

High Current Ferrite Chip Bead(Lead Free)

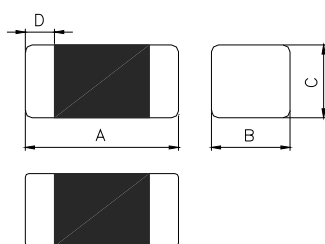
HCB3216KF-Series

1.Features

1. Monolithic inorganic material construction.
2. Closed magnetic circuit avoids crosstalk.
3. Suitable for reflow soldering.
4. Shapes and dimensions follow E.I.A. spec.
5. Available in various sizes.
6. Excellent solder ability and heat resistance.
7. High reliability.
8. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
9. Low DC resistance structure of electrode to prevent wasteful electric power consumption.



2.Dimensions



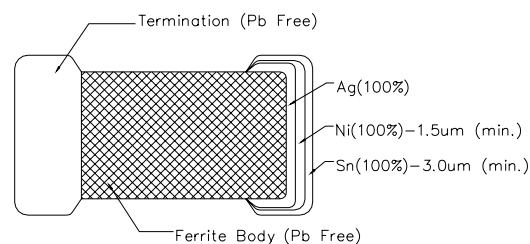
| Chip Size | |
|-----------|-----------|
| A | 3.20±0.20 |
| B | 1.60±0.20 |
| C | 1.10±0.20 |
| D | 0.50±0.30 |

Units: mm

3.Part Numbering



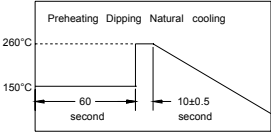
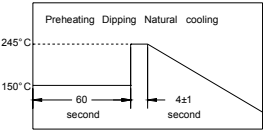
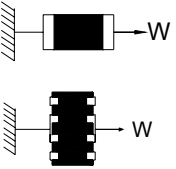
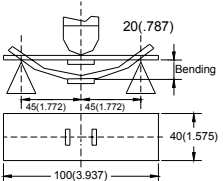
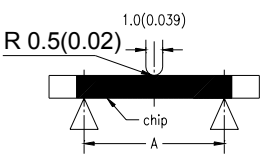
A: Series
 B: Dimension L x W
 C: Material Lead Free Material
 D: Impedance 300=30
 E: Packaging T=Taping and Reel, B=Bulk(Bags)
 F: Rated Current 30=3000mA



4.Specification

| Tai-Tech Part Number | Impedance () | Test Frequency (MHz) | DC Resistance () max. | Rated Current (mA) max. |
|----------------------|---------------|----------------------|------------------------|-------------------------|
| HCB3216KF-300T30 | 30±25% | 100 | 0.04 | 3000 |
| HCB3216KF-500T30 | 50±25% | 100 | 0.04 | 3000 |
| HCB3216KF-800T30 | 80±25% | 100 | 0.04 | 3000 |
| HCB3216KF-121T20 | 120±25% | 100 | 0.10 | 2000 |
| HCB3216KF-151T20 | 150±25% | 100 | 0.10 | 2000 |
| HCB3216KF-301T10 | 300±25% | 100 | 0.20 | 1000 |
| HCB3216KF-471T10 | 470±25% | 100 | 0.20 | 1000 |
| HCB3216KF-501T30 | 500±25% | 100 | 0.04 | 3000 |
| HCB3216KF-601T20 | 600±25% | 100 | 0.10 | 2000 |

