# SPECIFICATION

## Surface Acoustic Wave Filter

| | |
|---|---|
| USER | |
| USER PART No. | |
| SEMCO PART No. | SFHG42YA002 |
| DOC. No. | SMS-51-L-SFT FX-73 |
| DATE | June 10, 2014 |
| REVISION | Preliminary |

| WISOL | | | | | |
|---|---|---|---|---|---|
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## 1. REVISION HISTORY

| | | | |
|---|---|---|---|
| 000 | June 10, 2014 | All Page | Make specification |

## 2. DEFINITION

2-1. PART No.

**S F H G 4 2 Y A 0 0 2**

① ② ③ ④ ⑤ ⑥

| No. | EXPLANATION |
|---|---|
| ① | SAW Filter |
| ② | Design Type |
| ③ | Center Frequency :1842.5MHz(1805.6 ~ 1879.4) |
| ④ | Input:50ohm,Output:100ohm |
| ⑤ | Package size: 1.1×0.9mm$^2$ |
| ⑥ | Design Revision (02 : Molding Type) |

2-2. APPLICATION : Band-Pass Filter for LTE Band Ⅲ Rx etc (WCDMA Band Ⅲ)

## 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

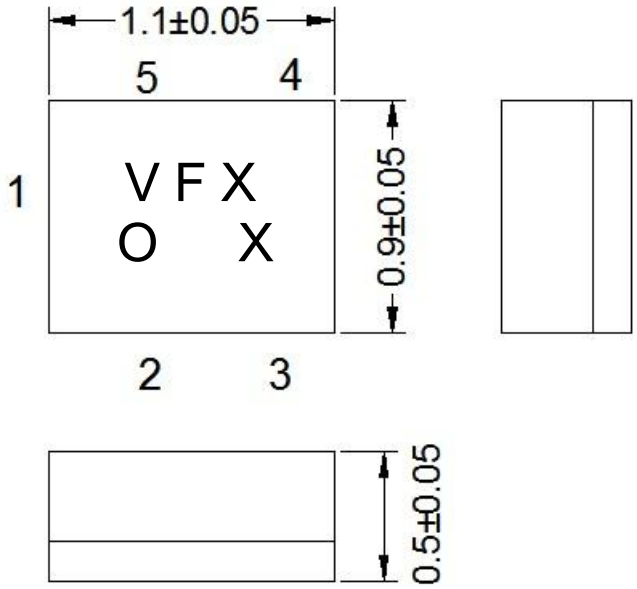
3-5. This is an electrostatic sensitive device.
Please avoid static voltage during operation and storage.

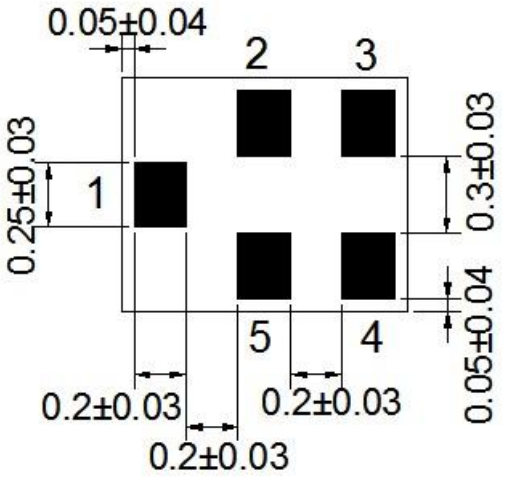
3-6. Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.

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

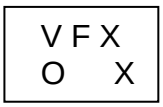
[Unit: mm]




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

## 5. MARKING




5-1. V F X X

- The 1st 2nd character 'VF' indicates the model name of SAW Filter SFHG42YA002.
- 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 | ℃ |

