

# Test Report

Report No. BCTC2003001519R

Date: Mar. 24, 2020

**Applicant** : Yumi Intelligent Manufacturing (Hangzhou) Co., Ltd  
**Address** : No. 18 Zhen Shan Road, Chang Kou Town, Fuyang District,  
Hangzhou City, Zhejiang Province

**The submitted sample and sample information was/were submitted and identified by/on the behalf of the client**

**Sample name** : Filament

**Type / model** : 1.75MM, 2.85MM, 3.00MM

**Manufacturer** : Zhejiang Weibin 3D Technology Co., Ltd

**Address** : No. 18 Zhen Shan Road, Chang Kou Town, Fuyang District,  
Hangzhou City, Zhejiang Province

**Sample received date** : Mar. 17, 2020

**Testing period** : Mar. 17, 2020 - Mar. 24, 2020

**Test requested** :

1. As specified by client, to screen Lead(Pb), Cadmium(Cd), Mercury(Hg), Chromium(Cr) and Bromine(Br) in the submitted sample(s) by XRF.
2. As specified by client, when screening results exceed the XRF screening limit in IEC 62321-3-1:2013, further use of chemical methods are required to test the Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs) in the submitted samples.
3. As specified by client, to test the Diisobutyl phthalate(DIBP), Dibutyl phthalate(DBP), Butyl benzyl phthalate(BBP), Bis(2-ethylhexyl) phthalate(DEHP) in the submitted sample(s).

**According to the RoHS Directive 2011/65/EU and amendment Commission Delegated Directive (EU) 2015/863**

\*\*\*\*\*For more detailed information, please refer to the next page\*\*\*\*\*

Tested by

*Ace*

Ace



Approved by

*Saher Chen*

Saher Chen  
Manager



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## Test Method:

### A. Screening test by XRF spectroscopy

XRF screening limits in mg/kg for regulated elements according to IEC 62321-3-1:2013.

| Element | Screening limits of IEC 62321-3-1:2013. Unit (mg/kg)      |                                                           | MDL      |                |
|---------|-----------------------------------------------------------|-----------------------------------------------------------|----------|----------------|
|         | Polymers and metals                                       | Composite material                                        | Polymers | Other material |
| Pb      | $BL \leq (700-3\sigma) < X < (1300+3\sigma)$<br>$\leq OL$ | $BL \leq (500-3\sigma) < X < (1500+3\sigma)$<br>$\leq OL$ | 10 mg/kg | 50 mg/kg       |
| Cd      | $BL \leq (70-3\sigma) < X < (130+3\sigma)$<br>$\leq OL$   | $LOD \leq (50-3\sigma) < X < (150+3\sigma)$<br>$\leq OL$  | 10 mg/kg | 50 mg/kg       |
| Hg      | $BL \leq (700-3\sigma) < X < (1300+3\sigma)$<br>$\leq OL$ | $BL \leq (500-3\sigma) < X < (1500+3\sigma)$<br>$\leq OL$ | 10 mg/kg | 50 mg/kg       |
| Cr      | $BL \leq (700-3\sigma) < X$                               | $BL \leq (500-3\sigma) < X$                               | 10 mg/kg | 50 mg/kg       |
| Br      | $BL \leq (300-3\sigma) < X$                               | $BL \leq (250-3\sigma) < X$                               | 10 mg/kg | 50 mg/kg       |

### Note:

-BL = Under the XRF screening limit

-OL = Further chemical test will be conducted while result is above the screening limit

-X= The symbol "X" marks the region where further investigation is necessary

-3σ= The reproducibility of analytical instruments

-LOD= Detection limit

-"-" = Not regulated.

### B. Chemical Test

| Test Item(s)                           | Test Method                | Measured Equipment(s) | MDL      | Limit      |
|----------------------------------------|----------------------------|-----------------------|----------|------------|
| Lead (Pb)                              | IEC 62321-5:2013 Ed.1.0    | ICP-OES               | 2 mg/kg  | 1000 mg/kg |
| Cadmium (Cd)                           | IEC 62321-5:2013 Ed.1.0    | ICP-OES               | 2 mg/kg  | 100 mg/kg  |
| Mercury (Hg)                           | IEC 62321-4:2013+AMD1:2017 | ICP-OES               | 2 mg/kg  | 1000 mg/kg |
| Hexavalent Chromium Cr(VI)             | IEC 62321-7-1:2015 Ed.1.0  | UV-VIS                | --       | 1000 mg/kg |
|                                        | IEC 62321-7-2:2017 Ed.1.0  |                       | 8 mg/kg  | 1000 mg/kg |
| Polybrominated Biphenyls (PBBs)        | IEC 62321-6:2015 Ed.1.0    | HPLC-UV               | 5 mg/kg  | 1000 mg/kg |
| Polybrominated Diphenyl Ethers (PBDEs) | IEC 62321-6:2015 Ed.1.0    | HPLC-UV               | 5 mg/kg  | 1000 mg/kg |
| Phthalates                             | IEC 62321-8:2017 Ed.1.0    | GC-MS                 | 50 mg/kg | 1000 mg/kg |