5. Reliability and Test Condition

| Item | Performance | | | | | | | | | | Test Condition | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|---|-------|-----|-----|-----|--|-----|-----|-----|-----|---|------|------------|-------|------|-------------|-----|------|-------------|-----|---------|-------------|-----|------|-------------|-----|------|-------------|-----|------|-------------|-----|------|-------------|-----|
| | FCB | FCM | HCB | GHB | FCA | FCI | FHI | FCH | HCI | MGI | | | | | | | | | | | | | | | | | | | | | | | | | |
| Series No. | | | | | | | | | | | -- | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Temperature | -40~+125 (Including self-temperature rise) | | | | | -40~+105 (Including self-temperature rise) | | | | | -- | | | | | | | | | | | | | | | | | | | | | | | | |
| Transportation Storage Temperature | -40~+125 | | | | | -40~+105 | | | | | For long storage conditions, please see the Application Notice | | | | | | | | | | | | | | | | | | | | | | | | |
| Impedance (Z) | Refer to standard electrical characteristics list | | | | | | | | | | Agilent4291 | | | | | | | | | | | | | | | | | | | | | | | | |
| Inductance (Ls) | | | | | | | | | | | Agilent E4991 | | | | | | | | | | | | | | | | | | | | | | | | |
| Q Factor | | | | | | | | | | | Agilent4287 | | | | | | | | | | | | | | | | | | | | | | | | |
| DC Resistance | | | | | | | | | | | Agilent16192 | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Current | | | | | | | | | | | Agilent 4338 | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature Rise Test | Rated Current < 1A ΔT 20 Max Rated Current 1A ΔT 40 Max | | | | | | | | | | 1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer. | | | | | | | | | | | | | | | | | | | | | | | | |
| Solder heat Resistance | Appearance: No significant abnormality. Impedance change: Within ± 30%. Inductance change: : within±10% | | | | | No mechanical damage. Remaining terminal electrode:75% min. | | | | | Preheat: 150 ,60sec. Solder: Sn-Cu0.5 Solder temperature: 260±5 Flux for lead free: ROL0 Dip time: 10±0.5sec.  | | | | | | | | | | | | | | | | | | | | | | | | |
| Solderability | More than 95% of the terminal electrode should be covered with solder. | | | | |  | | | | | Preheat: 150 ,60sec. Solder: Sn-Cu0.5 Solder temperature: 245±5 Flux for lead free: ROL0 Dip time: 4±1sec. | | | | | | | | | | | | | | | | | | | | | | | | |
| Terminal strength | The terminal electrode and the dielectric must not be damaged by the forces applied on the right conditions. | | | | |  | | | | | For FCB FCM HCB GHB FCI FHI FCH HCI MGI: Size Force (Kgf) Time(sec) 1005 0.2 1608 0.5 2012 0.6 3216 1.0 >30 3225 1.0 4516 1.0 4532 1.5 For FCA: Size Force (Kgf) Time(sec) 3216 0.5 >30 | | | | | | | | | | | | | | | | | | | | | | | | |
| Flexure strength | The terminal electrode and the dielectric must not be damaged by the forces applied on the right conditions. | | | | |  | | | | | Solder a chip on a test substrate, bend the substrate by 2mm (0.079in)and return. The duration of the applied forces shall be 60 (+ 5) Sec. | | | | | | | | | | | | | | | | | | | | | | | | |
| Bending Strength | The ferrite should not be damaged by Forces applied on the right condition. | | | | |  | | | | | <table border="1"> <thead> <tr> <th>Size</th> <th>mm(inches)</th> <th>P-Kgf</th> </tr> </thead> <tbody> <tr> <td>1608</td> <td>0.80(0.033)</td> <td>0.3</td> </tr> <tr> <td>2012</td> <td>1.40(0.055)</td> <td>1.0</td> </tr> <tr> <td>FCA3216</td> <td>2.00(0.079)</td> <td>1.5</td> </tr> <tr> <td>3216</td> <td>2.00(0.079)</td> <td>2.5</td> </tr> <tr> <td>3225</td> <td>2.00(0.079)</td> <td>2.5</td> </tr> <tr> <td>4516</td> <td>2.70(0.106)</td> <td>2.5</td> </tr> <tr> <td>4532</td> <td>2.70(0.106)</td> <td>2.5</td> </tr> </tbody> </table> | Size | mm(inches) | P-Kgf | 1608 | 0.80(0.033) | 0.3 | 2012 | 1.40(0.055) | 1.0 | FCA3216 | 2.00(0.079) | 1.5 | 3216 | 2.00(0.079) | 2.5 | 3225 | 2.00(0.079) | 2.5 | 4516 | 2.70(0.106) | 2.5 | 4532 | 2.70(0.106) | 2.5 |
| Size | mm(inches) | P-Kgf | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1608 | 0.80(0.033) | 0.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2012 | 1.40(0.055) | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCA3216 | 2.00(0.079) | 1.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 4516 | 2.70(0.106) | 2.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4532 | 2.70(0.106) | 2.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Random Vibration Test | Appearance: Cracking, chipping and any other defects harmful to the characteristics should not be allowed. Impedance: within±30% Inductance change: : within±10%. | | | | | | | | | | Frequency: 10-55-10Hz for 15 min. Amplitude: 1.52mm Directions and times: X, Y, Z directions for 15 min.. This cycle shall be performed 12 times in each of three mutually perpendicular directions (Total 9hours). | | | | | | | | | | | | | | | | | | | | | | | | |

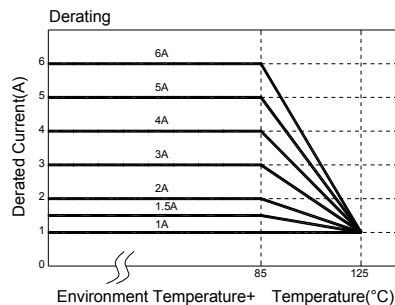
| Item | Performance | Test Condition |
|----------------------------------|---|--|
| Life testing at High Temperature | Appearance: no damage. | Temperature: 125±2 (bead), 85±2 (inductor) Applied current: rated current. Duration: 1000±12hrs. Measured at room temperature after placing for 2 to 3hrs. |
| Humidity | Impedance: within±30%of initial value. Inductance: within±10%of initial value. Q: within±30%of initial value. (FCI FHI FCH) Q: within±20%of initial value. (HCI MGI) | Humidity: 90~95%RH. Temperature: 40±2 . Temperature: 60±2 .(HCI MGI) Duration: 504±8hrs. Measured at room temperature after placing for 2 to 3hrs. |
| Thermal shock | Appearance: no damage. Impedance: within±30%of initial value. Inductance: within±10%of initial value. Q: within±30%of initial value. (FCI FHI FCH) Q: within±20%of initial value. (HCI MGI) | Condition for 1 cycle Step1: -40±2 30±5 min. Step2: +105±2 30±5min. Number of cycles: 500 Measured at room temperature after placing for 2 to 3 hrs. |
| Low temperature storage test | Q: within±20%of initial value. (HCI MGI) | Temperature: -40±2 . Duration: 500±8hrs. Measured at room temperature after placing for 2 to 3hrs. |
| Drop | No mechanical damage Impedance change: ±30% Inductance change: : within±10% | Drop 10 times on a concrete floor from a height of 75cm |

| Phase | Temperature() | Time(min.) |
|-------|----------------|------------|
| 1 | -40±2 | 30±5 |
| 2 | room temp. | 0.5 |
| 3 | +105±2 | 30±5 |

Measured: 500 times

****Derating Curve**

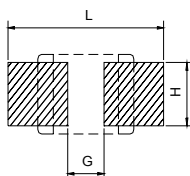
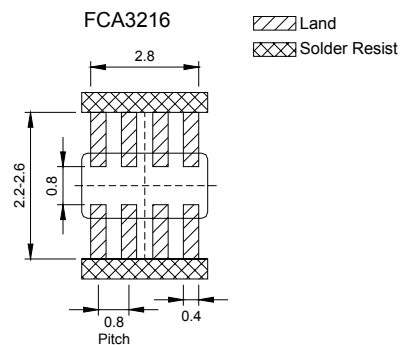
For the ferrite chip bead which withstanding current over 1.5A, as the operating temperature over 85 , the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.