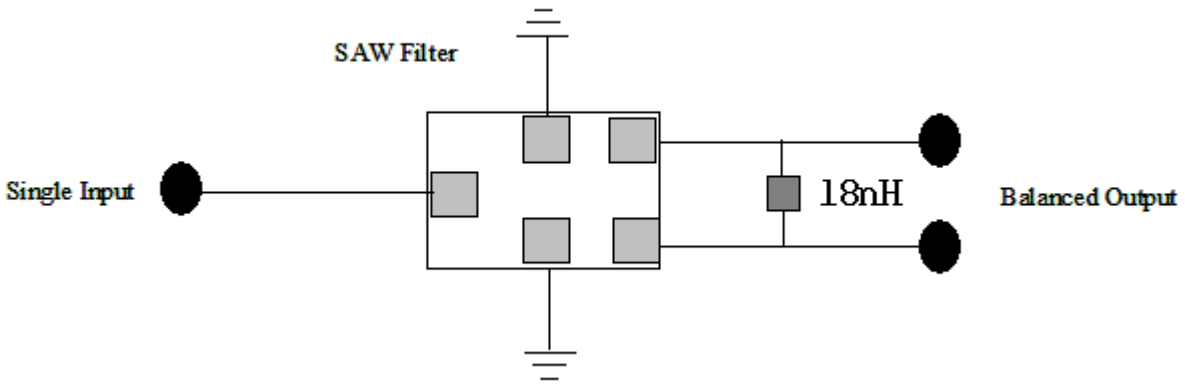
6-2. ELECTRICAL CHARACTERISTICS

6-2-1. TABLE

Ta = －30 ~ +85℃

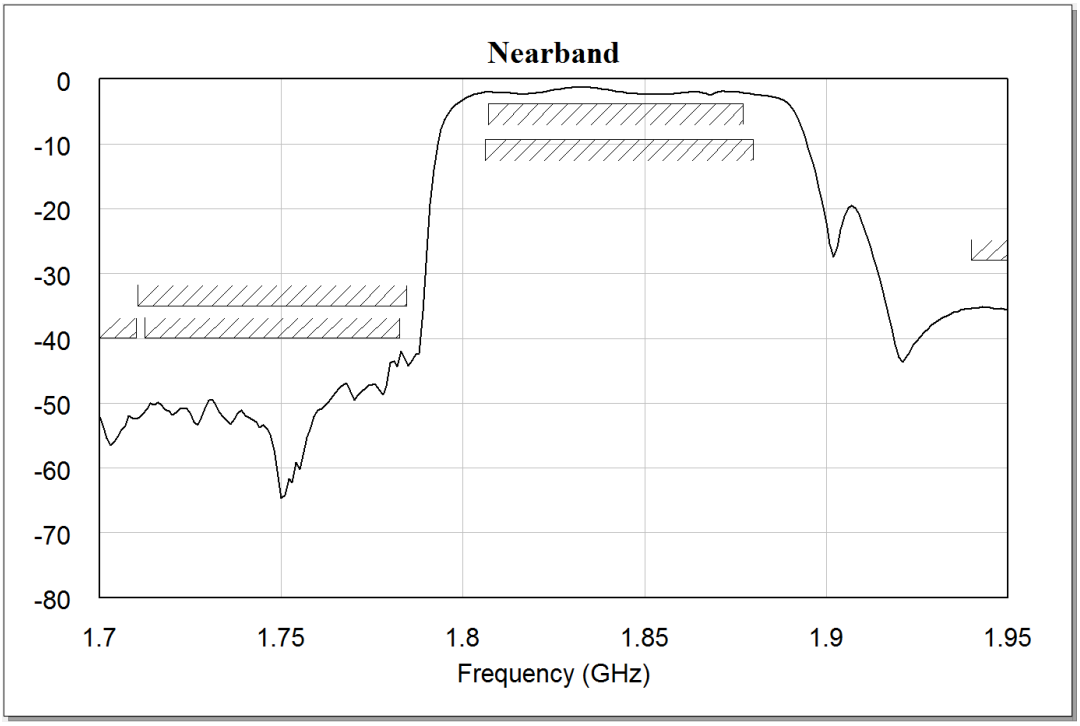
| Item | FREQUENCY RANGE [MHz] | UNIT | SPECIFICATION | | |
|---|---|---|---|---|---|
| | | | Min. | Typ. (25℃) | Max. |
| Insertion Loss | 1805.6 ~ 1879.4<br>1807.4 ~ 1877.6 | dB | -<br>- | 2.1<br>2.1 | 3.8<br>3.3 |
| Inband Ripple | 1805.6 ~ 1879.4<br>1807.4 ~ 1877.6 | dB | -<br>- | 0.7<br>0.7 | 2.6<br>2.1 |
| Input VSWR | 1805.6 ~ 1879.4 | - | - | 2.1 | 2.4 |
| Output VSWR | 1805.6 ~ 1879.4 | - | - | 2.0 | 2.4 |
| Absolute Attenuation | DC ~ 1710 | dB | 40 | 46 | - |
| | 1710.6 ~ 1784.4<br>1712.4~ 1782.6 | dB | 35<br>40 | 46<br>46 | -<br>- |
| | 1940 ~ 2400 | dB | 28 | 34 | - |
| | 2400 ~ 2500 | dB | 40 | 50 | - |
| | 2500 ~ 6000 | dB | 38 | 48 | - |
| Termination Impedance | | Input: Unbalanced 50 ohm<br>Output: Balanced 100 ohm // 18nH | | | |

