# TEST REPORT

## Test Report No. GGN/H(FCM)/22/001828

## Dated 2022.09.22

**Sample Image(s) (As Received)**

Component No. A

**Reference Image(s)**

Laboratory:
TÜV SÜD South Asia Pvt. Ltd.
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Saki Naka, Andheri (East),
Mumbai – 400072. India

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| | | |
|---|---|---|
| **Applicant / Company Name** | : | LEETHA PACK PRIVATE LIMITED |
| **Address** | : | MAJOR INDUSTRIAL ESTATE, SOUTH KALAMASSERY, COCHIN-683104-KERALA |
| **Attention / Contact Person** | : | DAWN MATHEWS |
| **Tested sample** | : | RECEIVED ON 2022.08.16 AT 10:03 P.M. |
| **Test period** | : | 2022.08.26 TO 2022.09.22 |
| **Article / sample description** | : | PAPER CUP BOARD |
| **Product Type/End use** | : | PAPER CUP |
| **Country of Origin** | : | INDIA |

*Note: The submitted sample(s) is / are Not Drawn by the Laboratory*

*NOTE: Unless otherwise agreed upon, Pass or Fail or Statement of compliance verdicts are given based on the measured values without any considerations of measurement uncertainties. Every test method has a measurement uncertainty which has been evaluated by the laboratory and are available on request. By taking measurement uncertainties into account it might happen that measured values can neither be assessed as Pass nor as Fail.*



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**Remarks:**

1. Sample(s) is / are tested as on-received basis.
2. Test(s) performed as requested by applicant.
3. Conclusion(s) of the test(s) was drawn as per compliance requirement(s) specified by applicant.
4. Tests “Specific migration of primary aromatic amines” were subcontracted to TÜV SÜD South Asia Pvt. Ltd, Ranipet (India).
5. Test “Transfer of antimicrobial agents” was subcontracted to TÜV SÜD South Asia Pvt. Ltd, Bangalore (India).

**Authorized By**

Robin Kumar Tyagi
(Authorised Signatory)

**Authorized By**

Rashmi Gupta
()

**Please Contact:**

**For any technical issues: Anuradha Dhamija at :Anuradha.Dhamija@tuvsud.com**
**For any complaint: Ashima Sapra at: Ashima.Sapra@tuvsud.com**



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**Summary of Test Result(s)**

| S. No. | Test(s) | Conclusion(#) |
|---|---|---|
| 1. | Sensory verification (Transfer of taste and Odour) | Pass |
| 2. | Extractable formaldehyde | Pass |
| 3. | Extractable heavy metals (lead, cadmium, & mercury) | Pass |
| 4. | Pentachlorophenol (PCP) content | Pass |
| 5. | Determination of Transfer of antimicrobial agents | Pass |
| 6. | Overall migration | Pass |
| 7. | Specific migration of heavy metals | Pass |
| 8. | Specific migration of primary aromatic amines (PAAs) | Pass |
| 9. | Specific migration of formaldehyde | Pass |
| 10. | Specific Migration of Bisphenol A (BPA) | Pass |
| 11. | Specific migration of acrylonitrile | Pass |
| (#) For details regarding specification(s) / regulation(s) based on which compliance is decided, refer test details. | | |

**Material list / List of material(s) (As confirmed by applicant)**

| Component No. | Component description | Material | Color |
|---|---|---|---|
| A | PAPER CUP BOARD | Coated Paper | White |

**Sampling plan (As requested by applicant)**

| S. No. | Test | Component No. |
|---|---|---|
| 1. | Sensory verification (Transfer of taste and odour) | A |
| 2. | Extractable formaldehyde | A |
| 3. | Extractable heavy metals (lead, cadmium, & mercury) | A |
| 4. | Pentachlorophenol (PCP) content | A |
| 5. | Determination of Transfer of antimicrobial agents | A |
| 6. | Overall migration | A |
| 7. | Specific migration of heavy metals | A |
| 8. | Specific migration of primary aromatic amines (PAAs) | A |
| 9. | Specific migration of formaldehyde | A |
| 10. | Specific Migration of Bisphenol A (BPA) | A |
| 11. | Specific migration of acrylonitrile | A |

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Test Result:

**Sensory verification of smell / odour**

Test Specification(s) / Regulation(s): Council of Europe Resolution AP (2002) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs and Framework regulation (EC) No 1935/2004
Test method adopted: DIN EN 1230-1:2010;
Simulant(s) used: Distilled water;
Test condition(s): 40°C for 24 Hours

| Component No. | Result (Rating) | Compliance Requirement / Limit Max. | Conclusion |
|---|---|---|---|
| A | 1 | Less than 2.5 | Pass |

Note:
(Intermediate grades are allowed)
0 = no perceptible difference in odour;
1 = just perceptible difference in odour (still difficult to define);
2 = slight difference in odour;
3 = marked difference in odour;
4 = strong difference in odour.