6.Soldering and Mounting

6-1. Recommended PC Board Pattern

| Chip Size | | | | | Land Patterns For Reflow Soldering | | | |
|-----------|------|----------|-----------|-----------|------------------------------------|-------|-------|-------|
| Series | Type | A(mm) | B(mm) | C(mm) | D(mm) | L(mm) | G(mm) | H(mm) |
| FCB | 0603 | 0.6±0.03 | 0.30±0.03 | 0.30±0.03 | 0.15±0.05 | 0.80 | 0.30 | 0.30 |
| FCM | 1005 | 1.0±0.10 | 0.50±0.10 | 0.50±0.10 | 0.25±0.10 | 1.50 | 0.40 | 0.55 |
| HCB | 1608 | 1.6±0.15 | 0.80±0.15 | 0.80±0.15 | 0.30±0.20 | 2.60 | 0.60 | 0.80 |
| GHB | 2012 | 2.0±0.20 | 1.25±0.20 | 0.85±0.20 | 0.50±0.30 | 3.00 | 1.00 | 1.00 |
| | | 2.0±0.20 | 1.25±0.20 | 1.25±0.20 | 0.50±0.30 | | | |
| FHI | 3216 | 3.2±0.20 | 1.60±0.20 | 1.10±0.20 | 0.50±0.30 | 4.40 | 2.20 | 1.40 |
| FCH | 3225 | 3.2±0.20 | 2.50±0.20 | 1.30±0.20 | 0.50±0.30 | 4.40 | 2.20 | 3.40 |
| HCI | 4516 | 4.5±0.20 | 1.60±0.20 | 1.60±0.20 | 0.50±0.30 | 5.70 | 2.70 | 1.40 |
| MGI | 4532 | 4.5±0.20 | 3.20±0.20 | 1.50±0.20 | 0.50±0.30 | 5.90 | 2.57 | 4.22 |



PC board should be designed so that products can prevent damage from mechanical stress when warping the board. Products shall be positioned in the sideway direction against the mechanical stress to prevent failure.

6-2. Soldering

Mildly activated rosin fluxes are preferred. The terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

Note.

If wave soldering is used, there will be some risk.

Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

6-2.1 Lead Free Solder re-flow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1.

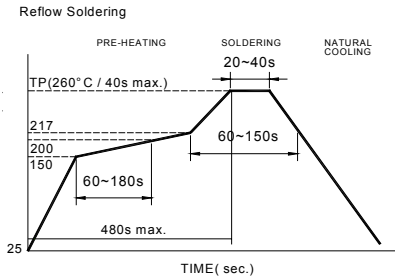
6-2.2 Soldering Iron:

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended. for Iron Soldering in Figure 2.

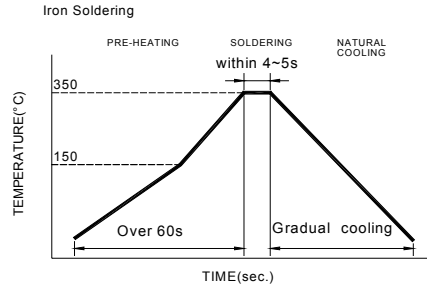
Preheat circuit and products to 150
350 tip temperature (max)

Never contact the ceramic with the iron tip
1.0mm tip diameter (max)

Use a 20 watt soldering iron with tip diameter of 1.0mm
Limit soldering time to 4-5sec.



Reflow times: 3 times max
Fig.1

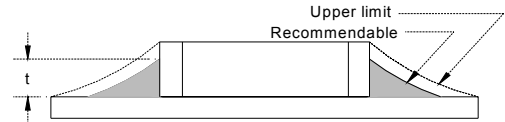


Iron Soldering times : 1 times max
Fig.2

6-2.3 Solder Volume:

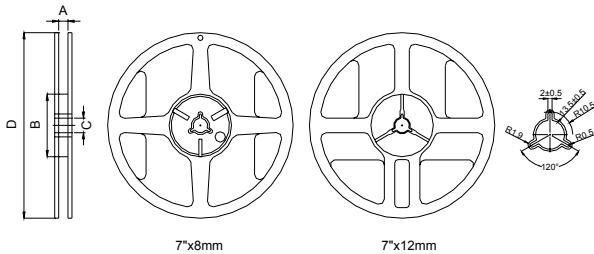
Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:

Minimum fillet height = soldering thickness + 25% product height



7.Packaging Information

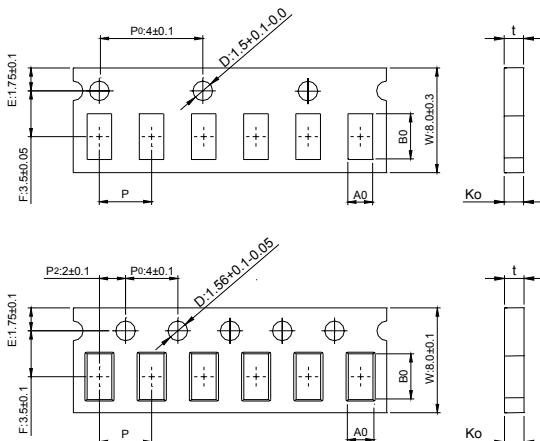
7-1. Reel Dimension



| Type | A(mm) | B(mm) | C(mm) | D(mm) |
|---------|----------|-------|----------|-------|
| 7"x8mm | 9.0±0.5 | 60±2 | 13.5±0.5 | 178±2 |
| 7"x12mm | 13.5±0.5 | 60±2 | 13.5±0.5 | 178±2 |

