



# Test Report

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Date: 12-Apr-2024

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MURATA MANUFACTURING CO., LTD.

1-10-1, HIGASHI KOTARI, NAGAOAKAKYO-SHI, KYOTO, 617-8555, JAPAN.

The following sample(s) was/were submitted and identified by the applicant as:

Sample Submitted By : MURATA MANUFACTURING CO., LTD.

Sample Name : Cu PLATING\_240412

CLIENT REF No : 1240319019

Sample Receiving Date : 03-Apr-2024

Testing Period : 03-Apr-2024 to 12-Apr-2024

Test Requested : As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

Test Results : Please refer to following pages.

Conclusion : Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

*Troy Chang*

Troy Chang / Department Manager  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory - Taipei



PIN CODE: C46610F9

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## Test Part Description

No.1 : COPPER COLORED SHEET

## Test Result(s)

| Test Item(s)                    | Method                                                                              | Unit               | MDL | Result | Limit |
|---------------------------------|-------------------------------------------------------------------------------------|--------------------|-----|--------|-------|
|                                 |                                                                                     |                    |     | No.1   |       |
| Cadmium (Cd)                    | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.             | mg/kg              | 2   | n.d.   | 100   |
| Lead (Pb)                       | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.             | mg/kg              | 2   | 13.8   | 1000  |
| Mercury (Hg)                    | With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES. | mg/kg              | 2   | n.d.   | 1000  |
| Hexavalent Chromium Cr(VI) (#2) | With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.            | µg/cm <sup>2</sup> | 0.1 | n.d.   | -     |
| Monobromobiphenyl               | With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.               | mg/kg              | 5   | n.d.   | -     |
| Dibromobiphenyl                 |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Tribromobiphenyl                |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Tetrabromobiphenyl              |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Pentabromobiphenyl              |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Hexabromobiphenyl               |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Heptabromobiphenyl              |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Octabromobiphenyl               |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Nonabromobiphenyl               |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Decabromobiphenyl               |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Sum of PBBs                     |                                                                                     | mg/kg              | -   | n.d.   | 1000  |
| Monobromodiphenyl ether         |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Dibromodiphenyl ether           |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Tribromodiphenyl ether          |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Tetrabromodiphenyl ether        |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Pentabromodiphenyl ether        |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Hexabromodiphenyl ether         |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Heptabromodiphenyl ether        |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Octabromodiphenyl ether         |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Nonabromodiphenyl ether         |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Decabromodiphenyl ether         |                                                                                     | mg/kg              | 5   | n.d.   | -     |
| Sum of PBDEs                    |                                                                                     | mg/kg              | -   | n.d.   | 1000  |

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| Test Item(s)                       | Method                                                                | Unit  | MDL | Result | Limit |
|------------------------------------|-----------------------------------------------------------------------|-------|-----|--------|-------|
|                                    |                                                                       |       |     | No.1   |       |
| Butyl benzyl phthalate (BBP)       | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50  | n.d.   | 1000  |
| Dibutyl phthalate (DBP)            |                                                                       | mg/kg | 50  | n.d.   | 1000  |
| Di-(2-ethylhexyl) phthalate (DEHP) |                                                                       | mg/kg | 50  | n.d.   | 1000  |
| Diisobutyl phthalate (DIBP)        |                                                                       | mg/kg | 50  | n.d.   | 1000  |

## Note :

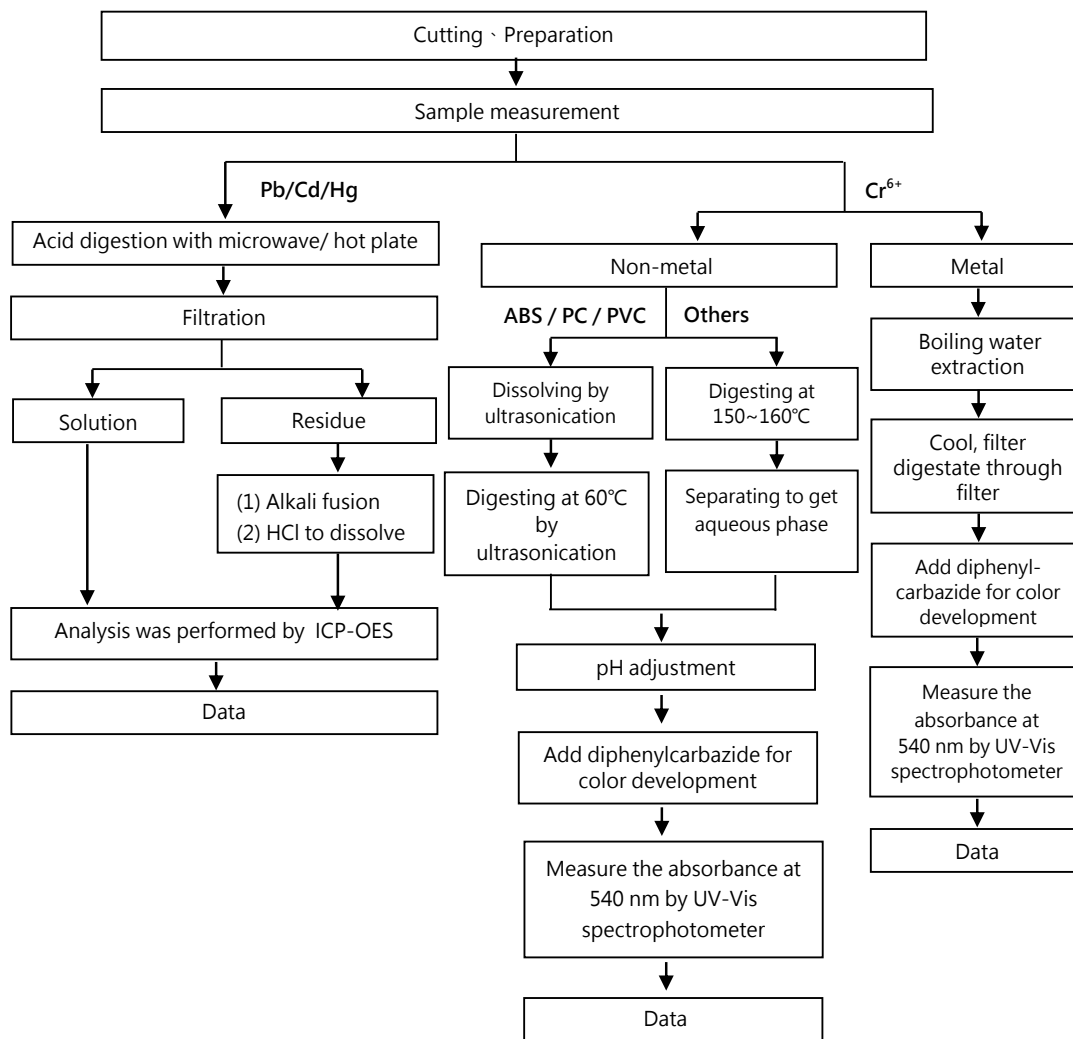
1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected ( Less than MDL)
4. "-" = Not Regulated
5. (#2) =
  - a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13  $\mu\text{g}/\text{cm}^2$ . The sample coating is considered to contain Cr(VI).
  - b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10  $\mu\text{g}/\text{cm}^2$ ). The coating is considered a non-Cr(VI) based coating
  - c. The result between 0.10  $\mu\text{g}/\text{cm}^2$  and 0.13  $\mu\text{g}/\text{cm}^2$  is considered to be inconclusive - unavoidable coating variations may influence the determination.
6. Unless otherwise stated , the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.