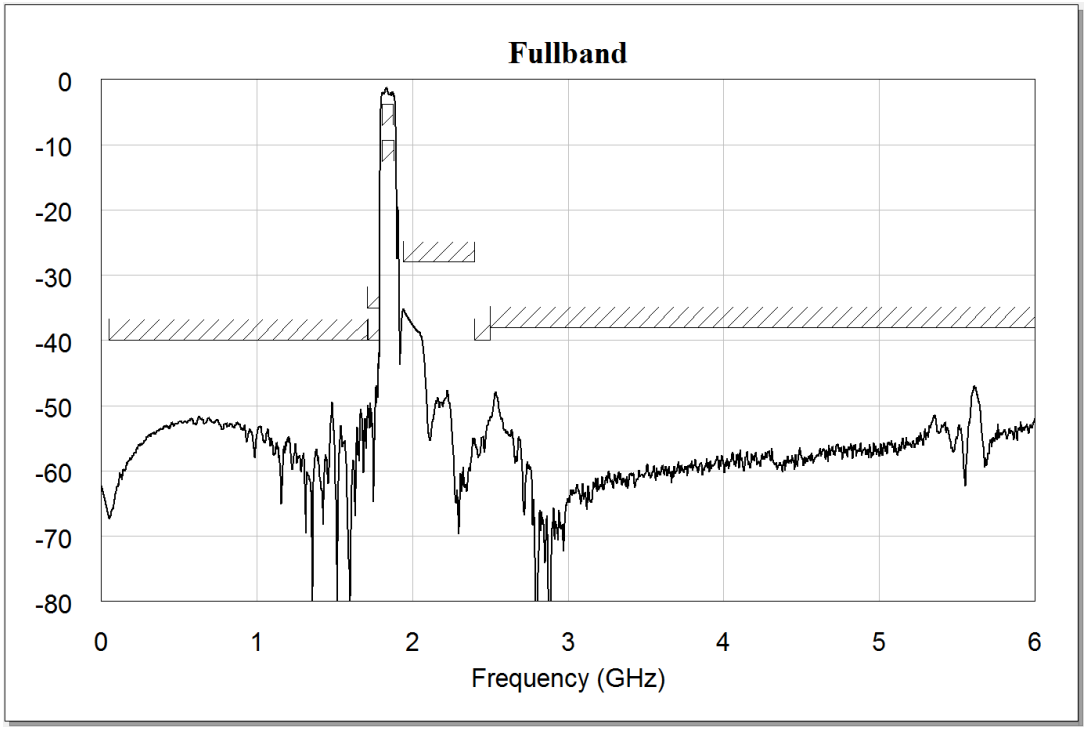
6-2-2. TEST FIXTURE




[X–Ray Top View]