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## Test Result(s):

| Sample No. | Sample Description      | Tested Items   | XRF Screening Test Unit (mg/kg) | Chemical Test Unit (mg/kg) | Conclusion |
|------------|-------------------------|----------------|---------------------------------|----------------------------|------------|
| 1          | Black plastic           | Pb             | BL                              | /                          | PASS       |
|            |                         | Cd             | BL                              | /                          |            |
|            |                         | Hg             | BL                              | /                          |            |
|            |                         | Cr(Cr(VI) )    | BL                              | /                          |            |
|            |                         | Br(PBBs&PBDEs) | BL                              | /                          |            |
| 2          | Black plastic           | Pb             | BL                              | /                          | PASS       |
|            |                         | Cd             | BL                              | /                          |            |
|            |                         | Hg             | BL                              | /                          |            |
|            |                         | Cr(Cr(VI) )    | BL                              | /                          |            |
|            |                         | Br(PBBs&PBDEs) | BL                              | /                          |            |
| 3          | Transparent plastic bag | Pb             | BL                              | /                          | PASS       |
|            |                         | Cd             | BL                              | /                          |            |
|            |                         | Hg             | BL                              | /                          |            |
|            |                         | Cr(Cr(VI) )    | BL                              | /                          |            |
|            |                         | Br(PBBs&PBDEs) | BL                              | /                          |            |
| 4          | White paper box         | Pb             | BL                              | /                          | PASS       |
|            |                         | Cd             | BL                              | /                          |            |
|            |                         | Hg             | BL                              | /                          |            |
|            |                         | Cr(Cr(VI) )    | BL                              | /                          |            |
|            |                         | Br(PBBs&PBDEs) | BL                              | /                          |            |

| Tested Item(s)                                       | Results<br>Unit (mg/kg) |      |      |      |
|------------------------------------------------------|-------------------------|------|------|------|
|                                                      | 1                       | 2    | 3    | 4    |
| Diisobutyl phthalate (DIBP)<br>CAS #:84-69-5         | N.D.                    | N.D. | N.D. | N.D. |
| Dibutyl phthalate (DBP)<br>CAS #:84-74-2             | N.D.                    | N.D. | N.D. | N.D. |
| Butyl benzyl phthalate (BBP)<br>CAS #:85-68-7        | N.D.                    | N.D. | N.D. | N.D. |
| Bis(2-ethylhexyl) phthalate (DEHP)<br>CAS #:117-81-7 | N.D.                    | N.D. | N.D. | N.D. |

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## Note:

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL)

-mg/kg = ppm = parts per million

-" / " = Not conducted.

-Negative = Absence of Cr(VI), the detected Cr(VI) concentration in the boiling water extraction solution is less than  $0.1\mu\text{g}/\text{cm}^2$  with  $50\text{cm}^2$  sample surface area used.

-Positive = Presence of Cr(VI), the detected Cr(VI) concentration in the boiling water extraction solution is equal to or greater than  $0.13\mu\text{g}/\text{cm}^2$  with  $50\text{cm}^2$  sample surface area used.

