



# Test Report

Report No.: PTC20040205301C-EN01

Issue Date: Apr. 09, 2020

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**Applicant:** Yueqing Langir Electric Co., Ltd.

**Address:** 4F, No.188, Liuqing North Road, Liushi Town, Yueqing City, Wenzhou, China

The following merchandise was (were) submitted and identified by client as:

**Sample Name:** CAPACITIVE SWITCH

**Model:** CP19, CP16, CP22, CP25

**Manufacturer:** Yueqing Langir Electric Co., Ltd.

**Address:** 4F, No.188, Liuqing North Road, Liushi Town, Yueqing City, Wenzhou, China

**Sample Received Date:** Apr. 03, 2020

**Completed Date:** Apr. 09, 2020

## Test Requested and Conclusion(s):

| No. | Test Sample      | Standard and Requirement   | Conclusion(s) |
|-----|------------------|--|---------------|
| 1   | Submitted sample | RoHS Directive 2011/65/EU and its subsequent amendments regulation EU No.2015/863.<br>- Lead (Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr <sup>6+</sup> ), PBBs and PBDEs, Phthalates (DBP, BBP,DEHP,DIBP) | PASS          |

**Test Result(s):** Please refer to next page(s).

Signed for and on Behalf of PTC

Miya Ning / Technical Manger

Precise Testing & Certification (Guangdong) Co., Ltd.



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## Test Result(s):

RoHS - Lead (Pb)/Cadmium(Cd)/Mercury(Hg)/Hexavalent Chromium(Cr<sup>6+</sup>)/PBBs/PBDEs

Test Method: IEC62321-3-1: 2013, IEC62321-5: 2013, IEC62321-6:2015, IEC62321-4: 2013, IEC 62321-7-1:2015, IEC 62321-7-2: 2017, analyzed by EDXRF & AAS & ICP-AES & GC-MS & UV-Vis.

| No.             | Material Description                 | EDXRF Result |    |    |    |    | Chemical Result (mg/kg)    | Conclusion |
|-----------------|--------------------------------------|--------------|----|----|----|----|----------------------------|------------|
|                 |                                      | Pb           | Cd | Hg | Cr | Br |                            |            |
| 1               | White plastic ( wire jacket )        | BL           | BL | BL | BL | BL | --                         | PASS       |
| 2               | Black plastic ( wire jacket )        | BL           | BL | BL | BL | BL | --                         | PASS       |
| 3               | Green plastic ( wire jacket )        | BL           | BL | BL | BL | BL | --                         | PASS       |
| 4               | Red plastic ( wire jacket )          | BL           | BL | BL | BL | BL | --                         | PASS       |
| 5               | Dark red plastic ( wire jacket )     | BL           | BL | BL | BL | BL | --                         | PASS       |
| 6               | Black plastic ( bushing )            | BL           | BL | BL | BL | BL | --                         | PASS       |
| 7               | Silvery metal ( wire )               | BL           | BL | BL | BL | -- | --                         | PASS       |
| 8               | Black solid material ( filling )     | BL           | BL | BL | BL | BL | --                         | PASS       |
| 9               | Silvery metal ( lower shell )        | BL           | BL | BL | IN | -- | Cr <sup>6+</sup> :Negative | PASS       |
| 10 <sup>E</sup> | Silvery metal ( nut )                | IN           | BL | BL | BL | -- | Pb:39528                   | PASS       |
| 11              | Silvery metal ( cover )              | BL           | BL | BL | IN | -- | Cr <sup>6+</sup> :Negative | PASS       |
| 12              | Silvery metal ( spring )             | BL           | BL | BL | IN | -- | Cr <sup>6+</sup> :Negative | PASS       |
| 13              | Silvery metal ( upper shell )        | BL           | BL | BL | IN | -- | Cr <sup>6+</sup> :Negative | PASS       |
| 14              | Transparent soft plastic ( stopper ) | BL           | BL | BL | BL | BL | --                         | PASS       |
| 15              | Black soft plastic ( gasket )        | BL           | BL | BL | BL | BL | --                         | PASS       |
| 16              | Translucent plastic ( stopper )      | BL           | BL | BL | BL | BL | --                         | PASS       |
| 17              | Green PCB ( inner )                  | BL           | BL | BL | BL | IN | PBBs:ND<br>PBDEs:ND        | PASS       |
| 18              | Silvery solder ( PCB )               | BL           | BL | BL | BL | -- | --                         | PASS       |
| 19              | Chip resistor ( PCB )                | BL           | BL | BL | BL | -- | --                         | PASS       |