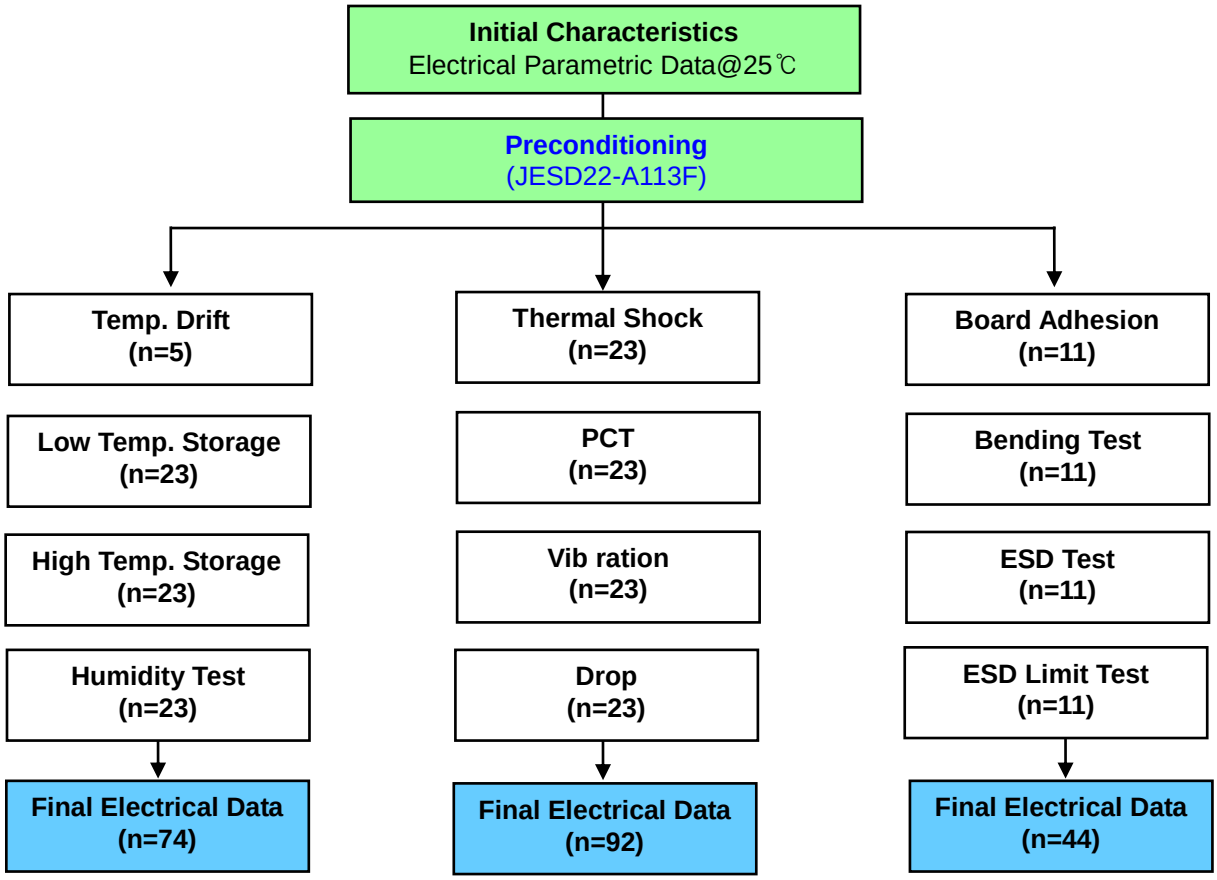
6-2-3. GRAPH



## 7. RELIABILITY

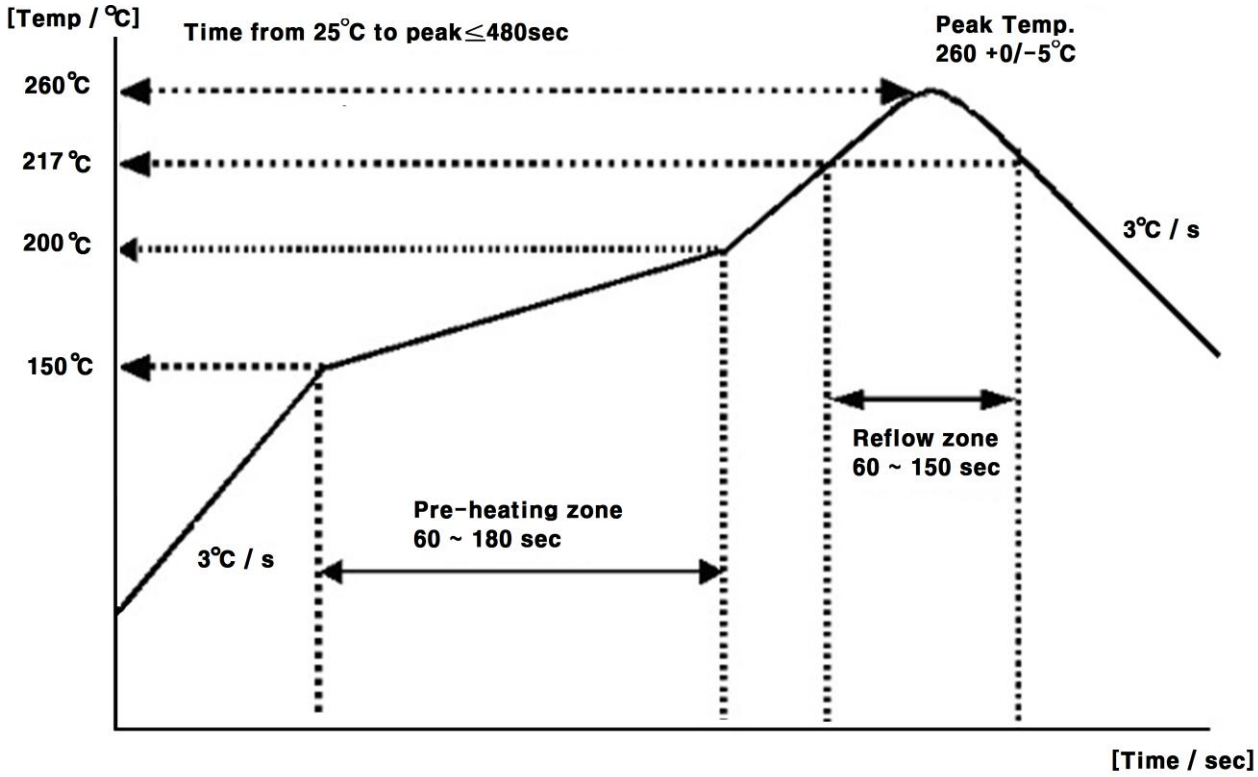
7-1. ENGINEERING SAMPLE FLOW CHART



7-2. TEST ITEM & CONDITION

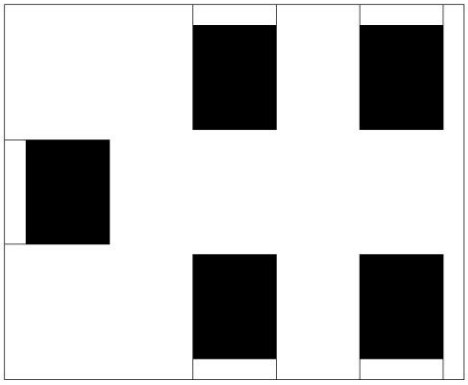
| CATEGORY | TEST ITEM | TEST CONDITION | REMARK |
|---|---|---|---|
| Preconditioning | | +125℃ 24hr Baking → +60℃ 60%RH 120hr → Reflow Test(3times) | JESD22A113F |
| Environment Test | Temp. Drift | -30℃ → +25℃→ +85℃ | description |
| | High Temp. Storage | +85℃ 240hr | JESD22-A103C |
| | Low Temp. 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<br>-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