## Remark:

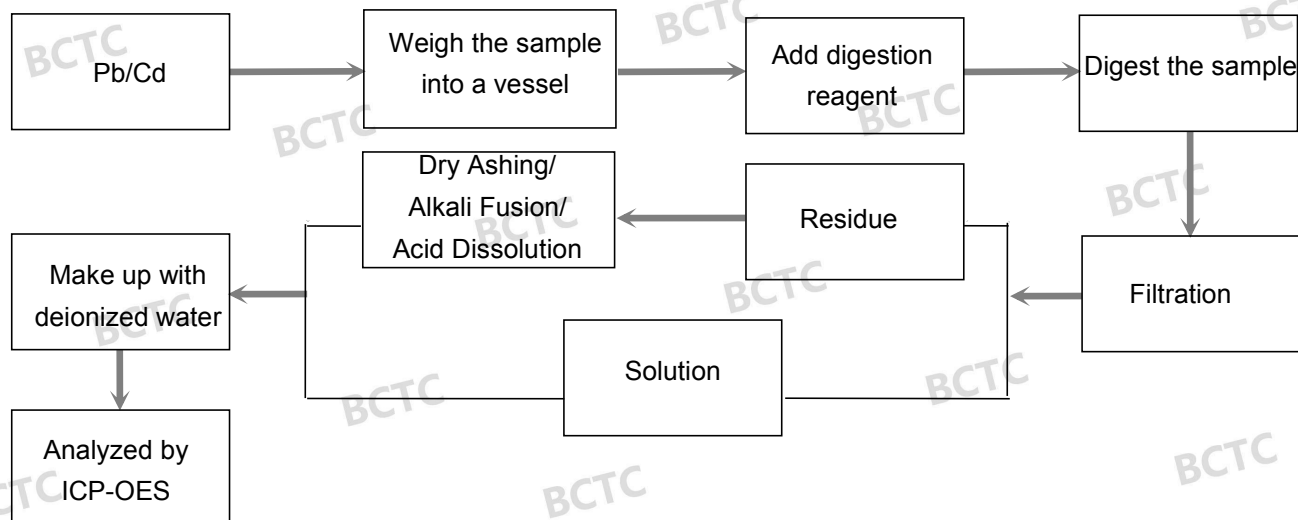
- The screening results are only used for reference.

- When conducting the test for PBBs&PBDEs, XRF was introduced to screen Br Exclusively; When conducting the test for Hexavalent Chromium, XRF was introduced to screen Chromium exclusively.

## Test Process:

The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.

◆ IEC 62321-5:2013 Ed.1.0

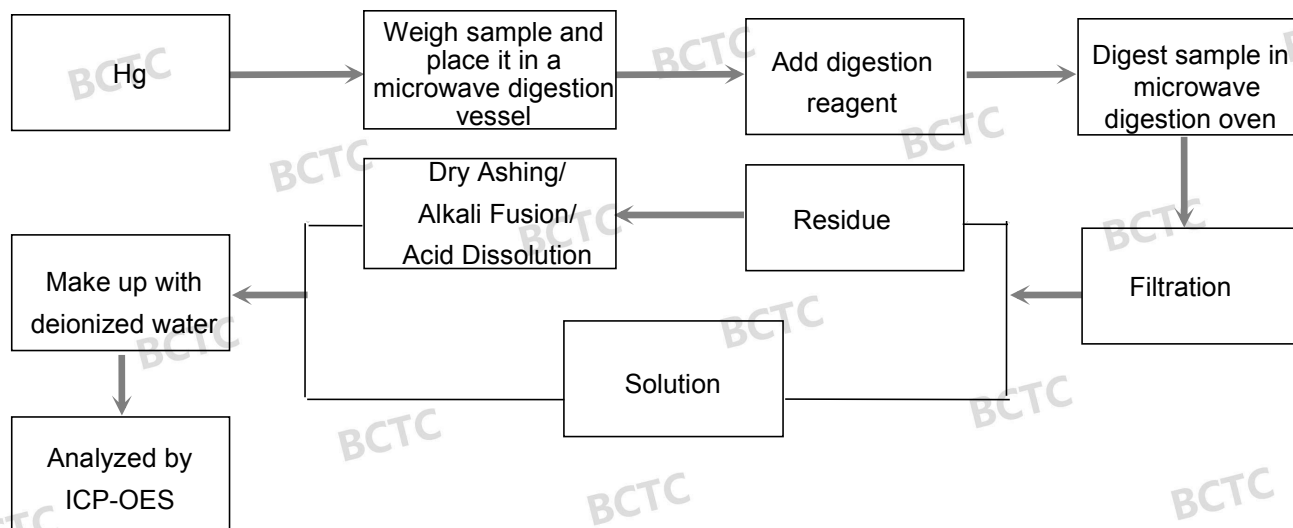


# Test Report

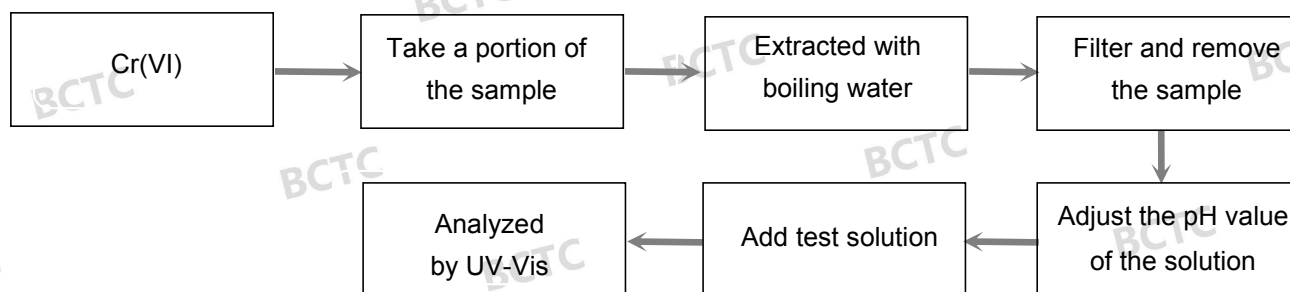
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◆IEC 62321-4:2013+AMD1:2017