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| No. | Material Description                    | EDXRF Result |    |    |    |    | Chemical Result (mg/kg) | Conclusion |
|-----|---|--------------|----|----|----|----|-------------------------|------------|
|     |   | Pb           | Cd | Hg | Cr | Br |                         |            |
| 20  | Brown chip capacitor ( PCB )            | BL           | BL | BL | BL | -- | --                      | PASS       |
| 21  | Transparent / white body ( diode, PCB ) | BL           | BL | BL | BL | BL | --                      | PASS       |
| 22  | Black body ( triode, PCB )              | BL           | BL | BL | BL | BL | --                      | PASS       |
| 23  | Black body ( IC, PCB )                  | BL           | BL | BL | BL | BL | --                      | PASS       |
| 24  | Silvery metal pin ( IC, PCB )           | BL           | BL | BL | BL | -- | --                      | PASS       |

- Note:**
1. mg/kg = milligram per kilogram (ppm).
  2. N.D. = Not Detected (<RL).
  3. Negative = Absence of Cr<sup>6+</sup>.
  4. Positive = Presence of Cr<sup>6+</sup>: the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.
  5. The result are obtained by EDXRF for primary screening, if the result exceeds the below limit (BL), and further chemical testing.
  6. "E"= This material is tin-lead solder or metal alloy proved by client, lead in tin-lead solder or copper alloy is exempted on the requirements of RoHS directive (EU Directive 2011/65/EU).

## Screening limits in mg/kg for regulated elements in various matrices

| Elements | Polymer                        | Metal                          | Composite Materials            |
|----------|--------------------------------|--------------------------------|--------------------------------|
| Pb       | BL≤(700-3σ)<X<(1300+3σ)≤<br>OL | BL≤(700-3σ)<X<(1300+3σ)≤<br>OL | BL≤(500-3σ)<X<(1500+3σ)≤<br>OL |
| Cd       | BL≤(70-3σ)<X<(130+3σ)≤<br>OL   | BL≤(70-3σ)<X<(130+3σ)≤<br>OL   | LOD<X<(150+3σ)≤OL              |
| Hg       | BL≤(700-3σ)<X<(1300+3σ)≤<br>OL | BL≤(700-3σ)<X<(1300+3σ)≤<br>OL | BL≤(500-3σ)<X<(1500+3σ)≤<br>OL |
| Cr       | BL≤(700-3σ)<X                  | BL≤(700-3σ)<X                  | BL≤(500-3σ)<X                  |
| Br       | BL≤(300-3σ)<X                  | --                             | BL≤(250-3σ)<X                  |

BL = Below Limit, OL = Over Limit, IN = Inconclusive, LOD = Limit of Detection

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## Chemical Testing - Detection Limit & 2011/65/EU Limit:

| No | Name of Chemicals  | Detection Limit (mg/kg)          | 2011/65/EU Limit (mg/kg)           |
|----|--|----------------------------------|------------------------------------|
| 1  | Lead (Pb)  | 5                                | 1000                               |
| 2  | Cadmium (Cd)   | 5                                | 100                                |
| 3  | Mercury (Hg)   | 5                                | 1000                               |
| 4  | Chromium VI (Cr VI)  | Non-metal: 10<br>Metal: Negative | Non-metal: 1000<br>Metal: Negative |
| 5  | Polybromobiphenyls (PBBs)<br>-Bromobiphenyl (MonoBB)<br>-Dibromobiphenyl (DiBB)<br>-Tribromobiphenyl (TriBB) -Tetrabromobiphenyl (TetraBB)<br>-Pentabromobiphenyl (PentaBB)<br>-Hexabromobiphenyl (HexaBB)<br>-Heptabromobiphenyl (HeptaBB)<br>-Octabromobiphenyl (OctaBB)<br>-Nonabromobiphenyl (NonaBB)<br>-Decabromobiphenyl (DecaBB)   | Each 5                           | Sum: 1 000                         |
| 6  | Polybromodiphenyl ethers (PBDEs)<br>-Bromodiphenyl ether (MonoBDE)<br>-Dibromodiphenyl ether (DiBDE)<br>-Tribromodiphenyl ether (TriBDE)<br>-Tetrabromodiphenyl ether (TetraBDE)<br>-Pentabromodiphenyl ether (PentaBDE)<br>-Hexabromodiphenyl ether (HexaBDE)<br>-Heptabromodiphenyl ether (HeptaBDE)<br>-Octabromodiphenyl ether (OctaBDE)<br>-Nonabromodiphenyl ether (NonaBDE)<br>-Decabromodiphenyl ether (DecaBDE) | Each 5                           | Sum: 1 000                         |

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## Test Result(s):

ROHS - Phthalates DIBP, DBP, BBP, DEHP

Method: IEC 62321-8: 2017, analyzed by Gas Chromatograph-Mass Spectrometry (GC-MS).

| Substances    | DBP            | BBP     | DEHP     | DIBP    | Conclusion |
|---------------|----------------|---------|----------|---------|------------|
| CAS No.       | 84-74-2        | 85-68-7 | 117-81-7 | 84-69-5 |            |
| Limit (mg/kg) | 1000           | 1000    | 1000     | 1000    |            |
| RL (mg/kg)    | 50             | 50      | 50       | 50      |            |
| Material No.  | Result (mg/kg) |         |          |         |            |
| 1+2+3         | N.D.           | N.D.    | N.D.     | N.D.    | PASS       |
| 4+5           | N.D.           | N.D.    | N.D.     | N.D.    | PASS       |
| 6+15          | N.D.           | N.D.    | N.D.     | N.D.    | PASS       |
| 14+16+17      | N.D.           | N.D.    | N.D.     | N.D.    | PASS       |

- Note:**
1. mg/kg = milligram per kilogram (ppm).
  2. N.D. = Not Detected (<RL).
  3. RL=Reporting Limit.

## Test Material List

The following materials apply only to the samples submitted for phthalates testing.

| Material No. | Description (Location)               |
|--------------|--------------------------------------|
| 1            | White plastic ( wire jacket )        |
| 2            | Black plastic ( wire jacket )        |
| 3            | Green plastic ( wire jacket )        |
| 4            | Red plastic ( wire jacket )          |
| 5            | Dark red plastic ( wire jacket )     |
| 6            | Black plastic ( bushing )            |
| 14           | Transparent soft plastic ( stopper ) |
| 15           | Black soft plastic ( gasket )        |
| 16           | Translucent plastic ( stopper )      |
| 17           | Green PCB ( inner )                  |

