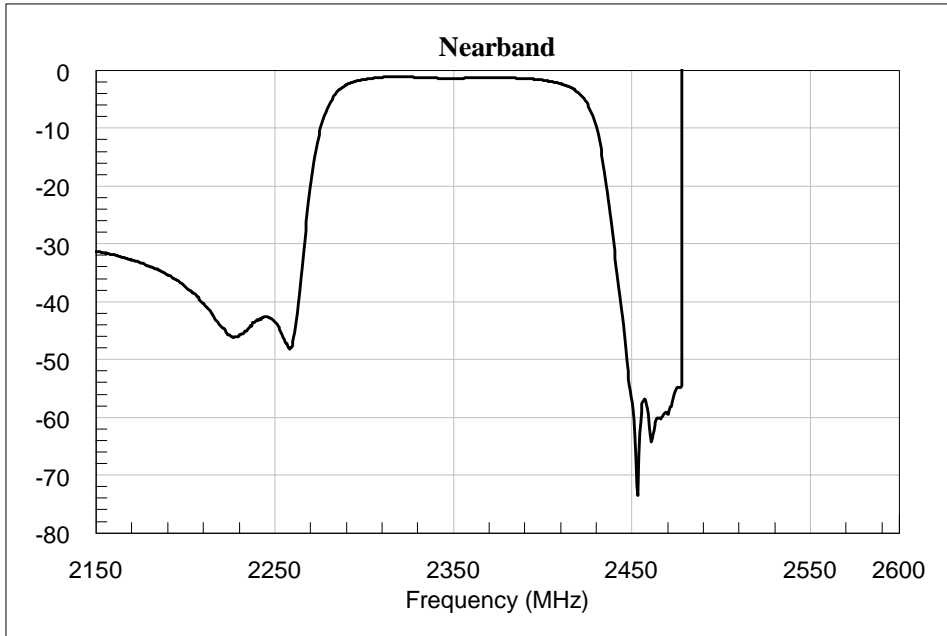
Item	CONDITION [MHz]	UNIT	RATING			Notes
			Min.	Typ.(25℃)	Max.	
Insertion Loss(*1)	2300 ~ 2400	dB	-	1.8	2.8	
Ripple Deviation	2300 ~ 2400	dB	-	0.7	1.9	
VSWR	2300 ~ 2400	-	-	1.9	2.4	
Absolute Attenuation	100 ~ 1574	dB	28	34	-	
	1574 ~ 1577	dB	28	34	-	
	1577 ~ 1680	dB	28	33	-	
	1845 ~ 1880	dB	25	30	-	
	2110 ~ 2170	dB	25	30	-	
	2460 ~ 2485	dB	35	48	-	
	2485 ~ 2500	dB	35	47	-	
	2500 ~ 3000	dB	25	29	-	
	4600 ~ 4800	dB	35	42	-	
6900 ~ 7200	dB	28	36	-		
Termination Impedance : Tx / ANT			(/3.3[nH])		(/3.9[nH])	

**6-2-2. TEST FIXTURE**


&lt; X-ray Top View &gt;