◆IEC 62321-7-1:2015 Ed.1.0

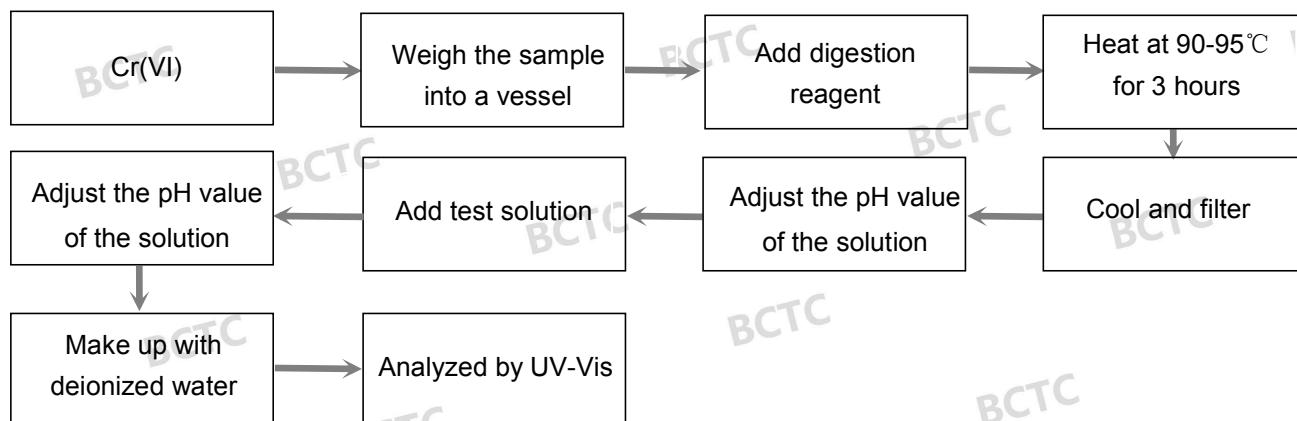


# Test Report

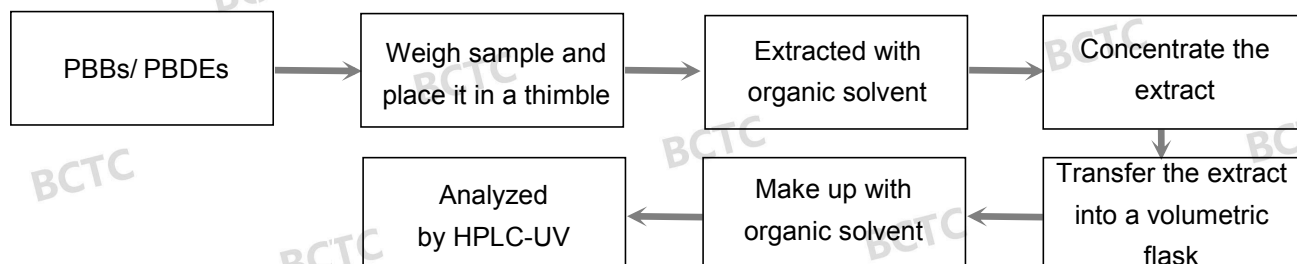
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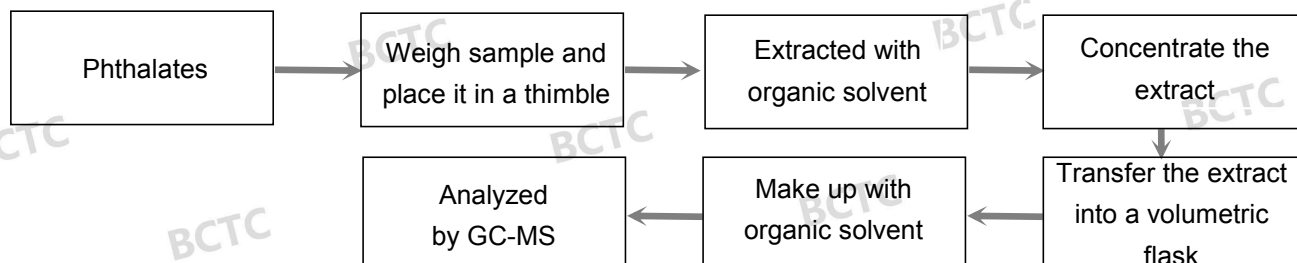
◆IEC 62321-7-2:2017 Ed.1.0