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## Analytical flow chart of heavy metal

These samples were dissolved totally by pre-conditioning method according to below flow chart.

(  $\text{Cr}^{6+}$  test method excluded )



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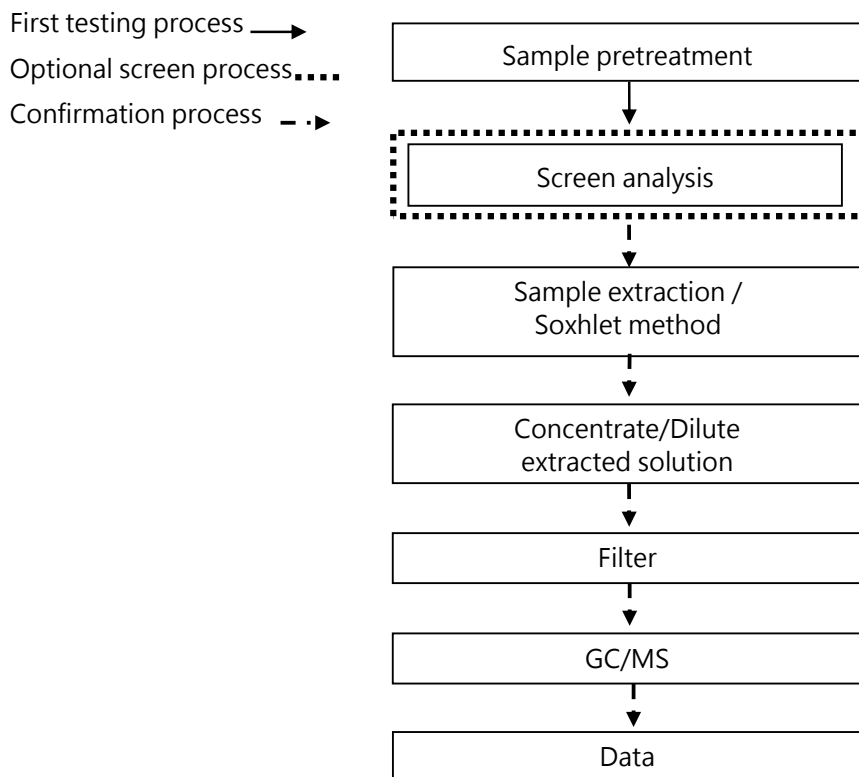
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## Analytical flow chart – PBBs / PBDEs



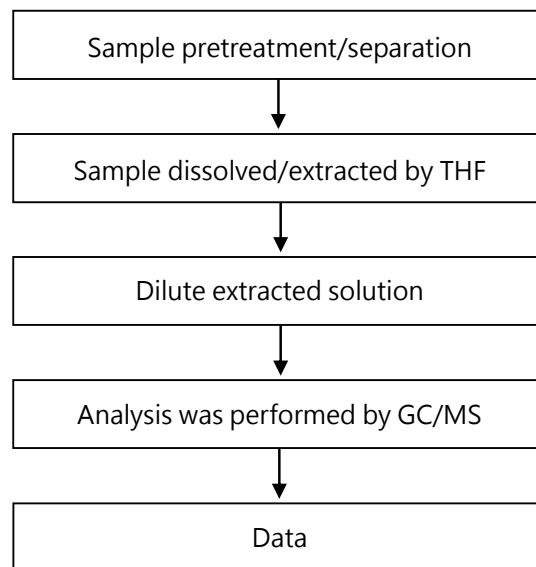
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## Analytical flow chart - Phthalate

【Test method: IEC 62321-8】



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

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\*\* End of Report \*\*

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