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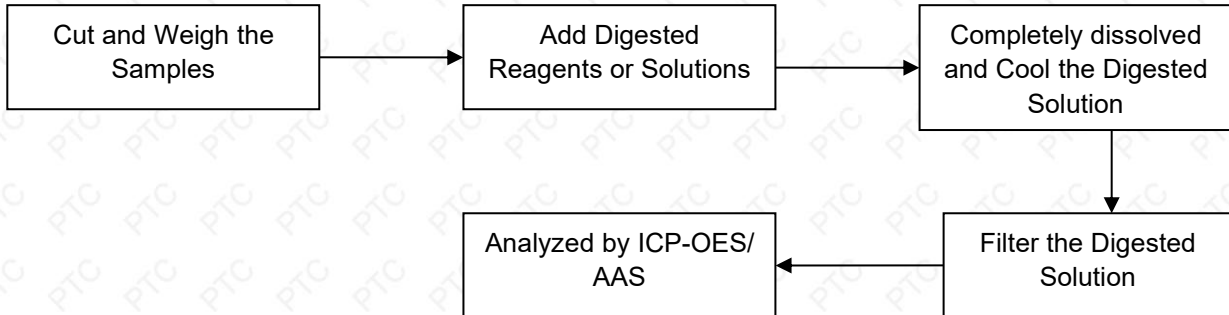
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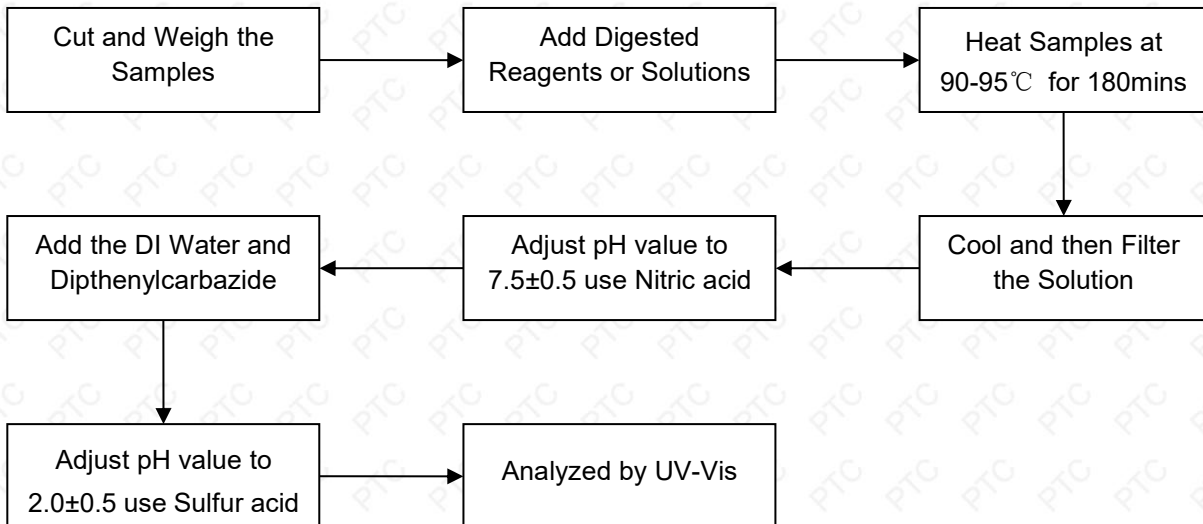
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## Test Process Flow:

### 1. Lead, Cadmium, Mercury



### 2. Hexavalent Chromium (Non-metal)



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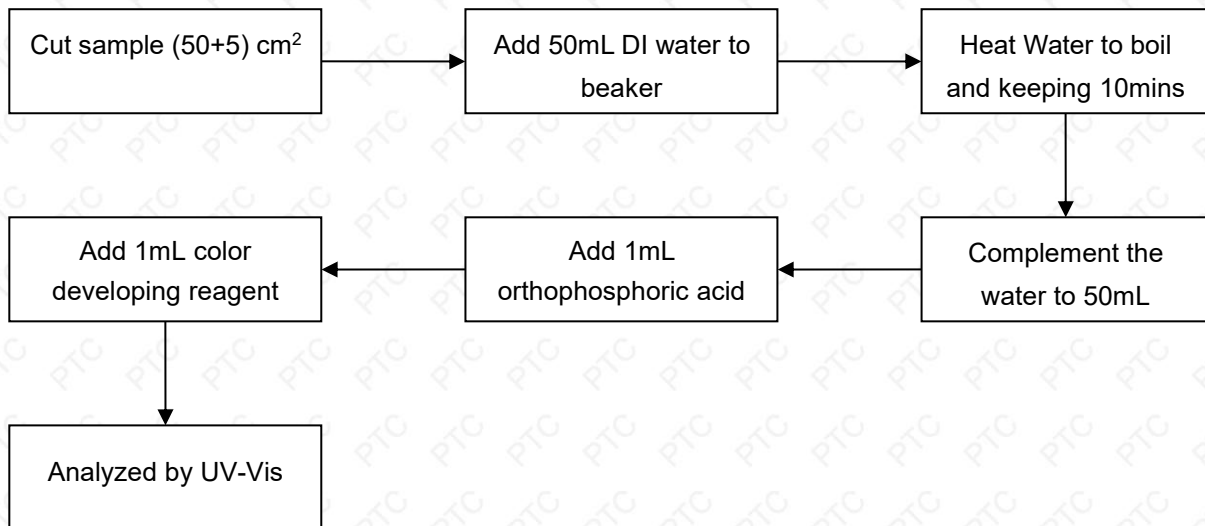
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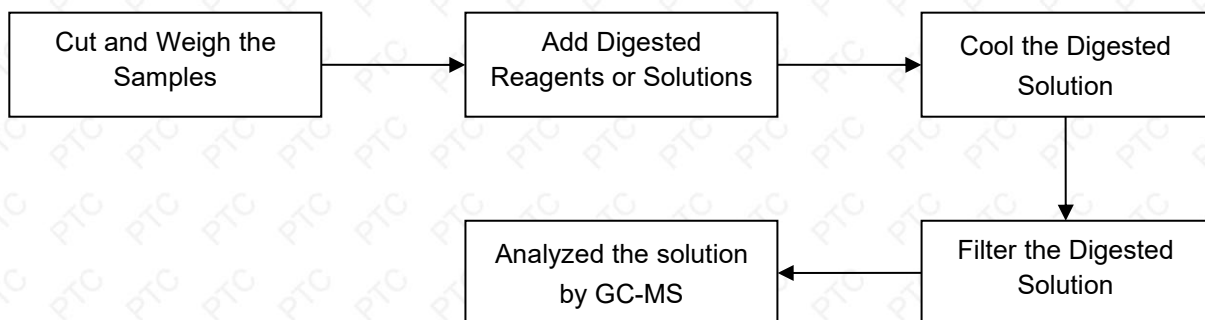
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## Hexavalent Chromium (Metal)



## 3. PBBs & PBDEs, Phthalates



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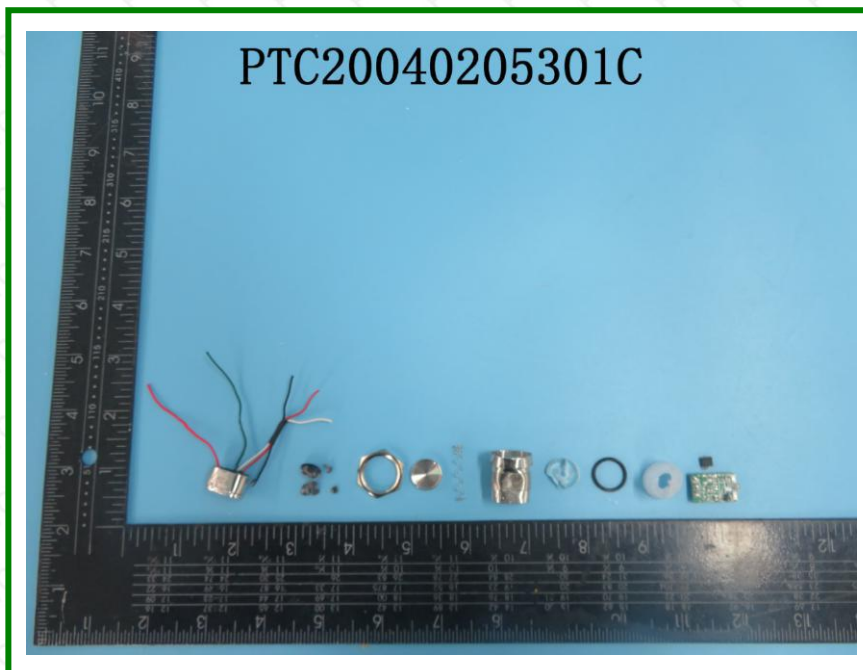
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Photo(s) of Sample:



\*\*\*End of Report\*\*\*

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