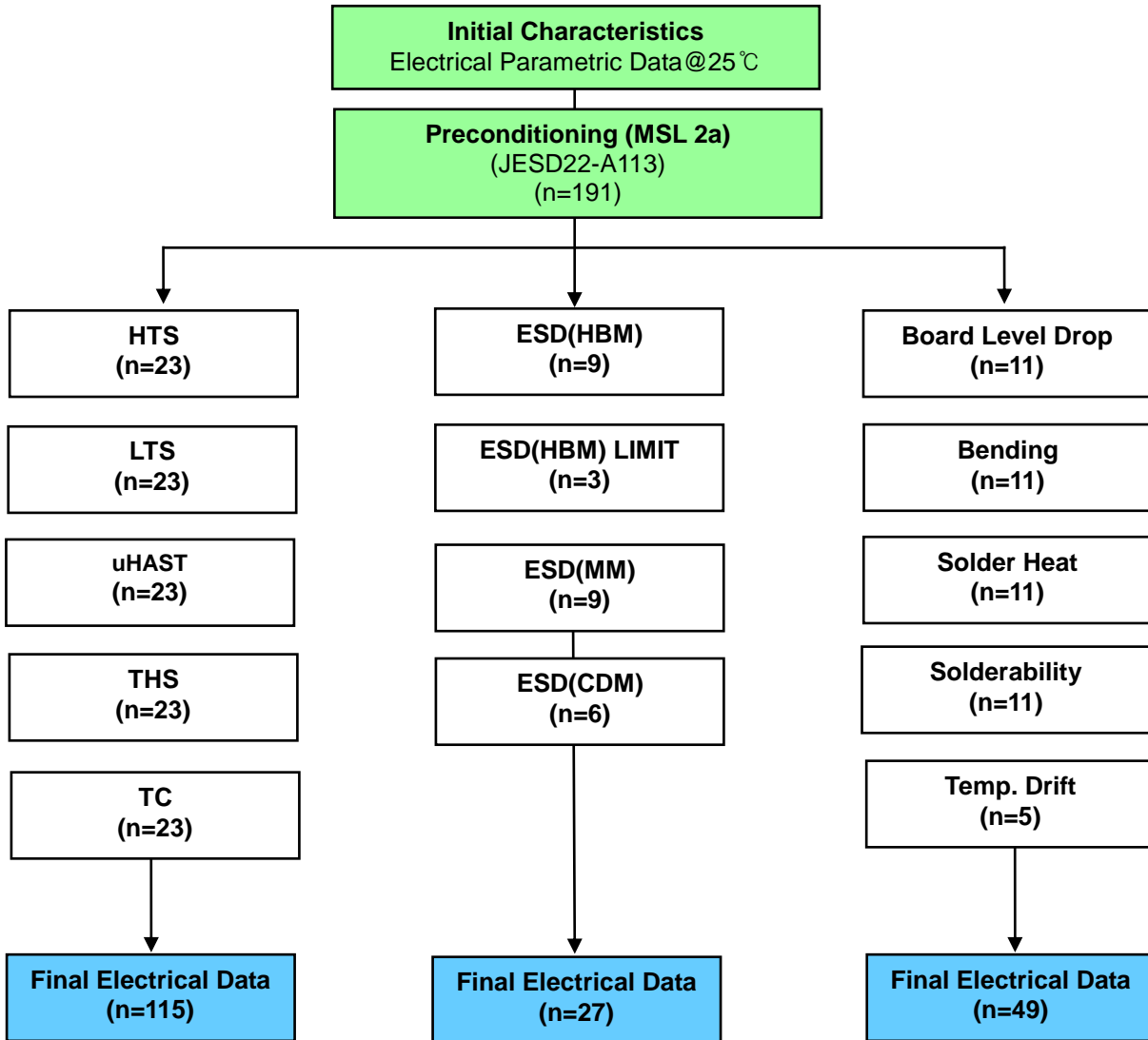


6-2-3. GRAPH



7. RELIABILITY

7-1. ENGINEERING SAMPLE FLOW CHART



**7-2. TEST ITEM & CONDITION**

CATEGORY	TEST ITEM	TEST CONDITION	REMARK
	Preconditioning	Bake + Soak(MSL or above) + 3X Reflow duration ( Soak 60 °C 60% 120HR)	JESD22-A113



TEST ITEM	REMARK	TEST CONDITION	Duration
HTS (High Temperature Storage)	JESD22-A103	condition A 125(-0/+10)	1000hr
LTS (Low Temperature Storage)	JESD22-A119	A -40(-10/+0)	1000hr
uHAST (Unbiased HAST)	JESD22-A118	130 /85% /33.3psi	96hr
THS (Temperature Humidity Storage)	JESD22-A101	85 /85% RH	1000hr
TC (Temperature Cycle)	JESD22-A104	Condition G (-40 /125 )	1000cycle
ESD(HBM)	JESD22-A114	250V or above	
ESD(HBM) LIMIT	-	300V or above	
ESD(MM)	JESD22-A115	No spec but need data	
ESD(CDM)	JESD22-C101	500V or above	
Board Level Drop Test	JESD22-B111	1500G Duration 0.5ms	150cycle
Bending Test		0.5 /sec 3times (1mm distance)	
Solder Heat Resistance		260	10sec
Solderability		235	3sec
Temp Drift		-40 +25 +125	Per conditions 2HR



## 10. CAUTION

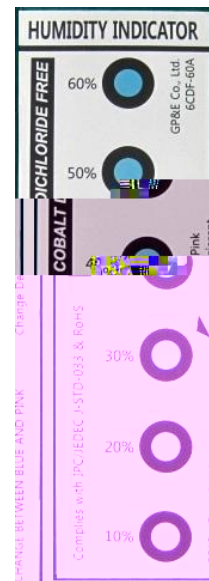
### Moisture Sensitivity Device Caution (MSL LEVEL=2a)

1. Calculated shelf life in sealed bag : 12 month at < 40°C and < 90% relative Humidity(RH)
  2. Peak package body temperature : **260°C**
  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 °C/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 °C
    - (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)