◆IEC 62321-6:2015 Ed.1.0



◆IEC 62321-8:2017 Ed.1.0





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## Photograph of Sample

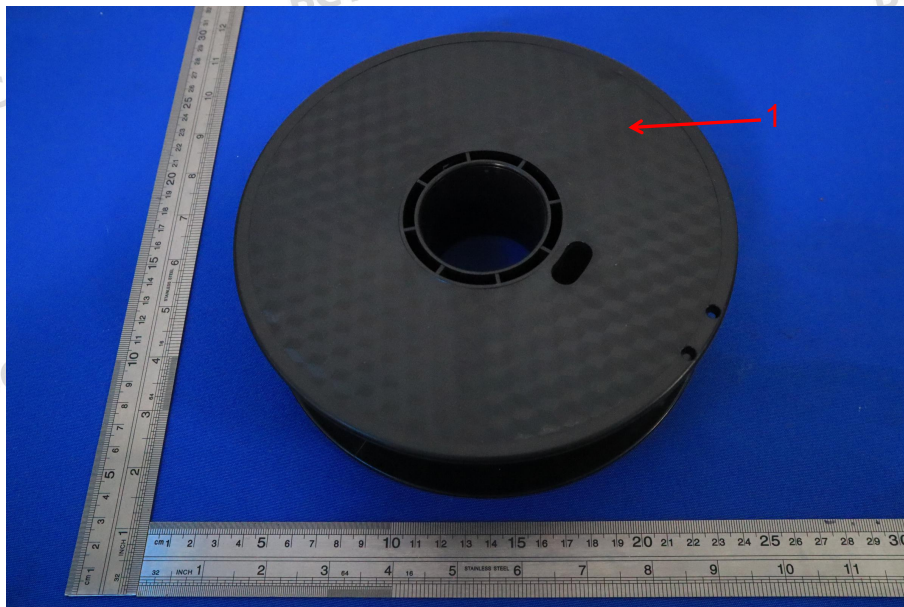


Fig.1



Fig.2



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Fig.3

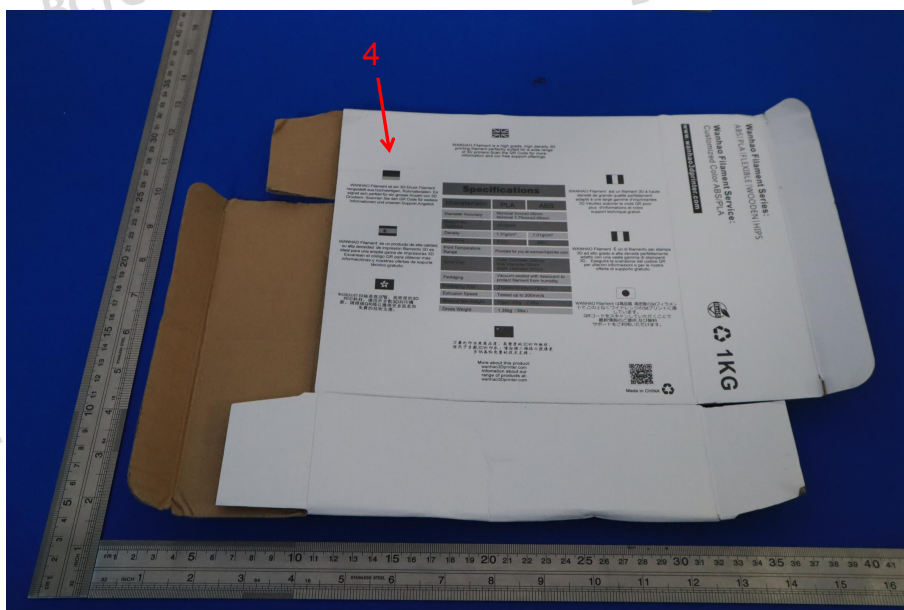


Fig.4

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## STATEMENT

1. The equipment lists are traceable to the national reference standards.
2. The test report can not be partially copied unless prior written approval is issued from our lab.
3. The test report is invalid without stamp of laboratory.
4. The test report is invalid without signature of person(s) testing and authorizing.
5. The test process and test result is only related to the Unit Under Test.
6. The quality system of our laboratory is in accordance with ISO/IEC17025.
7. If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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\*\*\*\*\* END OF REPORT \*\*\*\*\*