Test report ID XXXXX

Customer Example Company

Assignment Measurlabs provided testing services for food contact material as requested by the customer.

Sample(s) Sampling was performed by the customer.

Description: Recycled paper
Date of reception (dd/mm/yyyy): -
Batch number or other sample identification: -

Results The results presented on the next page(s) relate to the tested sample(s) only.

Summary of the results

Tests performed	Compliance
4,4'-bis(dimethylamino)benzophenone (Michler's ketone) **Specific migration assuming 100% migration based on content**	Compliant[1]
Phthalates **Specific migration assuming 100% migration based on content**	Compliant[1]
Benzophenone (CAS 119-61-9) **Specific migration assuming 100% migration based on content**	Compliant[1]
Bisphenol A **Specific migration assuming 100% migration based on content**	Compliant[1]
Bisphenol S **Specific migration assuming 100% migration based on content**	Compliant[1]
2,6-diisopropylnaphthalene (DIPN) content in paper and board	Compliant[1]
Sensory analysis – odor and flavor (EN 1230-1 and -2)	Compliant[2]
Transfer of antimicrobial components from paper or board	Compliant[3]
Elements (Cd, Al, Hg, Pb) in aqueous extracts of paper and board	Compliant[3]
Formaldehyde content in extracts of paper and board	Compliant[3]
Isothiazolinone content	Compliant[3]

[1] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.
[2] European Directorate for the Quality of Medicines & HealthCare of the Council of Europe (EDQM) document "Paper and board used in food contact materials and articles" (May, 2021).
[3] Results in accordance with BfR recommendation XXXVI (as of 01.08.2024).

On XXXXX, issued by

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Test results - Content of 4,4’-Bis(dimethylamino)-benzophenone (Michler’s ketone) and 4,4'-Bis(diethylamino)benzophenone (DEAB)

Methods

Content of 4,4'-Bis(dimethylamino)-benzophenone (Michler's ketone) and 4,4'-Bis(diethylamino)benzophenone (DEAB)
Accredited test method. Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Results

Parameter	CAS	Unit	Result	Criteria	Compliance[2]
4,4'-Bis(dimethylamino)-benzophenone (Michler’s ketone)	90-94-8	mg/kg[1]	< 6.0	-	-
		mg/kg of food[3]	< 0.01	Not detected (≤ 0.01)[4]	Compliant

[1] Content of substance in mass per sample.
[2] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.
[3] Amount of substance migrating into food by applying the conventional surface to volume ratio of 6 dm^2 : 1 kg of food.
[4] Calculated value assuming 100% migration based on residual content of the analyte.

Test results - content of phthalates

Test methods

Determination of specific migration of organic compounds in 95% ethanol by the UFLC method. Accredited test method. Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the 95% ethanol extract according to EN 15519 - 10 grams of the sample were immersed in 200 ml of 95% ethanol and left to extract for 2 hours at 20 °C. After 2 hours, the solution was decanted, and the sample was washed twice with 95% ethanol. The combined extract and washings were filtered into a 250 ml volumetric flask and added with 95% ethanol up to the mark. This leachate was then analysed.

Compound	CAS number	Unit	Result	Criteria	Compliance[2]
Dibutyl phthalate (DBP)	84-74-2	mg/l[1]	< 0.1	-	-
		mg/kg of food[3]	0.004[4]	≤ 0.12	compliant
Diisobutyl phthalate (DIBP)	84-69-5	mg/l[1]	< 0.1	-	-
		mg/kg of food[3]	0.004[4]	≤ 0.15	compliant
Di(2-ethylhexyl) phthalate (DEHP)	117-81-7	mg/l[1]	< 0.1	-	-
		mg/kg of food[3]	0.004[4]	≤ 0.6	compliant

[1] Expressed as mg of the determined compound per l of 95% ethanol leachate for an extraction ratio of 10 g / 250 ml.
[2] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.
[3] Amount of substance migrating into food by applying the conventional surface to volume ratio of 6 dm^2 : 1 kg of food.
[4] Calculated value assuming 100% migration based on residual content of the analyte.

Test results - Benzophenone

Methods

Benzophenone - Determination of specific migration of organic compound (Benzophenone) by the LC-MS method. Accredited test method. Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the 95% ethanol extract according to EN 15519 - 10 grams of the sample were immersed in 200 ml of 95% ethanol and left to extract for 2 hours at 20 °C. After 2 hours, the solution was decanted, and the sample was washed twice with 95% ethanol. The combined extract and washings were filtered into a 250 ml volumetric flask and added with 95% ethanol up to the mark. This leachate was then analysed.