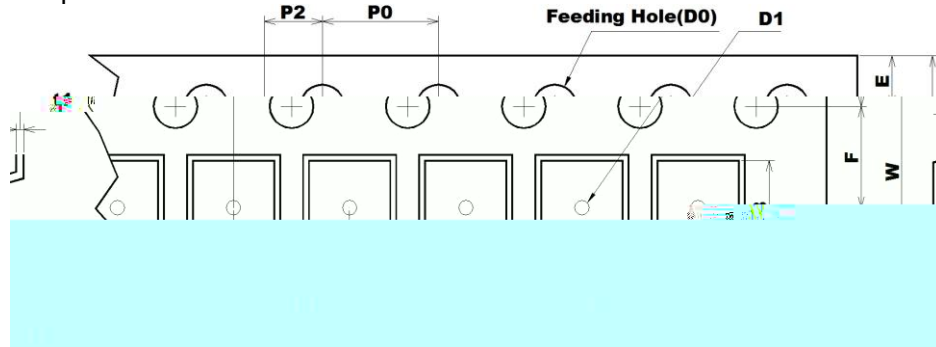


10 to 60% RH

## 11. PACKING

### 11-1. DIMENSIONS

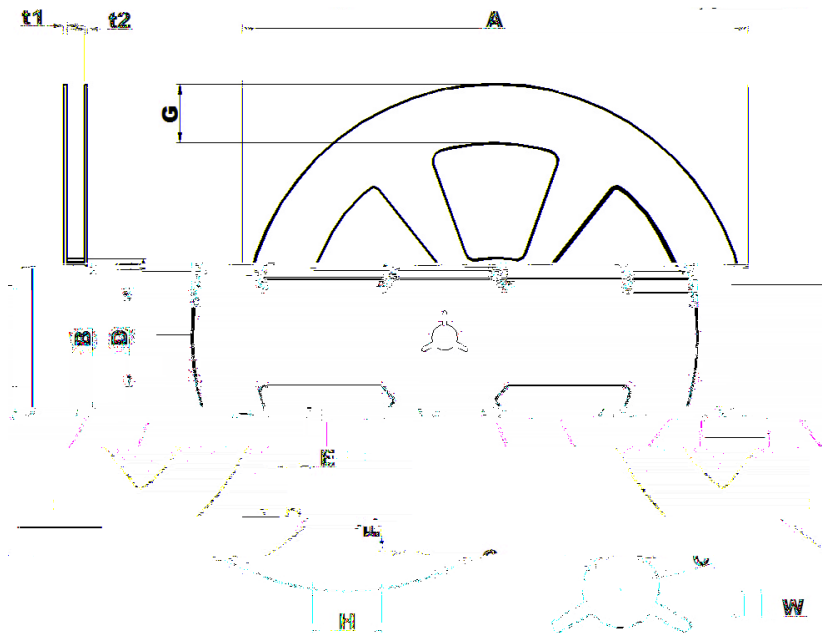
- Carrier Tape



[Unit: mm]

A	B	D0	D1	E	F	P0	P1	P2	t1	t2	W
1.30	1.60	Ø1.50	Ø0.60	1.75	3.50	4.00	4.00	2.00	0.25	0.70	8.00
0.05	0.05	0.10	MIN	0.10	0.05	0.10	0.10	0.05	0.05	0.05	0.10
-0.05	-0.05	0.00	-	-0.10	-0.05	-0.10	-0.10	-0.05	-0.05	-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

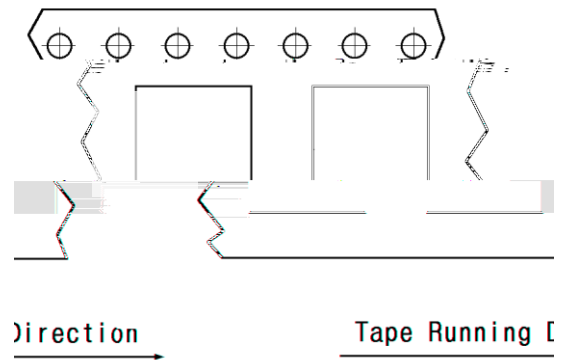
- The product shall be packed properly not to damaged during transportation and storage.

**11-2. REELING QUANTITY**

10 inch reel : 8,000 pcs/reel

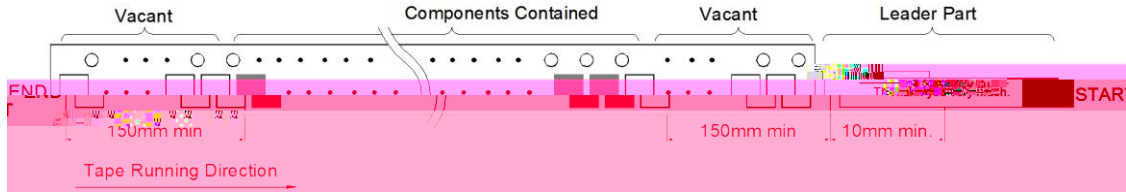
**11-3. TAPING STRUCTURE**

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


**11-3-2. BAR CODE LABEL**

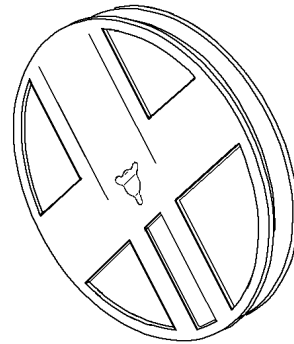

①	MODEL NAME BARCODE
②	Model Name
③	Reel number
④	Quantity / Marking

11-3-3. Leader part and vacant position specifications.