7-2.1 Tape Dimension / 8mm

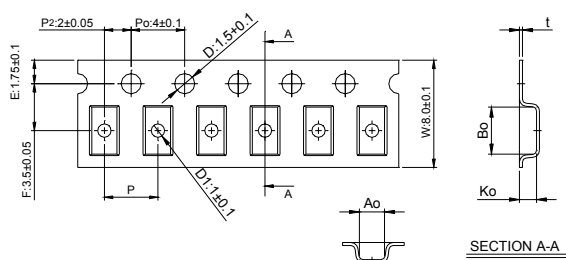
Material of taping is paper



| Size | Bo(mm) | Ao(mm) | Ko(mm) | P(mm) | t(mm) | D1(mm) |
|--------|-----------|-----------|---------|----------|---------|--------|
| 060303 | 0.68±0.05 | 0.38±0.05 | 0.50max | 2.0±0.05 | 0.50max | none |

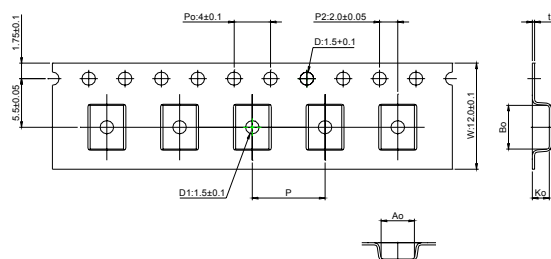
| Size | Bo(mm) | Ao(mm) | Ko(mm) | P(mm) | t(mm) | D1(mm) |
|--------|-----------|-----------|-----------|----------|-----------|--------|
| 100505 | 1.12±0.03 | 0.62±0.03 | 0.60±0.03 | 2.0±0.10 | 0.60±0.03 | none |
| 160808 | 1.85±0.05 | 1.05±0.05 | 0.95±0.05 | 4.0±0.10 | 0.95±0.05 | none |
| 201209 | 2.30±0.05 | 1.50±0.05 | 0.95±0.05 | 4.0±0.10 | 0.95±0.05 | none |

Material of taping is plastic



| Size | Bo(mm) | Ao(mm) | Ko(mm) | P(mm) | t(mm) | D1(mm) |
|--------|-----------|-----------|-----------|----------|-----------|----------|
| 160808 | 1.95±0.10 | 1.05±0.10 | 1.05±0.10 | 4.0±0.10 | 0.23±0.05 | none |
| 201209 | 2.25±0.10 | 1.42±0.10 | 1.04±0.10 | 4.0±0.10 | 0.22±0.05 | 1.0±0.10 |
| 201212 | 2.35±0.10 | 1.50±0.10 | 1.45±0.10 | 4.0±0.10 | 0.22±0.05 | 1.0±0.10 |
| 321611 | 3.50±0.10 | 1.88±0.10 | 1.27±0.10 | 4.0±0.10 | 0.22±0.05 | 1.0±0.10 |
| 322513 | 3.42±0.10 | 2.77±0.10 | 1.55±0.10 | 4.0±0.10 | 0.22±0.05 | 1.0±0.10 |
| 321609 | 3.40±0.10 | 1.77±0.10 | 1.04±0.10 | 4.0±0.10 | 0.22±0.05 | 1.0±0.10 |

7-2.2 Tape Dimension / 12mm

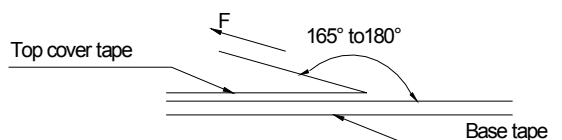


| Size | Bo(mm) | Ao(mm) | Ko(mm) | P(mm) | t(mm) | D1(mm) |
|--------|----------|----------|----------|---------|-----------|---------|
| 451616 | 4.95±0.1 | 1.93±0.1 | 1.93±0.1 | 4.0±0.1 | 0.24±0.05 | 1.5±0.1 |
| 453215 | 4.95±0.1 | 3.66±0.1 | 1.85±0.1 | 8.0±0.1 | 0.24±0.05 | 1.5±0.1 |

7-3. Packaging Quantity

| Chip Size | 453215 | 451616 | 322513 | 321611 | 321609 | 201212 | 201209 | 160808 | 100505 | 060303 |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Chip / Reel | 1000 | 2000 | 2500 | 3000 | 3000 | 2000 | 4000 | 4000 | 10000 | 15000 |
| Inner box | 4000 | 8000 | 12500 | 15000 | 15000 | 10000 | 20000 | 20000 | 50000 | 75000 |
| Middle box | 20000 | 40000 | 62500 | 75000 | 75000 | 50000 | 100000 | 100000 | 250000 | 375000 |
| Carton | 40000 | 80000 | 125000 | 150000 | 150000 | 100000 | 200000 | 200000 | 500000 | 750000 |
| Bulk (Bags) | 12000 | 20000 | 30000 | 50000 | 50000 | 100000 | 150000 | 200000 | 300000 | -- |

7-4. Tearing Off Force



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

| Room Temp. () | Room Humidity (%) | Room atm (hPa) | Tearing Speed mm/min |
|----------------|-------------------|----------------|----------------------|
| 5-35 | 45-85 | 860-1060 | 300 |