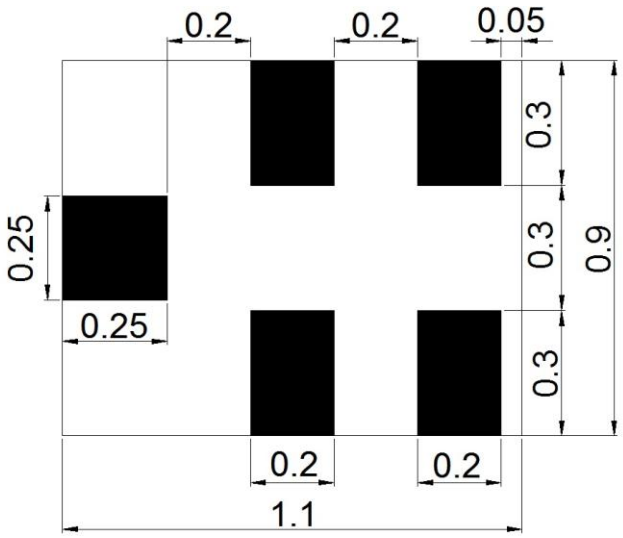



## 9. RECOMMENDED PCB DIMENSIONS

[unit : mm]



[SAW, X-ray Top view]




[PCB, X-ray Top view]

## 10. CAUTION

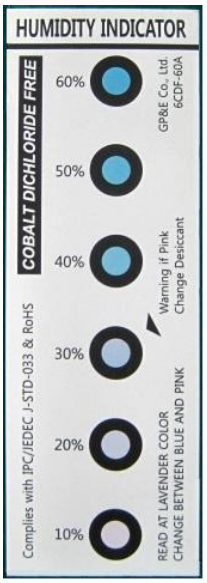
Moisture Sensitivity Device Caution (MSL LEVEL=2a)

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)

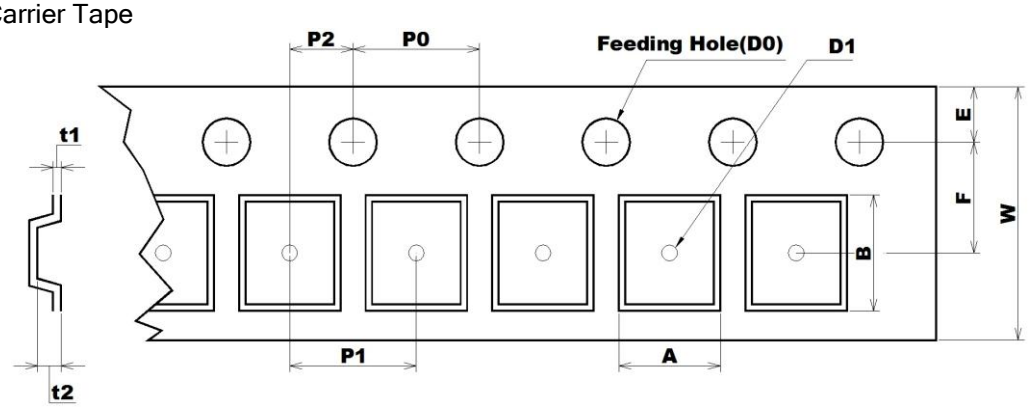



10 to 60% RH

## 11. PACKING

### 11-1. DIMENSIONS

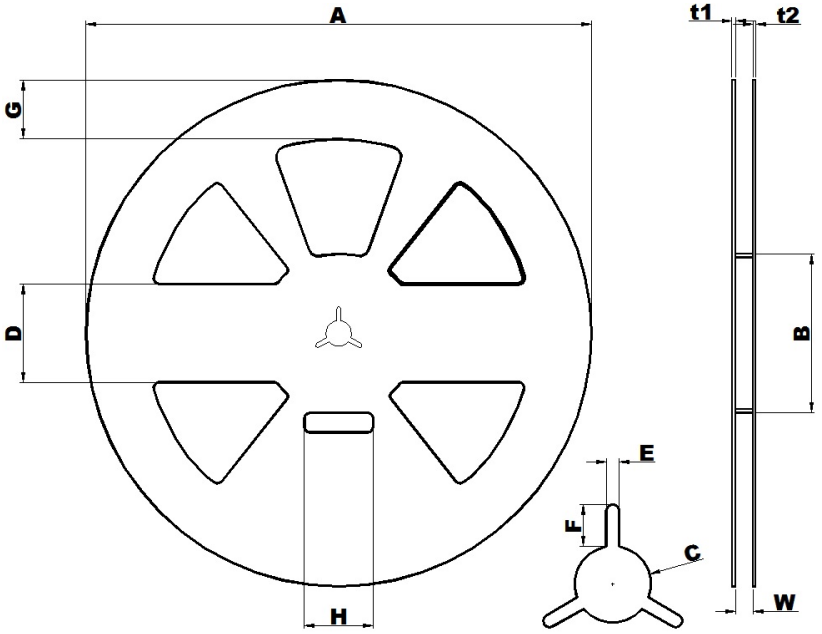
- Carrier Tape




[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 − 0.00 | 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]