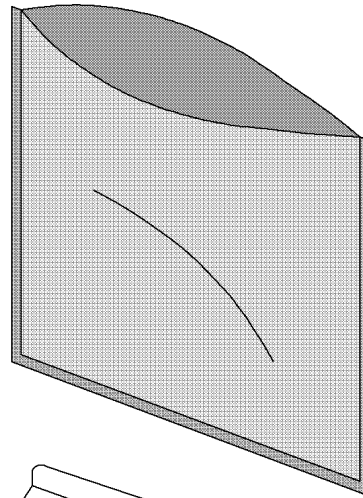


11-4. INNER BOX(Reel Packing) STRUCTURE

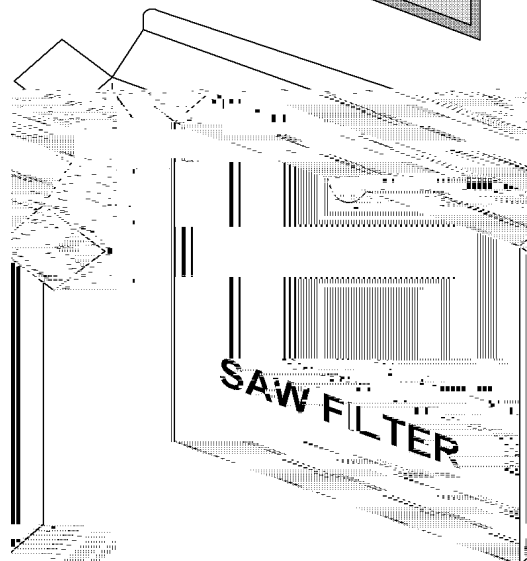
Material: Polycarbonate



Material: Polyethylene + Aluminium  
Size: 310×370mm<sup>2</sup>



Material: Paper  
Size: (D)260×(W)37×(H)265mm<sup>3</sup>

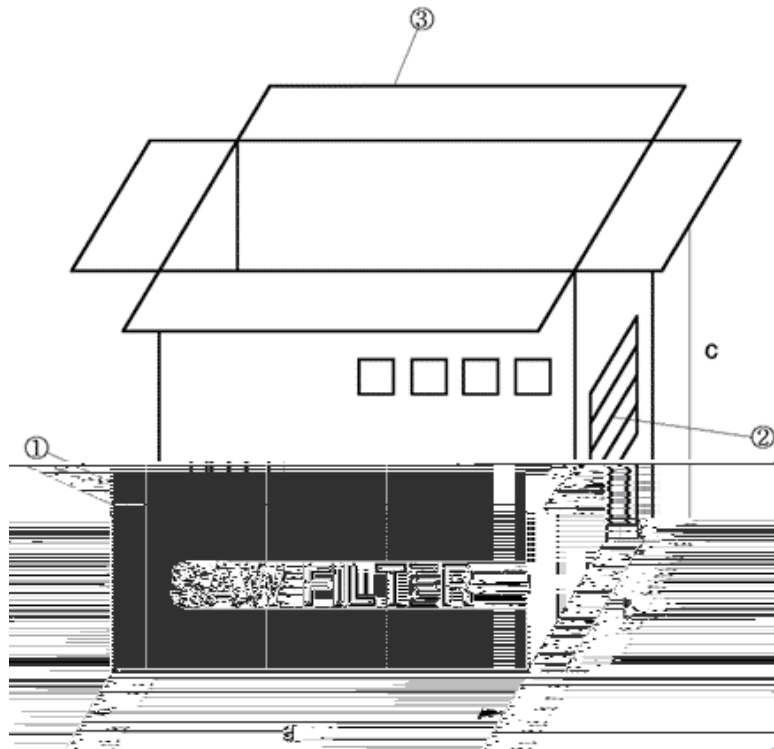




11-5. OUTER BOX STRUCTURE

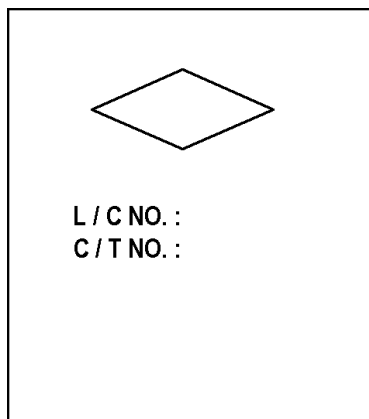
Material : Paper

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.