Application Notice

Storage Conditions

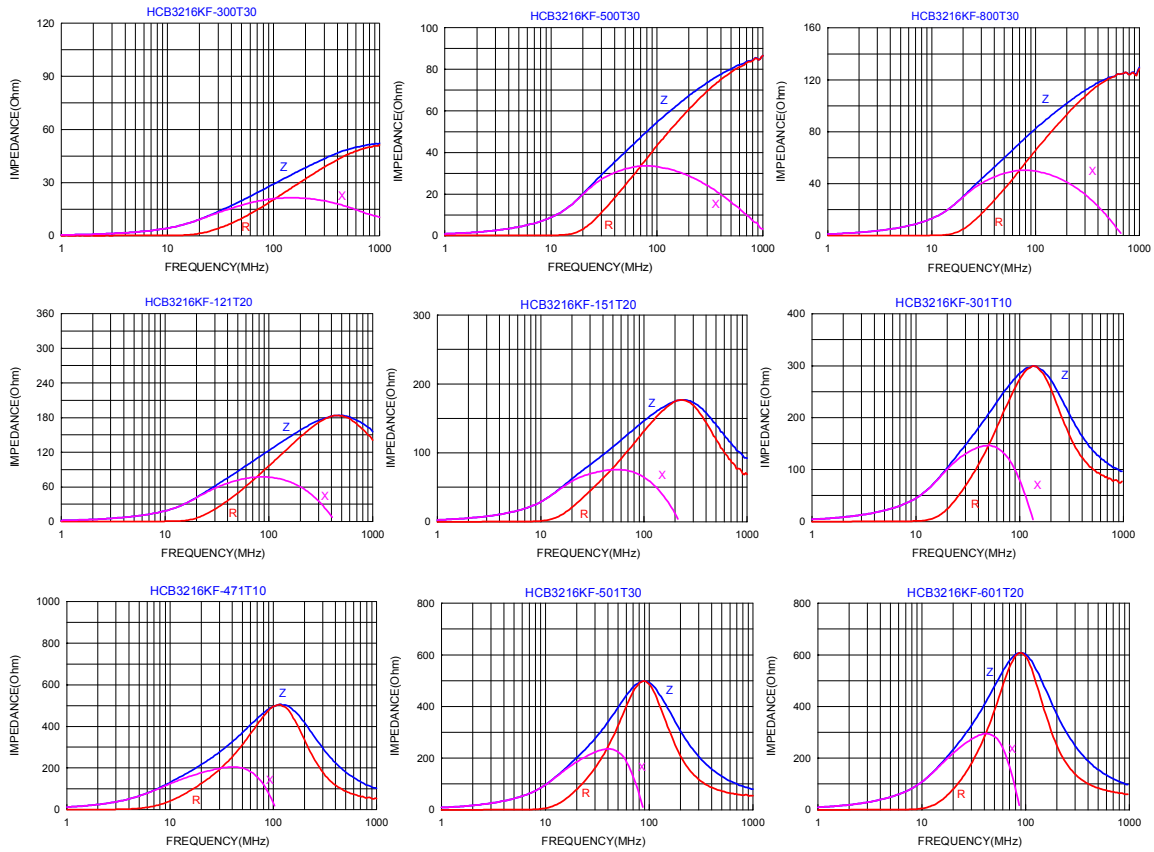
To maintain the solder ability of terminal electrodes:

1. TAI-TECH products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
2. Temperature and humidity conditions: Less than 40 and 60% RH.
3. Recommended products should be used within 12 months from the time of delivery.
4. The packaging material should be kept where no chlorine or sulfur exists in the air.

Transportation

1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

Impedance Frequency Characteristics(Typical)



測試報告 Test Report

號碼(No.) : CE/2011/C1821 日期(Date) : 2011/12/16 頁數(Page) : 1 of 12

西北臺慶科技股份有限公司 / TAI-TECH ADVANCED ELECTRONICS CO., LTD.



(東莞臺慶精密電子有限公司 / TAI-TECH ADVANCED ELECTRONICS (DONGGUAN) CO., LTD.)

(臺慶精密電子(昆山)有限公司 / TAI-TECH ADVANCED ELECTRONICS (KUN-SHAN) CO. LTD.)

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(廣東省東莞市黃江鎮黃牛埔福祥街2號 / NO. 2, FUXIANG STREET, HUANGNIUPU, HUANGJIANG TOWN, DONGGUAN, GUANGDONG)

(江蘇省昆山市蓬朗昆嘉高科技工業區郭澤路 / GUO-ZE ROAD, KUNJIA HI-TECH INDUSTRIAL PARK, KUN-SHAN, JIANG-SU, CHINA)

以下測試樣品係由客戶送樣，且由客戶聲稱並經客戶確認如下 (The following samples was/were submitted and identified by/on behalf of the client as) :

樣品名稱(Sample Description) : FERRITE CHIP BEAD INDUCTOR ARRAY MCF MCM YMV SERIES
樣品型號(Style/Item No.) : FERRITE CHIP BEAD INDUCTOR ARRAY MCF MCM YMV SERIES
收件日期(Sample Receiving Date) : 2011/12/09
測試期間(Testing Period) : 2011/12/09 TO 2011/12/16

=====
測試結果(Test Results) : 請見下一頁 (Please refer to next pages).


Chenyu Kung / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

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測試報告 Test Report

號碼(No.) : CE/2011/C1821 日期(Date) : 2011/12/16 頁數(Page) : 2 of 12

西北臺慶科技股份有限公司 / TAI-TECH ADVANCED ELECTRONICS CO., LTD.

(東莞臺慶精密電子有限公司 / TAI-TECH ADVANCED ELECTRONICS (DONGGUAN) CO., LTD.)

(臺慶精密電子(昆山)有限公司 / TAI-TECH ADVANCED ELECTRONICS (KUN-SHAN) CO. LTD.)