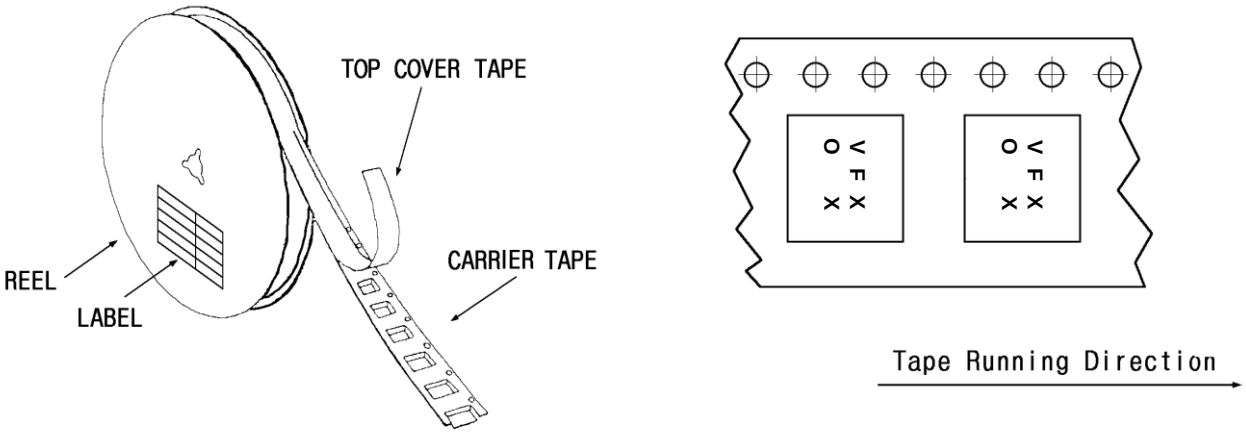
| A | B | C | D | E | F | G | H | t1 | t2 | W |
|---|---|---|---|---|---|---|---|---|---|---|
| Ø258.0 +1.0 -0.5 | Ø81.0 +1.0 -1.0 | Ø13.0 +0.5 -0.5 | 50.0 +0.8 -0.8 | 2.2 +0.3 -0.3 | 7.0 +0.5 -0.5 | 30.0 +0.8 -0.8 | 35.0 +1.0 -1.0 | 1.8 +0.5 -0.5 | 1.5 +0.5 -0.5 | 9.0 +1.0 -0.5 |

- 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

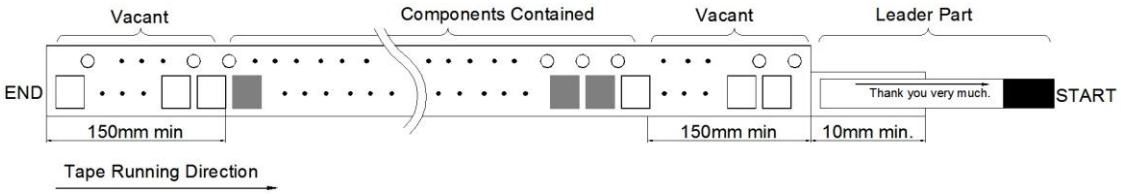
11-3-1. The tape shall be wound around the reel in direction shown below.




11-3-2. BAR CODE LABEL

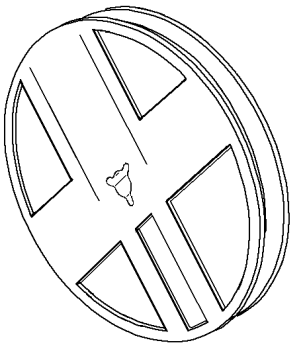

| | | |
|---|---|---|
| ① | | MODEL NAME BARCODE |
| ② | SFH836AQ101 | Model Name |
| ③ | RLYC12563 | Reel number |
| ④ | 8,000 / qAFYU | Quantity / Marking |