### 13. RoHS DATA


**Test Report No.** F690101/LF-CTSAYAA15-37174

**Issued Date :** 2015. 07. 20

**Page 1 of 7**
**WISOL CO., LTD.**  
 28-40, Gajangsaneopdong-ro  
 Osan-si, Gyeonggi-do  
 Korea

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

<b>SGS File No.</b>	: AYAA15-37174
<b>Product Name</b>	: SAW FILTER
<b>Item No./Part No.</b>	: N/A
<b>Buyer(s)</b>	: SAMSUNG
<b>Received Date</b>	: 2015. 07. 15
<b>Test Period</b>	: 2015. 07. 15 to 2015. 07. 20
<b>Test Comments</b>	: By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.
<b>Test Results</b>	: For further details, please refer to following page(s)

SGS Korea Co., Ltd.



Jeff Jang / Chemical Lab Mgr

This document is the property of the company. The company reserves the right to use the information contained herein for its internal or external purposes. The company is not responsible for its clients' actions. The company is not responsible for the results of the tests performed on the samples. The company is not responsible for the results of the tests performed on the samples. The company is not responsible for the results of the tests performed on the samples.	This document is the property of the company. The company reserves the right to use the information contained herein for its internal or external purposes. The company is not responsible for its clients' actions. The company is not responsible for the results of the tests performed on the samples. The company is not responsible for the results of the tests performed on the samples. The company is not responsible for the results of the tests performed on the samples.
321 The G Valley 76-15-ro, Gwangju, 507-720, Korea, Tel: +82-61-260-1000 69-62 (G1) 4608-000, F432 (G1) 4608-000 <a href="http://www.sgsgroup.fr">http://www.sgsgroup.fr</a>	30,804799 Co., Ltd. Member of the SGS Group (Société Générale de Surveillance) E4016V690102



Test Report No. F690101/LF-CTSAYAA15-37174

Issued Date : 2015. 07. 20

Page 2 of 7

Sample No. : AYAA15-37174.001

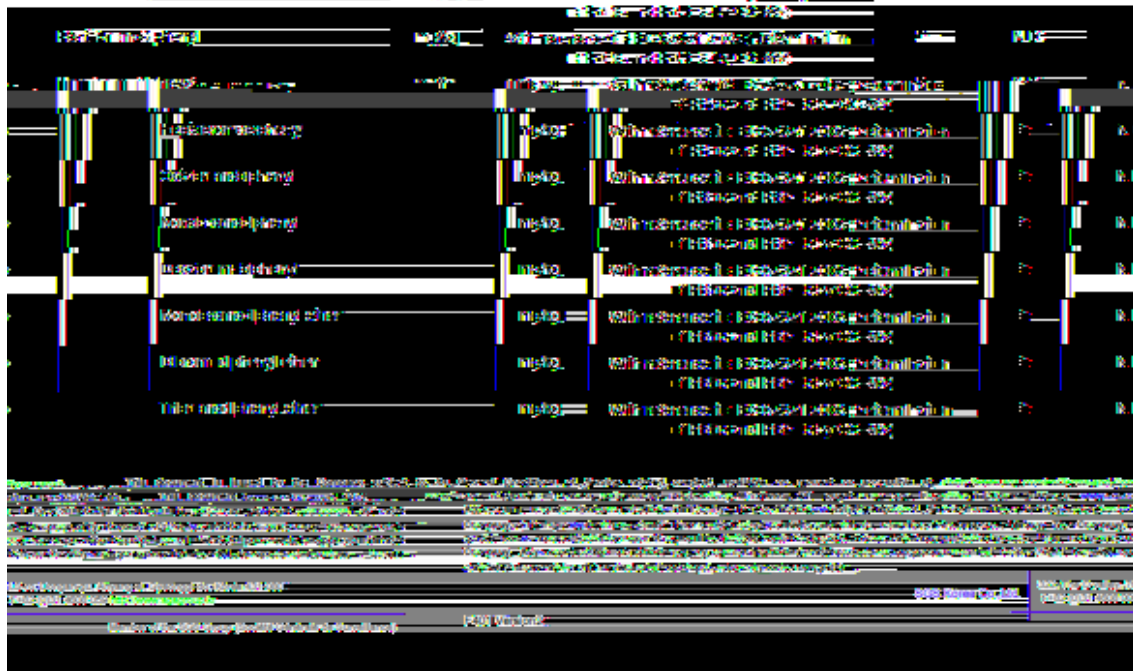
Sample Description : SAW FILTER  
 (Determination of Lead by ICP-OES)  
 (Determination of Cadmium by ICP-OES)

Results	Test Items	Unit	Test Method	MDL
N.D.	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 62321-5:2013	0.1