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(廣東省東莞市黃江鎮黃牛埔福祥街2號 / NO. 2, FUXIANG STREET, HUANGNIUPU, HUANGJIANG TOWN, DONGGUAN, GUANGDONG)

(江蘇省昆山市蓬朗區嘉高科技工業區郭澤路 / GUO-ZE ROAD, KUNJIA HI-TECH INDUSTRIAL PARK, KUN-SHAN, JIANG-SU, CHINA)

測試結果(Test Results)

測試部位(PART NAME)No.1 : 整體混測 (10款) (MIXED ALL PARTS (10 KINDS))

| 測試項目 (Test Items) | 單位 (Unit) | 測試方法 (Method) | 方法偵測 極限值 (MDL) | 結果 (Result) |
|--|--------------|--|----------------------|----------------|
| | | | | No.1 |
| 鎘 / Cadmium (Cd) | mg/kg | 參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES. | 2 | n.d. |
| 鉛 / Lead (Pb) | mg/kg | 參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES. | 2 | n.d. |
| 汞 / Mercury (Hg) | mg/kg | 參考IEC 62321: 2008方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321: 2008 and performed by ICP-AES. | 2 | n.d. |
| 六價鉻 / Hexavalent Chromium Cr(VI) | mg/kg | 參考IEC 62321: 2008方法, 以UV-VIS檢測. / With reference to IEC 62321: 2008 and performed by UV-VIS. | 2 | n.d. |
| 全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide) | mg/kg | 參考US EPA 3540C: 1996方法, 以液相層析/質譜儀檢測全氟辛烷磺酸含量. / With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS. | 10 | n.d. |
| 全氟辛酸(銨) / PFOA (CAS No.: 335-67-1) | mg/kg | 參考US EPA 3540C: 1996方法, 以液相層析/質譜儀檢測全氟辛酸(銨)含量. / With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS. | 10 | n.d. |

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測試報告

Test Report

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| 測試項目 (Test Items) | 單位 (Unit) | 測試方法 (Method) | 方法偵測 極限值 (MDL) | 結果 (Result) |
|--|--------------|--|----------------------|----------------|
| | | | | No.1 |
| 六溴環十二烷 / Hexabromocyclododecane (HBCDD) (CAS No.: 25637-99-4) | mg/kg | 參考US EPA 3540C方法, 以氣相層析/質譜儀檢測。 / With reference to US EPA 3540C method. Analysis was performed by GC/MS. | 5 | n.d. |
| 鄰苯二甲酸甲苯基丁酯 / BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7) | % | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0.003 | n.d. |
| 鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di-(2-ethylhexyl) phthalate) (CAS No.: 117-81-7) | % | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0.003 | n.d. |
| 鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0) | % | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0.01 | n.d. |
| 鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0) | % | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0.01 | n.d. |
| 鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0) | % | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0.003 | n.d. |
| 鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2) | % | 參考EN 14372, 以氣相層析/質譜儀檢測之。 / With reference to EN 14372. Analysis was performed by GC/MS. | 0.003 | n.d. |

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| 測試項目 (Test Items) | 單位 (Unit) | 測試方法 (Method) | 方法偵測 極限值 (MDL) | 結果 (Result) |
|----------------------------------|--------------|---|----------------------|----------------|
| | | | | No.1 |
| 多溴聯苯總和 / Sum of PBBs | mg/kg | 參考IEC 62321: 2008方法, 以氣相層析儀/ 質譜儀檢測。 / With reference to IEC 62321: 2008 and performed by GC/MS. | - | n.d. |
| 一溴聯苯 / Monobromobiphenyl | | | 5 | n.d. |
| 二溴聯苯 / Dibromobiphenyl | | | 5 | n.d. |
| 三溴聯苯 / Tribromobiphenyl | | | 5 | n.d. |
| 四溴聯苯 / Tetrabromobiphenyl | | | 5 | n.d. |
| 五溴聯苯 / Pentabromobiphenyl | | | 5 | n.d. |
| 六溴聯苯 / Hexabromobiphenyl | | | 5 | n.d. |
| 七溴聯苯 / Heptabromobiphenyl | | | 5 | n.d. |
| 八溴聯苯 / Octabromobiphenyl | | | 5 | n.d. |
| 九溴聯苯 / Nonabromobiphenyl | | | 5 | n.d. |
| 十溴聯苯 / Decabromobiphenyl | | | 5 | n.d. |
| 多溴聯苯醚總和 / Sum of PBDEs | | | - | n.d. |
| 一溴聯苯醚 / Monobromodiphenyl ether | | | 5 | n.d. |
| 二溴聯苯醚 / Dibromodiphenyl ether | | | 5 | n.d. |
| 三溴聯苯醚 / Tribromodiphenyl ether | | | 5 | n.d. |
| 四溴聯苯醚 / Tetrabromodiphenyl ether | | | 5 | n.d. |
| 五溴聯苯醚 / Pentabromodiphenyl ether | | | 5 | n.d. |
| 六溴聯苯醚 / Hexabromodiphenyl ether | | | 5 | n.d. |
| 七溴聯苯醚 / Heptabromodiphenyl ether | | | 5 | n.d. |
| 八溴聯苯醚 / Octabromodiphenyl ether | | | 5 | n.d. |
| 九溴聯苯醚 / Nonabromodiphenyl ether | 5 | n.d. | | |
| 十溴聯苯醚 / Decabromodiphenyl ether | 5 | n.d. | | |

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| 測試項目 (Test Items) | 單位 (Unit) | 測試方法 (Method) | 方法偵測 極限值 (MDL) | 結果 (Result) |
|---|--------------|---|----------------------|----------------|
| | | | | No.1 |
| 鹵素 / Halogen | | | | |
| 鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8) | mg/kg | 參考BS EN 14582:2007, 以離子層析儀分析。 / With reference to BS EN 14582:2007. Analysis was performed by IC. | 50 | n.d. |
| 鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 22537-15-1) | | | 50 | n.d. |
| 鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2) | | | 50 | n.d. |
| 鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 14362-44-8) | | | 50 | n.d. |

備註(Note) :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)
5. 樣品的測試是基於申請人要求混合測試，報告中的混合測試結果不代表其中個別單一材質的含量。(The samples was/were analyzed on behalf of the applicant as mixing sample in one testing. The above results was/were only given as the informality value.)

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PFOS參考資訊(Reference Information) : 指令 2006/122/EC (Directive 2006/122/EC)

- (1) 該物質不可置於市場上或使用於特殊物質或配置成分重量濃度等於或大於0.005%.

