

## TEST REPORT:

No. CPSA/210359139-CA59955  
Job Ref. C&P/2021-03-09-027

REPORTED DATE: 26-March-2021

### DYNACRAFT INDUSTRIES SDN. BHD.

NO. 255-A, BLOCK D, PHASE II,  
BAYAN LEPAS INDUSTRIAL ZONE,  
11900 PENANG, MALAYSIA.

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

SAMPLE DESCRIPTION : PRE-PLATED LEADFRAME C7025 (STANDARD/MICRO NiPdAu & ADVANCED MICRO/RT PPF NiPdAuAg)

SAMPLE RECEIVED : 09-March-2021

TESTING PERIOD : 09-March-2021 to 26-March-2021

TEST REQUESTED : Selected test(s) as requested by customer

TEST METHOD : -PLEASE REFER TO NEXT PAGE(S)-

TEST RESULTS : -PLEASE REFER TO NEXT PAGE(S)-

CONCLUSION : Based on the performed tests on submitted sample(s), the result(s) of Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (CrVI), Polybrominated biphenyl, PBB, Polybrominated diphenyl ether, PBDE, Dibutyl phthalate (DBP), Benzyl butyl phthalate (BBP), Di(2-ethylhexyl) phthalate (DEHP), Diisobutyl phthalate (DIBP) complies/comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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SGS (MALAYSIA) SDN BHD

TAY SIAM PINE  
TECHNICAL MANAGER  
IKM No. M/3452/6047/11/12



Test Report Form No.: SGS/TR/CP/013, Ver: 2.0, Effective Date: 15/03/2021

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## TEST RESULTS:

### Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

| Test Parameter(s):         | Unit   | Test Method                                                                                                                              | Result | MDL  | Limit    |
|----------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------|--------|------|----------|
| Cadmium (Cd)               | mg/kg  | With reference to IEC 62321-5:2013. Analysis performed by ICP-OES. (Decision rule: refer Appendix, category 1)                           | N.D.   | 2    | Max 100  |
| Lead (Pb)                  | mg/kg  | With reference to IEC 62321-5:2013. Analysis performed by ICP-OES. (Decision rule: refer Appendix, category 1)                           | N.D.   | 2    | Max 1000 |
| Mercury (Hg)               | mg/kg  | With reference to IEC 62321-4:2013+A1:2017. Analysis performed by ICP-OES. (Decision rule: refer Appendix, category 1)                   | N.D.   | 2    | Max 1000 |
| Hexavalent Chromium (CrVI) | µg/cm² | With reference to IEC 62321-7-1:2015. Analysis performed by Colorimetric Method using UV-Vis. (Decision rule: Refer Appendix category 2) | N.D.   | 0.10 | -        |
| Sum of PBBs                | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | Max 1000 |
| Monobromobiphenyl          | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Dibromobiphenyl            | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Tribromobiphenyl           | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Tetrabromobiphenyl         | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Pentabromobiphenyl         | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Hexabromobiphenyl          | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Heptabromobiphenyl         | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |
| Octabromobiphenyl          | mg/kg  | With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 1)                          | N.D.   | 5    | -        |

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## TEST RESULTS:

### Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

| Test Parameter(s):       | Unit  | Test Method                                                                                                    | Result | MDL | Limit    |
|--------------------------|-------|----------------------------------------------------------------------------------------------------------------|--------|-----|----------|
| Nonabromobiphenyl        | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 1) | N.D.   | 5   | -        |
| Decabromobiphenyl        | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 1) | N.D.   | 5   | -        |
| Sum of PBDEs             | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | Max 1000 |
| Monobromodiphenyl ether  | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Dibromodiphenyl ether    | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Tribromodiphenyl ether   | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Hexabromodiphenyl ether  | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Octabromodiphenyl ether  | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Nonabromodiphenyl ether  | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |
| Decabromodiphenyl ether  | mg/kg | With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer Appendix category 1)     | N.D.   | 5   | -        |