**Sensory verification of taste**

Test Specification(s) / Regulation(s): Council of Europe Resolution AP (2002) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs and Framework regulation (EC) No 1935/2004
Test method adopted: DIN EN 1230-2:2018;
Simulant(s) used: Distilled water;
Test condition(s): 40°C for 24 Hours

| Component No. | Result (Rating) | Compliance Requirement / Limit Max. | Conclusion |
|---|---|---|---|
| A | 0 | Less than 2.5 | Pass |

Note:
(Intermediate grades are allowed)
0 = no perceptible difference in taste;
1 = just perceptible difference in taste (still difficult to define);
2 = slight difference in taste;
3 = marked difference in taste;
4 = strong difference in taste.

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**Extractable Formaldehyde**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2002) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Regulation (EC) No. 1935/2004);

Test method(s) adopted: Hot water Extraction as per EN 647 followed by analysis using UV – VIS Spectrophotometer as per BS EN 1541:2001;

Equipment(s) used: Ultra-violet – Visible Spectrophotometer.

| Component No. | Result (mg/kg) | Limit of quantification (mg/kg) | Maximum permissible limit | Conclusion |
|---|---|---|---|---|
| A | ND | 10.0 | 15.0 mg/kg | Pass |

**Extractable heavy metals (lead, cadmium, mercury)**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2002) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Regulation (EC) No. 1935/2004);

Test method: (For Lead and Cadmium) EN 647 (Hot water extract method) followed by analysis with reference to BS EN 12498:2005 / (For Mercury) EN 647 (Hot water extract method) followed by analysis with reference to BS EN 12497:2005;
Equipment(s) used: ICP-MS (Inductively Coupled Plasma – Mass Spectrometer)

| Test parameter | Result ($mg/dm^2$) Component No. A | Limit of quantification ($mg/dm^2$) | Maximum permissible limit ($mg/dm^2$) | Conclusion |
|---|---|---|---|---|
| Extractable lead (as Pb) | ND | 0.001 | 0.003 | Pass |
| Extractable cadmium (as Cd) | ND | 0.001 | 0.002 | Pass |
| Extractable mercury (as Hg) | ND | 0.001 | 0.002 | Pass |

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## Dated 2022.09.22

**Pentachlorophenol (PCP) content**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2002) 1/Policy Statement on paper and board materials and articles intended to come into contact with / Regulation (EC) No. 1935/2004)
Test method(s) adopted: ISO 15320:2011;
Equipment(s) used: GC – MS (Gas Chromatograph – Mass Spectrometer)

| Component No. | Result (mg/kg) | Limit of quantification (mg/kg) | Maximum permissible limit | Conclusion |
|---|---|---|---|---|
| A | ND | 0.05 | 0.15 mg/kg | Pass |

**Determination of Transfer of antimicrobial agents**

Test Specification(s) / Regulation(s): BfR recommendation XXXVI (Paper and board for food contact) supplementing German LFGB section 31 (§) (para 1) of Food, Commodities and Feed Code (Food and Feed Code - LFGB);
Test method(s) adopted: EN 1104:2018 (Determination of the transfer of Antimicrobial constituents);
Test organism(s) evaluated: Aspergillus niger ATCC 6275 & Bacillus subtilis ATCC 6633;
Component tested: Component No. A

| Test organism | Inhibition zone area / Number of positive test specimen | Compliance Requirement / Limit Max. | Conclusion |
|---|---|---|---|
| Aspergillus niger ATCC 6275 | Absent / 0 | Absence in Zone Inhibition | Pass |
| Bacillus subtilis ATCC 6633 | Absent / 0 | Absence in Zone Inhibition | Pass |