(May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005% by mass.)

- (2) 該物質不可置於市場上的半成品或商品或其物件; 假若零件上明顯地具有PFOS並參照結構上及微細構造上計算PFOS重量濃度等於或大於0.1%, 而紡織品或其他覆蓋物質, 如果PFOS在覆蓋物質中含量等於或大於 $1\mu\text{g}/\text{m}^2$.

(May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1% by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than $1\mu\text{g}/\text{m}^2$ of the coated material.)

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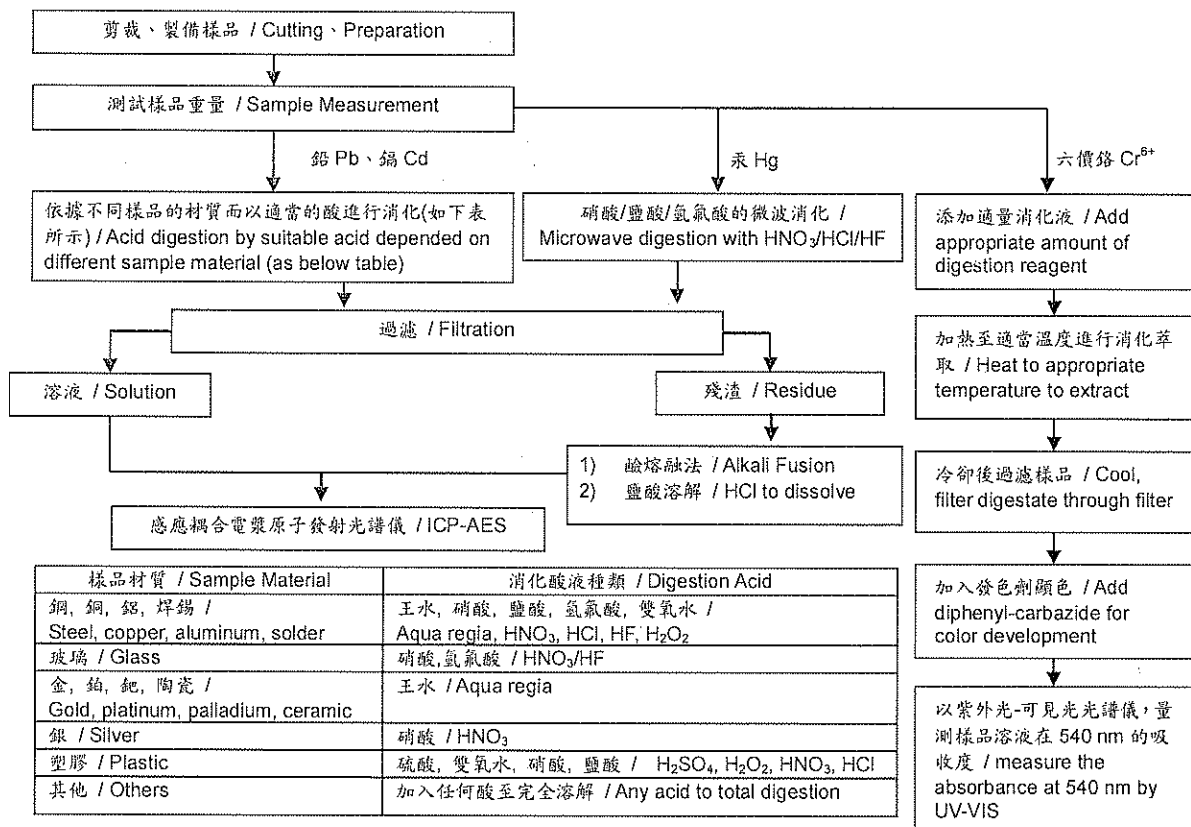
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- 1) 根據以下的流程圖之條件，樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)
- 2) 測試人員：楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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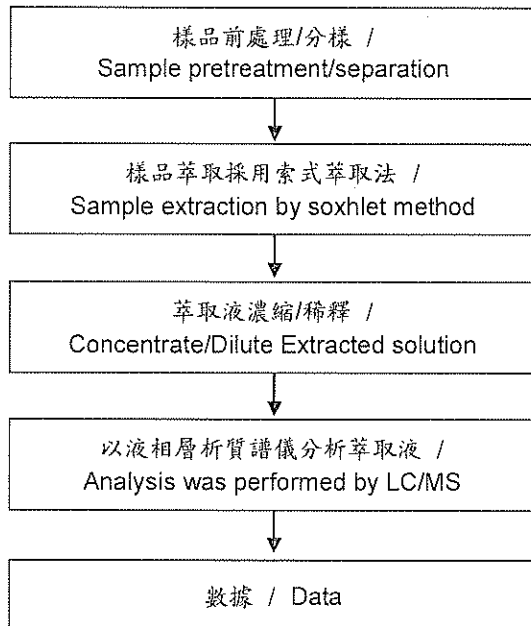
索式萃取分析流程圖 /

Analytical flow chart of Soxhlet extraction (LC/MS) procedure

- 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang

【測試項目：全氟辛酸磺酸/全氟辛酸(銨)、苯並三唑類化合物 /

Test Items: PFOS/PFOA、Benzotriazole】



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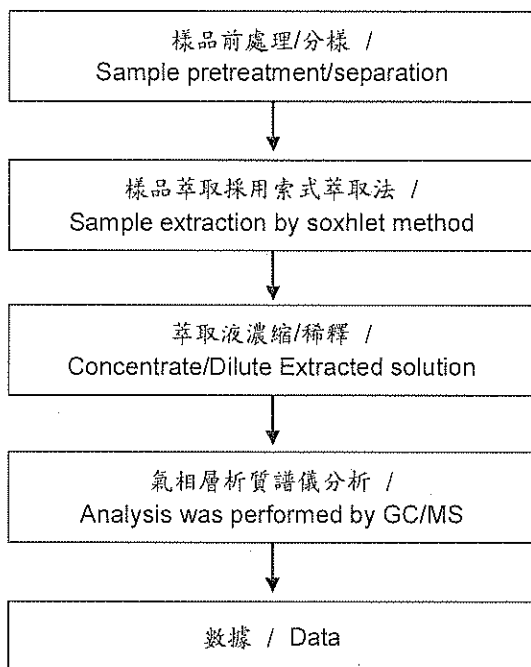
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索式萃取分析流程圖 / Analytical flow chart of Soxhlet extraction (GC/MS) procedure