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**TEST REPORT:**

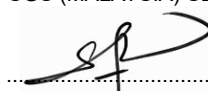
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- Note :
- (a) mg/kg = ppm ; ug/kg = ppb (0.01 mg/kg = 10 ug/kg); 0.1wt% = 1000ppm
  - (b) N.D. = Not Detected
  - (c) MDL = Method Detection Limit
  - (d) - = Not regulated
  - (e) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
  - (f) IEC 62321 series is equivalent to EN 62321 series.  
[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
  - (g) a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13  $\mu\text{g}/\text{cm}^2$ . The sample coating is considered to contain CrVI.
  - b. The sample is negative for CrVI if CrVI is N.D. (concentration less than 0.10  $\mu\text{g}/\text{cm}^2$ ). The coating is considered a non-CrVI 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.
- For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

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## TEST RESULTS:

### Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

Optional: RoHS Directive 2011/65/EU, priority substances

| Test Parameter(s):                                           | Unit  | Test Method                                                                                            | Result | MDL |
|--------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------|--------|-----|
| Hexabromocyclododecane (HBCDD)(CAS No.: 3194-55-6,25637-99-4 | mg/kg | In-house method, SGS-TM-RSTS-O-012, with reference to IEC 62321-6:2015. Analysis was performed by GCMS | N.D.   | 5   |

Note : (a) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.  
(b) N.D. = Not Detected

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## TEST RESULTS:

### Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

| Test Parameter(s):                                      | Unit  | Test Method                                                                                                | Result | MDL | Limit    |
|---------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------|--------|-----|----------|
| Dibutyl phthalate (DBP)<br>(CAS No. 84-74-2)            | mg/kg | With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 1) | N.D.   | 50  | Max 1000 |
| Benzyl butyl phthalate (BBP)<br>(CAS No. 85-68-7)       | mg/kg | With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 1) | N.D.   | 50  | Max 1000 |
| Di(2-ethylhexyl) phthalate (DEHP)<br>(CAS No. 117-81-7) | mg/kg | With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 1) | N.D.   | 50  | Max 1000 |
| Diisobutyl phthalate (DIBP)<br>(CAS No. 84-69-5)        | mg/kg | With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 1) | N.D.   | 50  | Max 1000 |

- Note :
- (a) mg/kg = ppm ; ug/kg = ppb (0.01 mg/kg = 10 ug/kg); 0.1wt% = 1000ppm
  - (b) N.D. = Not Detected
  - (c) MDL = Method Detection Limit
  - (d) - = Not regulated
  - (e) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
  - (f) IEC 62321 series is equivalent to EN 62321 series.  
[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
  - (g) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

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## TEST RESULTS BY CHEMICAL METHOD:

### Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

| Test Parameter(s):    | Unit  | Test Method                                                                               | Result | MDL |
|-----------------------|-------|-------------------------------------------------------------------------------------------|--------|-----|
| Beryllium (Be)        | mg/kg | With reference to EPA Method 3051A, and performed by ICP-OES.                             | N.D.   | 2   |
| Antimony (Sb)         | mg/kg | With reference to EPA Method 3051A, and performed by ICP-OES.                             | N.D.   | 2   |
| Halogen               | -     | -                                                                                         | -      | -   |
| Halogen-Fluorine (F)  | mg/kg | With reference to BS EN 14582:2016, analysis performed by IC method for Fluorine content. | N.D.   | 50  |
| Halogen-Chlorine (Cl) | mg/kg | With reference to BS EN 14582:2016, analysis performed by IC method for Chlorine content. | N.D.   | 50  |
| Halogen-Bromine (Br)  | mg/kg | With reference to BS EN 14582:2016, analysis performed by IC method for Bromine content.  | N.D.   | 50  |
| Halogen-Iodine (I)    | mg/kg | With reference to BS EN 14582:2016, analysis performed by IC method for Iodine content.   | N.D.   | 50  |

Note : (a) mg/kg = ppm ; ug/kg = ppb (0.01 mg/kg = 10 ug/kg); 0.1wt% = 1000ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) Negative = Undetectable / Positive = Detectable

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**TEST RESULTS:**
**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