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**Overall Migration**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2004) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Framework Regulation (EC) No. 1935/2004);
Test method(s) adopted: EN 1186-1 and EN 1186-13
Simulant(s) used: Refer below;
Test condition(s): 70°C for 2 Hours (Single use condition / 1st attack);

| S. No. | Simulant | Result (mg/dm$^2$) – Component No. A | Maximum Permissible Limit (mg/dm$^2$) | Conclusion |
|---|---|---|---|---|
| 1. | 3 % (w/v) acetic acid | ND | 10 | Pass |
| 2. | 50 % (v/v) ethanol | ND | 10 | Pass |
| Limit of quantification: 2.0 mg/dm$^2$ | | | | |

**Specific migration of heavy metals**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2004) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Framework Regulation (EC) No. 1935/2004);
Test method(s) adopted: With reference to EN 13130-1:2004 for exposure part followed by analysis using ICPMS;
Simulant(s) used: 3 % (w/v) acetic acid;
Test condition(s): 70°C for 2 Hours (Single use condition / 1st attack);
Equipment(s) used: ICP – MS (Inductively Coupled Plasma – Mass Spectrometer).

| S. No. | Heavy metal | Result (mg/kg) – Component No. A | Limit of Quantification (mg/kg) | Compliance requirement / Limit Max. (mg/kg) |
|---|---|---|---|---|
| 1. | Barium (as Ba) | ND | 0.03 | 1 |
| 2. | Cobalt (as Co) | ND | 0.03 | 0.05 |
| 3. | Lithium (as Li) | ND | 0.03 | 0.6 |
| 4. | Copper (as Cu) | ND | 0.03 | 5 |
| 5. | Manganese (as Mn) | ND | 0.03 | 0.6 |
| 6. | Zinc (as Zn) | ND | 0.03 | 5 |
| **Conclusion** | | Pass | -- | -- |

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**Specific migration of primary aromatic amines (PAA)**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2004) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Framework Regulation (EC) No. 1935/2004);
Test method(s) adopted: With reference to EN 13130-1:2004 for exposure part followed by analysis using ICP – MS;
Simulant(s) used: 3 % (w/v) acetic acid ;
Test condition(s): 70°C for 2 Hours (Single use condition / 1st attack);
Equipment(s) used: LC-MS-MS (Liquid Chromatography with tandem mass spectrometry);

| S. No. | Primary Aromatic Amines | Cas No. | Result (mg/kg) Component No. A | Compliance requirement / Limit Max. (mg/kg) |
|---|---|---|---|---|
| 1. | biphenyl-4-ylamine 4-aminobiphenyl xenylamine **(*)(#)** | 92-67-1 | ND | **Requirement as per REACH Annex XVII Appendix 8: Entry 43:**<br><br>**(#)** Primary aromatic amines shall be less than 0.002 mg/kg for each analyte<br><br>**Requirement as per JRC Technical guidelines (Refer Note 7):**<br>**(*)** Sum of Primary aromatic amines shall be less than 0.01 mg/kg |
| 2. | Benzidine **(*)(#)** | 92-87-5 | ND | |
| 3. | 4-chloro-o-toluidine **(*)(#)** | 95-69-2 | ND | |
| 4. | 2-naphthylamine**(#)** | 91-59-8 | ND | |
| 5. | o-aminoazotoluene 4-amino-2',3-dimethylazobenzene 4-o-tolylazo-o-toluidine**(#)** | 97-56-3 | ND | |
| 6. | 5-nitro-o-toluidine**(#)** | 99-55-8 | ND | |
| 7. | 4-chloroaniline **(*)(#)** | 106-47-8 | ND | |
| 8. | 4-methoxy-m-phenylenediamine **(*)(#)** | 615-05-4 | ND | |
| 9. | 4,4'-methylenedianiline 4,4'-diaminodiphenylmethane **(*)(#)** | 101-77-9 | ND | |
| 10. | 3,3'-dichlorobenzidine 3,3'-dichlorobiphenyl-4,4'-ylenediamine**(#)** | 91-94-1 | ND | |
| 11. | 3,3'-dimethoxybenzidine o-dianisidine **(#)** | 119-90-4 | ND | |
| 12. | 3,3'-dimethylbenzidine 4,4'-bi-o-toluidine **(*)(#)** | 119-93-7 | ND | |
| 13. | 4,4'-methylenedi-o-toluidine **(*)(#)** | 838-88-0 | ND | |
| 14. | 6-methoxy-m-toluidine p-cresidine **(*)(#)** | 120-71-8 | ND | |
| 15. | 4,4'-methylene-bis-(2-chloro-aniline) 2,2'-dichloro-4,4'-methylene-dianiline**(#)** | 101-14-4 | ND | |
| 16. | 4,4'-oxydianiline **(*)(#)** | 101-80-4 | ND | |
| 17. | 4,4'-thiodianiline**(#)** | 139-65-1 | ND | |
| 18. | o-toluidine 2-aminotoluene **(*)(#)** | 95-53-4 | ND | |
| 19. | 4-methyl-m-phenylenediamine **(*)(#)** | 95-80-7 | ND | |
| 20. | 2,4,5-trimethylaniline **(*)(#)** | 137-17-7 | ND | |
| 21. | o-anisidine 2-methoxyaniline **(*)(#)** | 90-04-0 | ND | |
| 22. | 4-amino azobenzene**(#)** | 60-09-3 | ND | |
| 23. | Aniline (ANL) **(*)** | 62-53-3 | ND | |
| 24. | 2,4-Dimethylaniline (2,4-DMA) **(*)** | 95-68-1 | ND | |
| 25. | 2,6-Dimethylaniline (2,6-DMA) **(*)** | 87-62-7 | ND | |
| 26. | m-Phenylenediamine (m-PDA) **(*)** | 108-45-2 | ND | |
| 27. | p-Phenylenediamine (p-PDA) **(*)** | 106-50-3 | ND | |
| 28. | 2,6-Toluenediamine (2,6-TDA) **(*)** | 823-40-5 | ND | |
| **Conclusion** | | | Pass | |