- 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang

【測試項目：可塑劑、苯並三唑類化合物、六溴環十二烷、壬酚、單甲基二溴二苯基甲烷、有機磷化合物 / Test Items: Phthalate、Benzotriazole、HBCDD、NP、DBBT、Organic phosphorus compounds】



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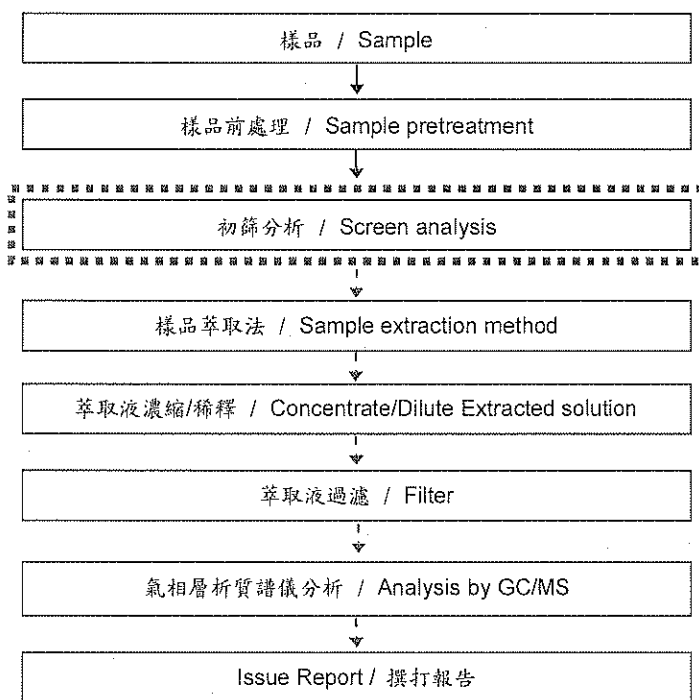
分析流程圖 / Analytical flow chart

■ 測試人員：翁賜彬 / Name of the person who made measurement: Roman Wong

■ 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang

【測試項目(Test Items): 多溴聯苯/多溴聯苯醚、四溴雙酚-A-雙 / PBB/PBDE, TBBP-A-bis】

初次測試程序 / First testing process → 選擇性篩檢程序 / Optional screen process 確認程序 / Confirmation process - - >



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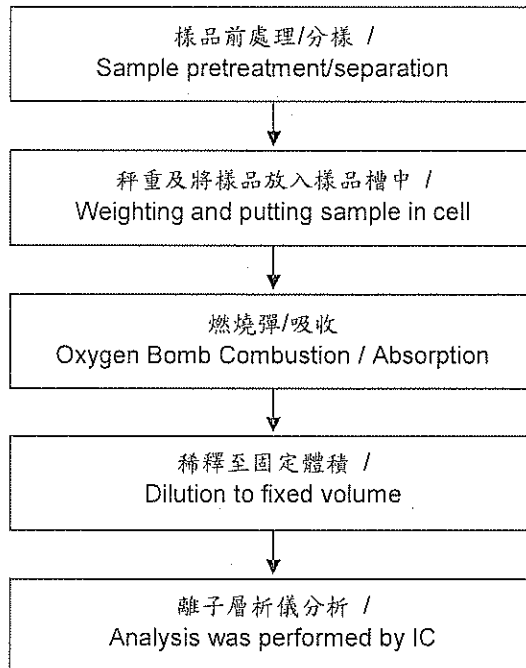
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鹵素分析流程圖 / Analytical flow chart of halogen content

- 1) 測試人員：陳恩臻 / Name of the person who made measurement: Rita Chen
- 2) 測試負責人：張啓興 / Name of the person in charge of measurement: Troy Chang



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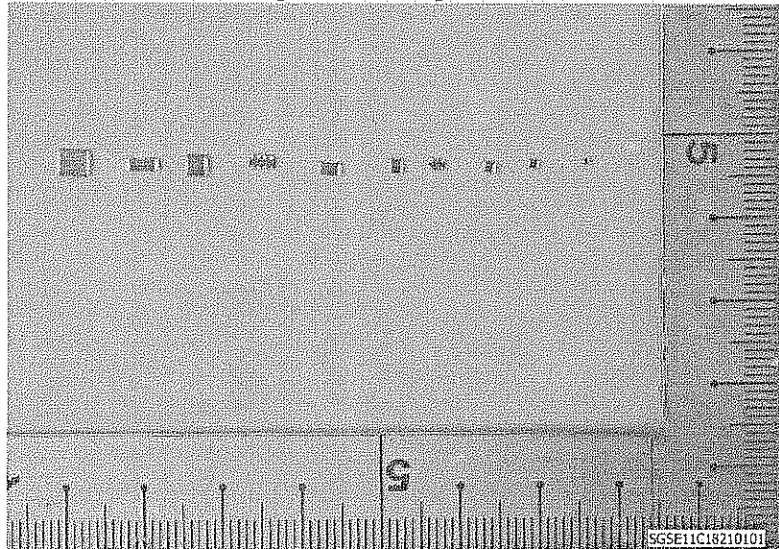
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* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位。*

(The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2011/C1821



** 報告結尾 (End of Report) **

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