Test Method	MDL	Results
to IEC 62321:2008 (Determination of Pb and PBDEs by GC-MS)	5	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL
Monobromobiphenyl	mg/kg	With reference of PBI	5





Test Report No. F690101/LF-CTSAYAA15-37174

Issued Date : 2015. 07. 20

Page 3 of 7

Sample No. : AYAA15-37174.001  
 Sample Description : SAW FILTER  
 Item No./Part No. : N/A  
 Materials : HTCC, GOLD, EPOXY, LT

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
5-Bromobenzophenone	mg/kg	GC-MS	100	Not Detected
Hexabromocyclopentadiene	mg/kg	GC-MS	100	Not Detected
Heptabromodiphenyl ether	mg/kg	GC-MS	100	Not Detected
Octabromodiphenyl ether	mg/kg	GC-MS	100	Not Detected
Decabromodiphenyl ether	mg/kg	GC-MS	100	Not Detected
Decabromobiphenyl ether	mg/kg	GC-MS	100	Not Detected
Decabromodiphenyl sulfone	mg/kg	GC-MS	100	Not Detected

Halogen Content				
Unit	Method	MDL	Max/Min	Result
mg/kg	Wavelength Dispersive XRF	100	100	Below 100
mg/kg	Wavelength Dispersive XRF	100	100	Below 100

NOTE :  
 01. N/A : Not analyzed (N/A) ;  
 02. mg/kg : ppm ;  
 03. ND : Not detected (ND) ;  
 04. : No regulation ;  
 05. Regs: EU REACH (Annex 17) (EU REACH) & Canada ;  
 06. : EU REACH (Annex 17) (EU REACH) ;  
 07. : EU REACH (Annex 17) (EU REACH) ;  
 08. : EU REACH (Annex 17) (EU REACH) ;  
 09. : EU REACH (Annex 17) (EU REACH) ;  
 10. : EU REACH (Annex 17) (EU REACH) ;  
 11. : EU REACH (Annex 17) (EU REACH) ;  
 12. : EU REACH (Annex 17) (EU REACH) ;  
 13. : EU REACH (Annex 17) (EU REACH) ;  
 14. : EU REACH (Annex 17) (EU REACH) ;  
 15. : EU REACH (Annex 17) (EU REACH) ;  
 16. : EU REACH (Annex 17) (EU REACH) ;  
 17. : EU REACH (Annex 17) (EU REACH) ;  
 18. : EU REACH (Annex 17) (EU REACH) ;  
 19. : EU REACH (Annex 17) (EU REACH) ;  
 20. : EU REACH (Annex 17) (EU REACH) ;  
 21. : EU REACH (Annex 17) (EU REACH) ;  
 22. : EU REACH (Annex 17) (EU REACH) ;  
 23. : EU REACH (Annex 17) (EU REACH) ;  
 24. : EU REACH (Annex 17) (EU REACH) ;  
 25. : EU REACH (Annex 17) (EU REACH) ;  
 26. : EU REACH (Annex 17) (EU REACH) ;  
 27. : EU REACH (Annex 17) (EU REACH) ;  
 28. : EU REACH (Annex 17) (EU REACH) ;  
 29. : EU REACH (Annex 17) (EU REACH) ;  
 30. : EU REACH (Annex 17) (EU REACH) ;  
 31. : EU REACH (Annex 17) (EU REACH) ;  
 32. : EU REACH (Annex 17) (EU REACH) ;  
 33. : EU REACH (Annex 17) (EU REACH) ;  
 34. : EU REACH (Annex 17) (EU REACH) ;  
 35. : EU REACH (Annex 17) (EU REACH) ;  
 36. : EU REACH (Annex 17) (EU REACH) ;  
 37. : EU REACH (Annex 17) (EU REACH) ;  
 38. : EU REACH (Annex 17) (EU REACH) ;  
 39. : EU REACH (Annex 17) (EU REACH) ;  
 40. : EU REACH (Annex 17) (EU REACH) ;  
 41. : EU REACH (Annex 17) (EU REACH) ;  
 42. : EU REACH (Annex 17) (EU REACH) ;  
 43. : EU REACH (Annex 17) (EU REACH) ;  
 44. : EU REACH (Annex 17) (EU REACH) ;  
 45. : EU REACH (Annex 17) (EU REACH) ;  
 46. : EU REACH (Annex 17) (EU REACH) ;  
 47. : EU REACH (Annex 17) (EU REACH) ;  
 48. : EU REACH (Annex 17) (EU REACH) ;  
 49. : EU REACH (Annex 17) (EU REACH) ;  
 50. : EU REACH (Annex 17) (EU REACH) ;