Test Method: With reference to CEN/TS 15968:2010. Analysis was performed by LC-MS

| Test Parameter(s):                                  | Result (%) | Max. Limit ( $\mu\text{g}/\text{m}^2$ )<br>(Textile/Coated material) | Max.Limit(%)<br>(Plastic) | Max. Limit(%)<br>(Substances/<br>in mixtures) |
|-----------------------------------------------------|------------|----------------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Perfluorooctanesulfonic acid (PFOS)                 | N.D.       | 1                                                                    | 0.1                       | 0.001                                         |
| Perfluorooctanoic acid (PFOA)<br>(CAS No. 335-67-1) | N.D.       | /                                                                    | /                         | /                                             |
| <b>Conclusion</b>                                   | PASS       |                                                                      |                           |                                               |

Note: (a) N.D. = Not Detected

(b) Detection limit =  $1 \mu\text{g}/\text{m}^2$  for Textile / Coated Material

= 0.001% for Plastic, substances or mixtures

(c) Recommended requirement with reference to Commission Regulation (EU) 2019/1021 on Persistent Organic Pollutant.

(d) PFOS refers to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

## Appendix

| Category | Decision Rule Statement                                                                                                                                                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Based on binary statement with guard band (equal to the expanded measurement uncertainty with a 95% coverage probability, $w=U95$ ) in ILAC-G8:09/2019 Clause 4.2.2.                                                          |
| 2        | According to IEC 62321-7-1 Edition 1.0 2015-09 Section 7: Table 1- Comparison to standard and interpretation of result.                                                                                                       |
| 3        | Based on binary statement for simple acceptance rule ( $w=0$ ) in ILAC-G8:09/2009 Clause 4.2.1.                                                                                                                               |
| 4        | Based on non-binary statement with guard band (equal to the expanded measurement uncertainty with a 95% coverage probability, $w=U95$ ) in ILAC-G8:09/2019 Clause 4.2.3.                                                      |
| 5        | According to IEC 62321-3-1 Edition 1.0 2013-06 Annex A.3 Interpretation of result.                                                                                                                                            |
| Remark   | When decision rule is not feasible to be used and the uncertainty of the result is available to be provided, the uncertainty range of result will be shown in the report. Otherwise, only result will be shown in the report. |

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TAY SIAM PINE  
TECHNICAL MANAGER  
IKM No. M/3452/6047/11/12



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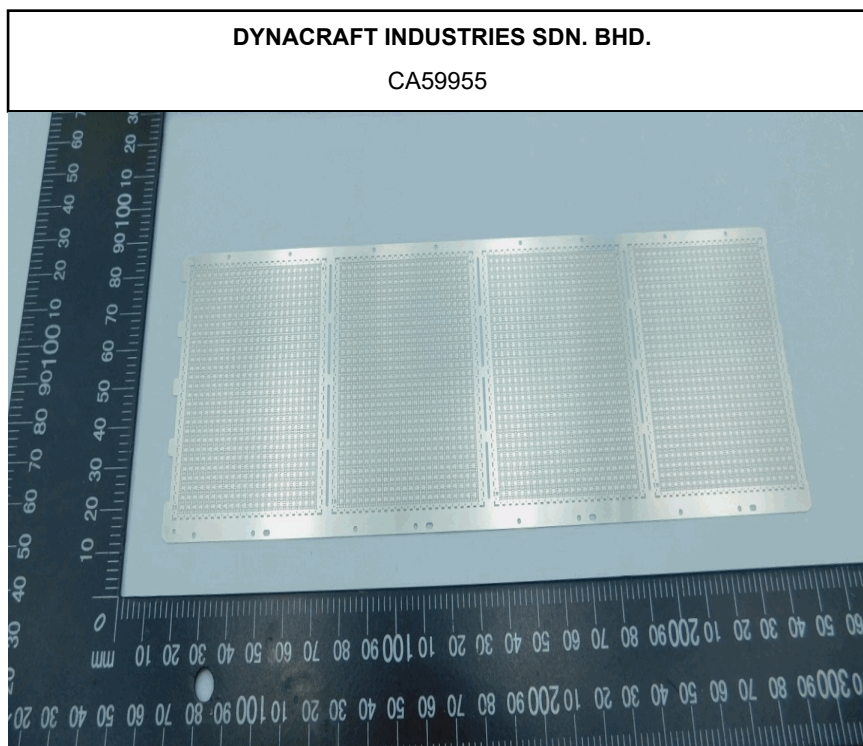
## TEST REPORT:

No. CPSA/210359139-CA59955  
Job Ref. C&P/2021-03-09-027

REPORTED DATE: 26-March-2021

### Test Part Description :

Sample Description: -PLEASE REFER TO PAGE 1-



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## 1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321-5 2013

Sample Receiving and Registration  
↓  
Sample Preparation  
↓  
Weigh sample (0.2-0.5g) into digestion vessel  
↓  
Acid digestion (Hotplate)  
↓  
"Totally Dissolved"  
↓  
Filtration  
↓  
Analyses by ICP

## 2. DETERMINATION OF LEAD CONTENT BY IEC 62321-5 2013

Sample Receiving and Registration  
↓  
Sample Preparation  
↓  
Weigh sample (0.2-0.5g) into digestion vessel  
↓  
Acid digestion (Hotplate)  
↓  
"Totally Dissolved"  
↓  
Filtration  
↓  
Analyses by ICP

## 3. DETERMINATION OF MERCURY CONTENT BY IEC 62321-4 2013/AMD1 2017

Sample Receiving and Registration  
↓  
Sample Preparation  
↓  
Weigh sample (0.1-0.5g) into digestion vessel  
↓  
Acid digestion (Hotplate)  
↓  
"Totally Dissolved"  
↓  
Filtration  
↓  
Analyses by ICP

## 4. DETERMINATION OF HEXAVALENT CHROMIUM BY IEC 62321-7-1 2015

Sample Receiving and Registration  
↓  
Sample Preparation  
↓  
Boiling-water-extraction  
↓  
Analyses by UV- Spectrophotometer  
↓  
Test Report

## 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321-6 2015

Sample Preparation  
↓  
Weigh sample (0.5-4.0g) into extraction thimble  
↓  
Soxhlet Extraction with Toluene  
↓  
Filter through 0.45 um membrane filter  
↓  
Analyses by GC-MS (with appropriate dilution)

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### DETERMINATION OF HBCDD CONTENT

Sample preparation  
↓  
Weigh sample (0.5 – 4.0g) into extraction thimble  
↓  
Solvent extraction with Toluene  
↓  
Filter through 0.45 µm membrane filter  
↓  
Analysis by GC-MS (with appropriate dilution)

### DETERMINATION OF PHTHALATES WITH GC-MS BY IEC 62321-8:2017

Sample Cutting / Preparation  
↓  
Sample Measurement  
↓  
Solvent Extraction  
↓  
Concentrate / Dilute extracted solution  
↓  
GC-MS analysis  
↓  
DATA

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REPORTED DATE: 26-March-2021

### MICROWAVE ASSISTED ACID DIGESTION OF ORGANICALLY BASED METRICES BY US EPA 3051A

Sample Preparation  
↓  
Weight sample (0.2-0.5g) into digestion vessel  
↓  
Acid digestion  
↓  
"Totally Dissolved"  
↓  
Filtration  
↓  
Analyses by ICP

### DETERMINATION OF HALOGEN CONTENT

Sample pre-treatment  
↓  
Weighting and putting sample in cell  
↓  
Combustion / Absorption  
↓  
Dilution to fixed volume  
↓  
Analyses by IC

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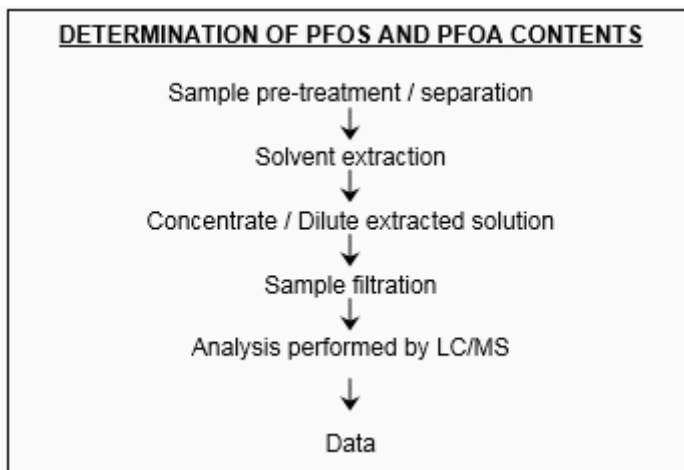
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\*\*\* End of test report \*\*\*

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