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

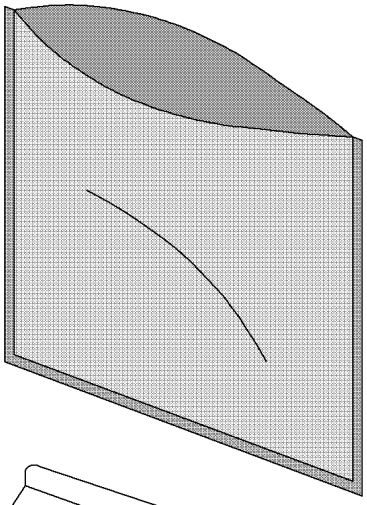



11-4. INNER BOX(Reel Packing) STRUCTURE

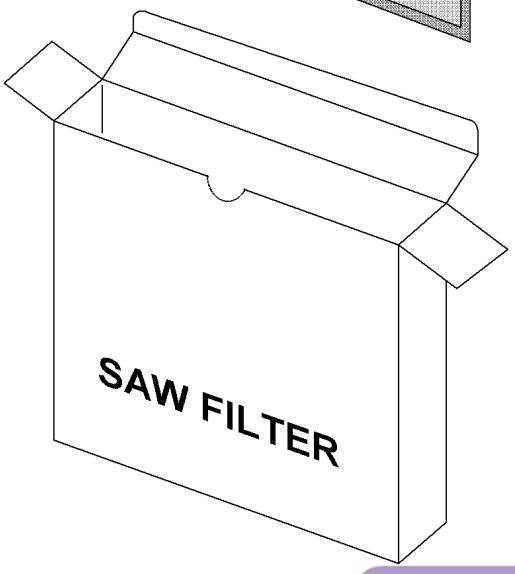
Material: Polycarbonate



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



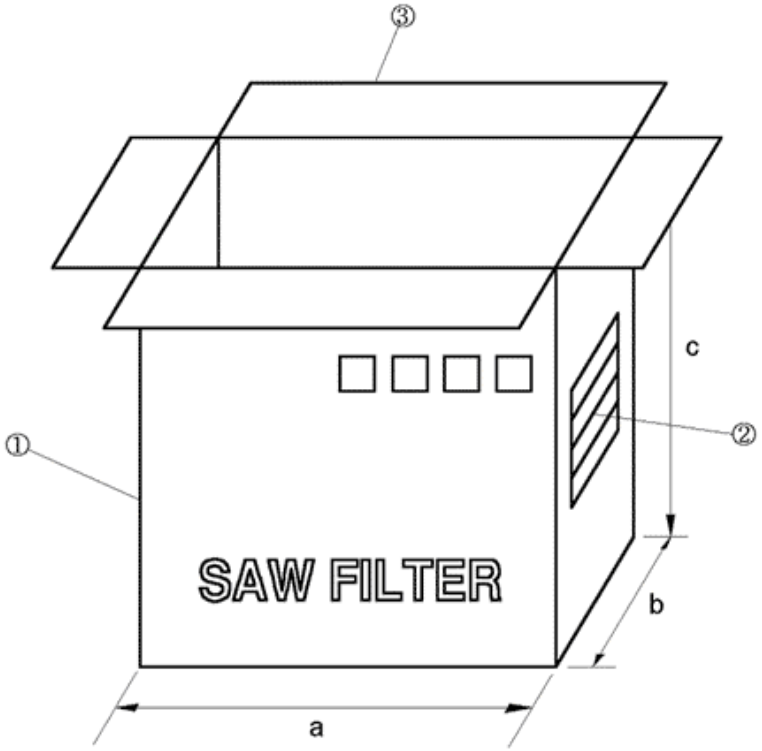
Material : Paper
Size: (D)260×(W)37×(H)265mm$^3$



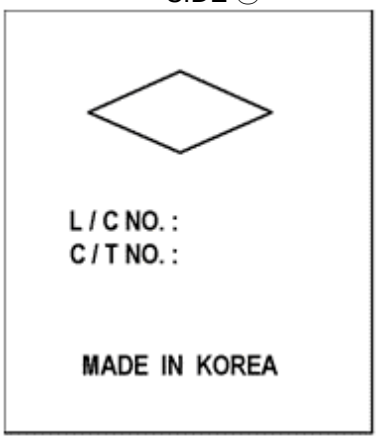
11-5. OUTER BOX STRUCTURE

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 | . . |

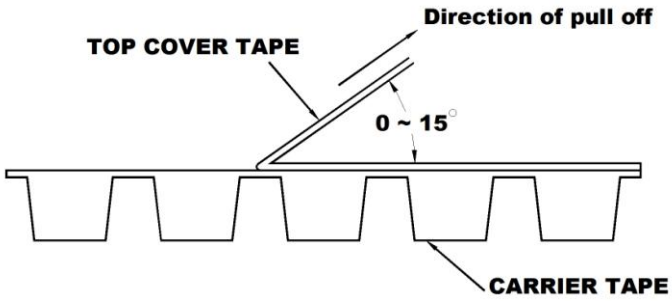
- SIDE is the same as front side.

## 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

**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.



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Member of the SGS Group (Société Générale de Surveillance)

F052 Version5

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:


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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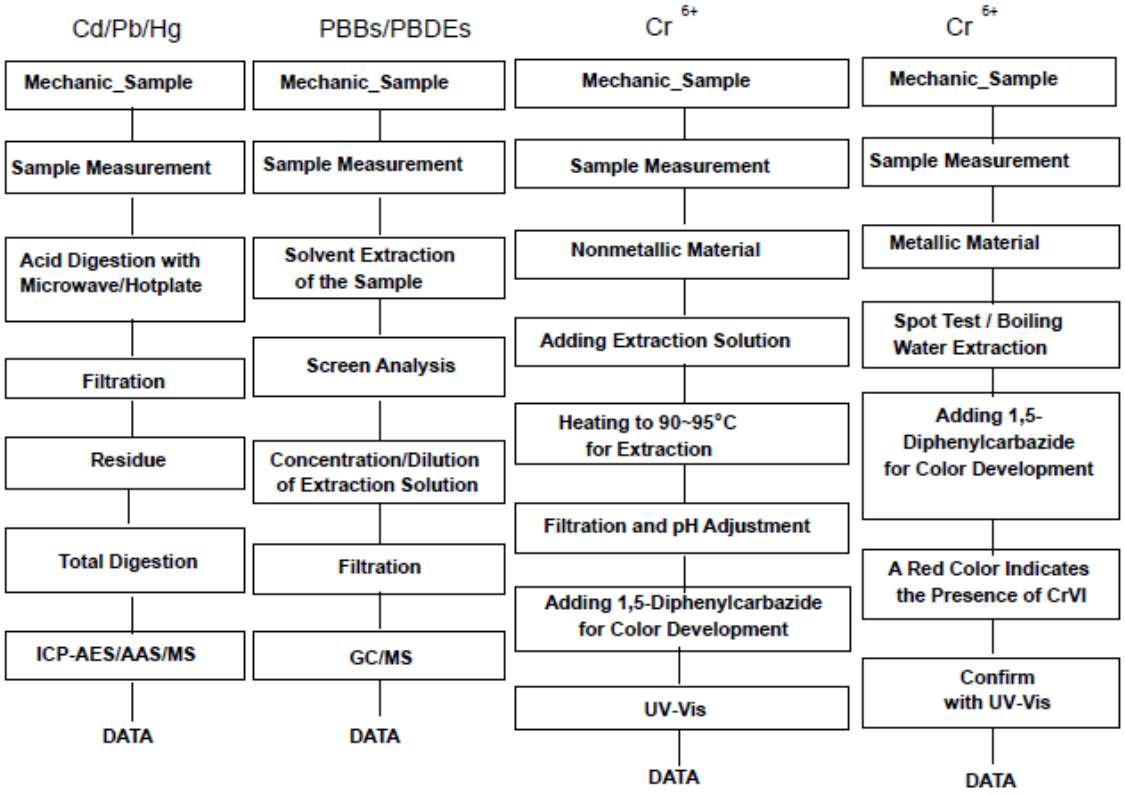
**Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr$^{6+}$ /PBBs&PBDEs Testing**




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)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
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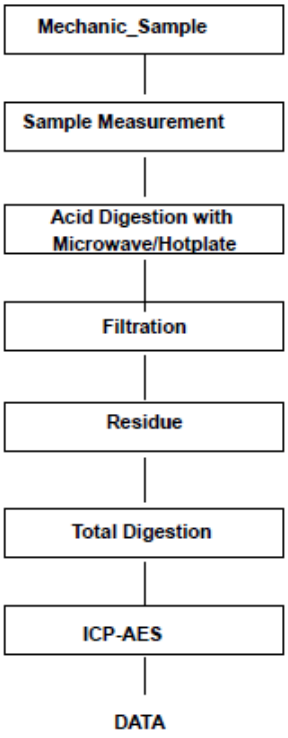
## Flow Chart for Inorganic Elements Testing

Inorganic Elements




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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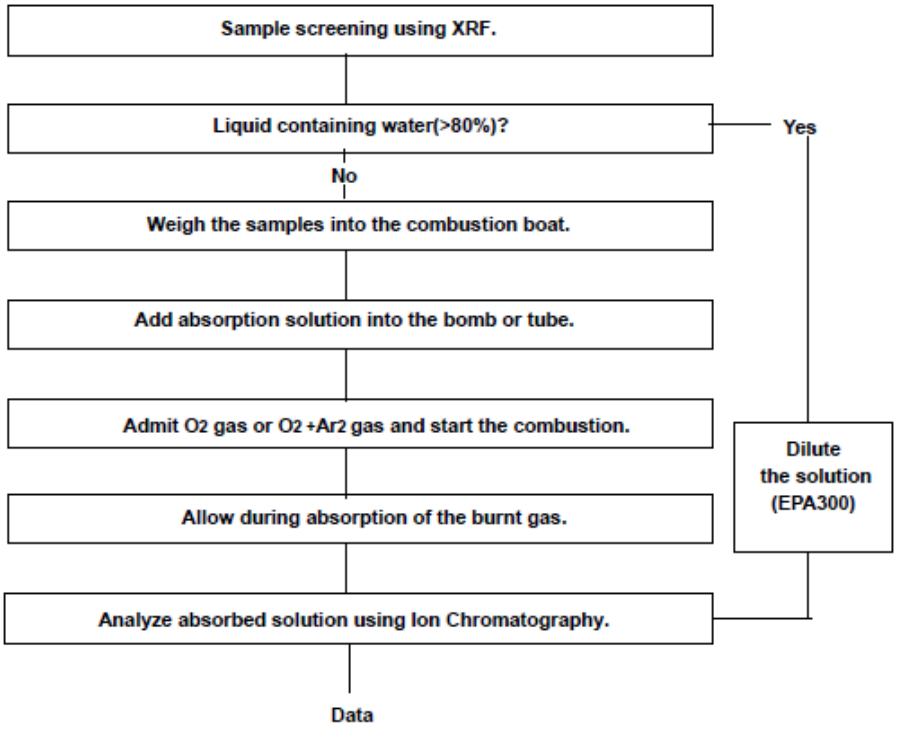
## Flow Chart for Halogen Test




*** 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
(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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