This document is issued by the Company subject to its General Conditions of Service (printed overleaf, available on request or accessible at: [www.sgsltd.com/sgs](http://www.sgsltd.com/sgs)) and its RoHS/Electronic (RoHS) Documents, subject to its Terms and Conditions for RoHS/Electronic Documents, at: [www.sgsltd.com/sgs/rohs\\_electronic\\_documents](http://www.sgsltd.com/sgs/rohs_electronic_documents).  
 Knowledge is transferable (in the absence of liability, indemnification and jurisdiction issues) based on the actual content of this document. It is advised that information obtained hereby may not constitute a warranty or the basis for any other claim or action. The Company is not responsible for any third party's use of this document, and the document shall not be used in any transaction, from whatever source, without the express written consent of the Company. This document cannot be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of the Company. The Company is not responsible for any third party's use of this document, and the document shall not be used in any transaction, from whatever source, without the express written consent of the Company.

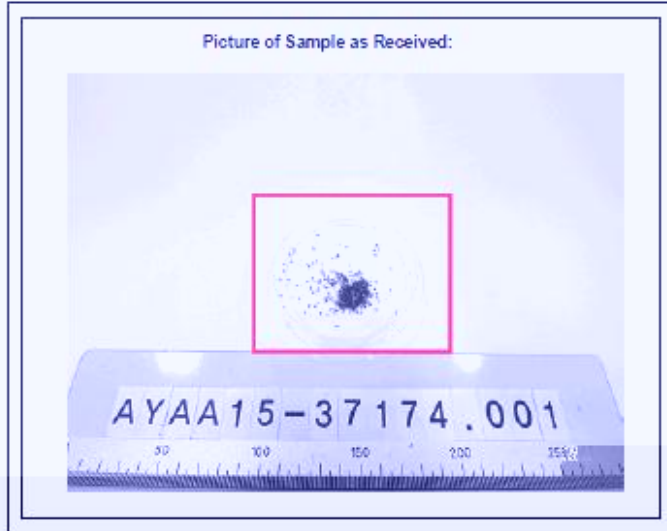


Test Report No. F690101/LF-CTSAYAA15-37174

Issued Date : 2015. 07. 20

Page 4 of 7

Picture of Sample as Received:



This document is issued by the Company subject to its  Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at [http://www.sgs.com/Terms\\_e-document.html](http://www.sgs.com/Terms_e-document.html) / [http://www.sgs.com/terms\\_e-document.html](http://www.sgs.com/terms_e-document.html). Forwarded is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not constitute advice to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, stored in full, without prior written approval of the Company. Any use without approval, beyond the function of the correct use, acceptance of the document is intended and its consequences are accepted by the Client, without prejudice to the Company's liability to the sample(s).

F401 Version2

SGS Korea Co., Ltd.

322, The Gateway, 78, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-000  
T +82 (0)31 4600 000 F +82 (0)31 4600 050 <http://www.sgs.com>

Member of the SGS Group (Société Générale de Surveillance)



Figure 4-4: RESTART-01377-01 (REV.001) Test Flow Chart for ReHS (Cu/Pall./Cr) (BPA9000) Testing (Rev.001) (J-Test)