Limit of quantification (mg/kg): 0.002

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South Asia

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**Specific migration of Formaldehyde**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2004) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Regulation (EC) No. 1935/2004);
Test method(s) adopted: With reference to EN 13130-1:2004;
Test condition(s): 70°C for 2 Hours (one-time / single use condition / 1st attack);
Equipment(s) used: Ultra-violet – Visible Spectrophotometer.

| Simulant | Result (mg/kg) Component No. A | Limit of quantification (mg/kg) | Maximum permissible limit | Conclusion |
|---|---|---|---|---|
| 3 % (w/v) acetic acid | ND | 10.0 | 15 (mg/kg) | Pass |

**Specific migration of Bisphenol A (BPA) / {2,2-bis(4-hydroxyphenyl) propane (CAS No.: 000080-05-7)}**

Test Specification(s) / Regulation(s): With reference to Council of Europe Resolution AP (2004) 1/Policy Statement on paper and board materials and articles intended to come into contact with foodstuffs / Regulation (EC) No. 1935/2004);
Test method(s) adopted: With reference to EN 13130-1:2004 followed by analysis as per CEN/TS 13130-13:2005;
Simulant(s) used: 3 % (w/v) acetic acid ;
Test condition(s): 70°C for 2 Hours ( One Time/ Single use condition / 1st attack );
Equipment(s) used: LC – MS (Liquid Chromatograph – Mass Spectrometer).

| Component No. | Test result(s) (mg/kg) | Compliance Requirement / Limit Max. (mg/kg) | Conclusion |
|---|---|---|---|
| A | ND | 0.05 | Pass |
| Limit of quantification: 0.05 mg/kg | | | |

**Specific migration of Acrylonitrile**

Test Specification(s) / Regulation(s): Framework Regulation (EC) No. 1935/2004);
Test method(s) adopted: With reference to EN 13130-1:2004;
Simulant(s) used: 3 % (w/v) acetic acid;
Test condition(s): 70°C for 2 Hours (one-time / single use condition / 1st attack);
Equipment(s) used: LC – MS (Liquid Chromatograph – Mass Spectrometer).

| Component No. | Test result(s) (mg/kg) | Compliance Requirement / Limit Max. (mg/kg) | Conclusion |
|---|---|---|---|
| A | ND | 0.05 | Pass |
| Limit of quantification: 0.05 mg/kg | | | |

Abbreviations

"mg/kg" denotes milligram per kilogram & is equivalent to ppm (parts per million); "ND" denotes Not Detected or below limit of quantification; "°C" denotes degree Celsius; "%" denotes percent; "% (v/v)" denotes percent by volume.; "% (w/v)" denotes percent in terms of mass / weight per unit volume; Conversion from % to ppm or mg/kg can be done by multiplying with 10,000; "mg/dm$^2$" denotes milligram per square decimetre;

--- END OF THE TEST REPORT ---

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