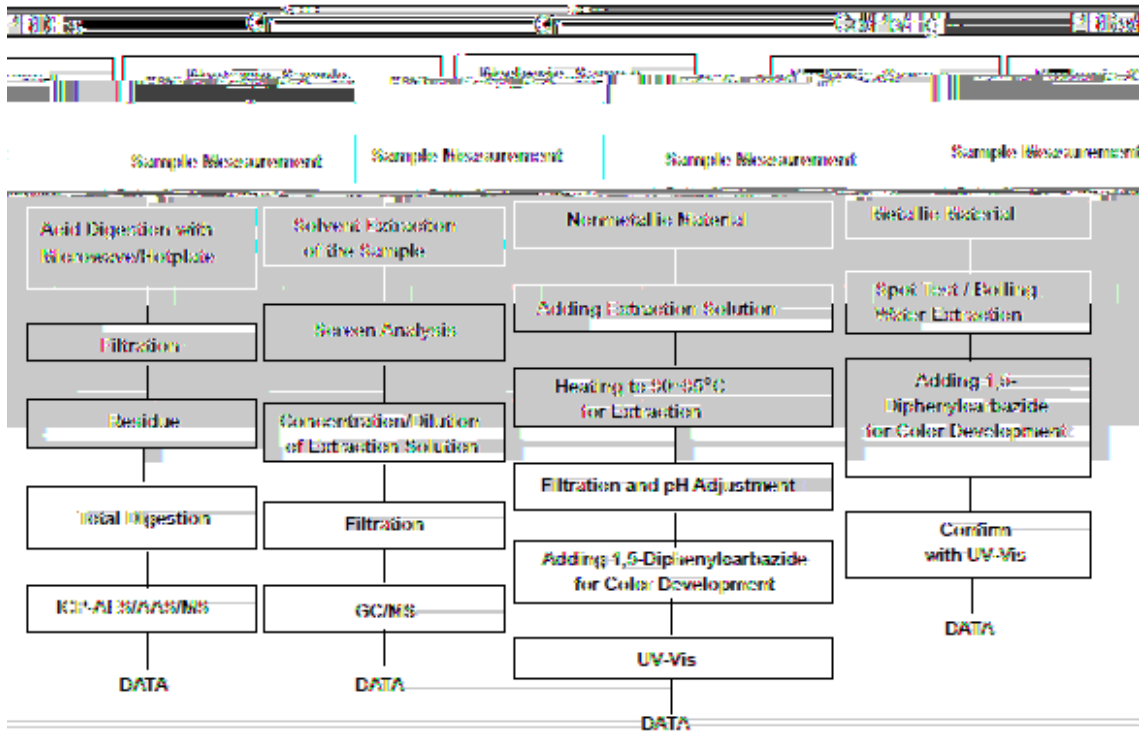


Figure 4-4 (Cont.) (b) (Fig. 4-4) The samples were analyzed totally by pre-conditioning method according to above flow chart Section Chief : Glsao Y.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_e.doc](http://www.sgs.com/terms_e.doc). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's opinion, at the time of its preparation, only and within the limits of Client's instructions. It says, The Company's sole responsibility is to its Client and this document does not constitute any warranty or guarantee. The Client shall remain fully responsible for the accuracy and completeness of the information provided to the Company and for the results obtained from the analysis. The Client shall also be responsible for the accuracy and completeness of the information provided to the Company and for the results obtained from the analysis. The Client shall also be responsible for the accuracy and completeness of the information provided to the Company and for the results obtained from the analysis. The Client shall also be responsible for the accuracy and completeness of the information provided to the Company and for the results obtained from the analysis.

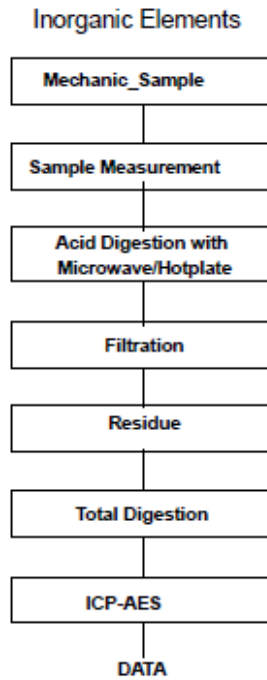


**Test Report** No. F690101/LF-CTSAYAA15-37174

Issued Date : 2015. 07. 20

Page 6 of 7

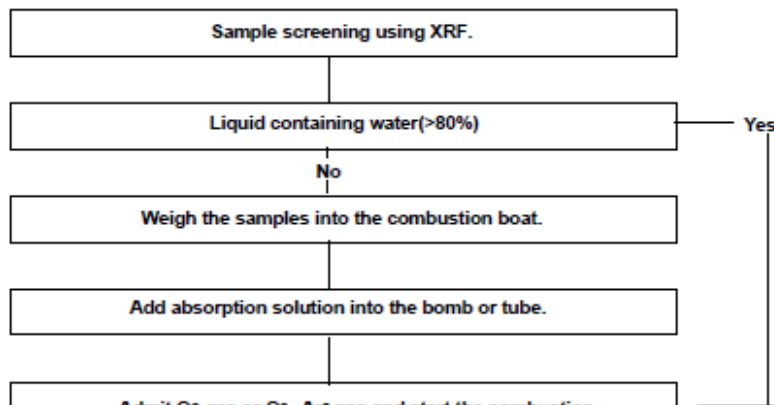
Inorganic Elements



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



Flow Chart for Halogen Test



Test Report

2016.07.29

Legend Data

Flowchart content (partially obscured):

- Sample screening using XRF.
- Liquid containing water(>80%)
  - Yes: Add 0.5ml of water to the combustion
  - No: Weigh the samples into the combustion boat.
- Add absorption solution into the bomb or tube.
- Allow during absorption of the bomb types.
- Analyze absorbed solution using Ion Chromatography.
- Data
- "" End of Report ""

Footer text (partially obscured):

by subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sfd.com/terms-and-conditions.aspx>. This document is issued by the Company and, for electronic format, document liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the information available at the time of printing. Attention is drawn to the limitation of liability and indemnification provisions contained herein. The Company shall not be liable for any loss or damage, including consequential, special, or exemplary damages, arising out of the use of this document. The Company shall not be liable for any loss or damage, including consequential, special, or exemplary damages, arising out of the use of this document. The Company shall not be liable for any loss or damage, including consequential, special, or exemplary damages, arising out of the use of this document.