Results

Parameter	CAS	Unit	Result	Criteria	Compliance[2]
Benzophenone	119-61-9	mg/l[1]	< 0.03	-	-
		mg/kg of food[3]	< 0.0012[4]	≤ 0.6	Compliant

[1] Expressed as mg of the determined compound per l of 95% ethanol leachate for an extraction ratio of 10 g / 250 ml.
[2] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.
[3] Amount of substance migrating into food by applying the conventional surface to volume ratio of 6 dm^2 : 1 kg of food.
[4] Calculated value assuming 100% migration based on residual content of the analyte.

Test results - Bisphenol A

Test methods

Determination of specific migration of bisphenol A in 95% ethanol by the UFLC method. Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the 95% ethanol extract according to EN 15519 - 10 grams of the sample were immersed in 200 ml of 95% ethanol and left to extract for 2 hours at 20 °C. After 2 hours, the solution was decanted, and the sample was washed twice with 95% ethanol. The combined extract and washings were filtered into a 250 ml volumetric flask and added with 95% ethanol up to the mark. This leachate was then analysed.

Parameter	CAS	Unit	Result	Criteria	Compliance[2]
Bisphenol A	80-05-7	mg/l[1]	< 0.01	-	-
		mg/kg of food[3]	0.0004[4]	≤ 0.05	compliant

[1] Expressed as mg of the determined compound per l of 95% ethanol leachate for an extraction ratio of 10 g / 250 ml.
[2] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.
[3] Amount of substance migrating into food by applying the conventional surface to volume ratio of 6 dm^2 : 1 kg of food.
[4] Calculated value assuming 100% migration based on residual content of the analyte.

Test results - Bisphenol S

Test methods

Determination of specific migration of bisphenol S in 95% ethanol by the UFLC method. Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the 95% ethanol extract according to EN 15519 - 10 grams of the sample were immersed in 200 ml of 95% ethanol and left to extract for 2 hours at 20 °C. After 2 hours, the solution was decanted, and the sample was washed twice with 95% ethanol. The combined extract and washings were filtered into a 250 ml volumetric flask and added with 95% ethanol up to the mark. This leachate was then analysed.

Parameter	CAS	Unit	Result	Criteria	Compliance
Bisphenol S	80-09-1	mg/l[1]	< 0.01	-	-
		mg/kg of food[3]	0.0004[4]	≤ 0.05	compliant

[1] Expressed as mg of the determined compound per l of 95% ethanol leachate for an extraction ratio of 10 g / 250 ml.
[2] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.
[3] Amount of substance migrating into food by applying the conventional surface to volume ratio of 6 dm^2 : 1 kg of food.
[4] Calculated value assuming 100% migration based on residual content of the analyte.

Test results - 2,6-Diisopropylonaphthalene (DIPN)

Methods

2,6-Diisopropylonaphthalene (DIPN) - EN 14719:2006
Accredited test method

Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Results

Parameter	CAS	Unit	Result[1]	Criteria[2]	Compliance[2]
2,6-Diisopropylonaphthalene (DIPN)	24157-81-1	mg/kg	< 0.6	As low as technically possible	Compliant

[1] The lower limit of the measuring range of the accredited method, which is also the limit of quantification set by the Laboratory.
[2] BfR Recommendation XXXVI. Paper and board for food contact of 01.08.2024. Annex to recommendation XXXVI.

Test results - Organoleptic properties

Test methods

Sensory analysis - scoring method (6 assessors) according to EN 1230-1:2009 (odor) and EN 1230-2:2009 (flavor). Test method accredited for paper and cardboard. Tests performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Test parameter	Simulant	Conditions	Value[1]	Criteria	Compliance[2]
Transfer of odor	-	1 day at 23 °C	1.0	< 3	compliant
Transfer of flavor	Chocolate	2 days at 23 °C	0.0	< 3	compliant

[1] The scale used for the odor and flavor assessment

0 - no noticeable deviation of the odor/flavor
1 - barely noticeable deviation of the odor/flavor (hard to define yet)
2 - weak deviation of the odor/flavor
3 - significant deviation of the odor/flavor
4 - strong deviation of the odor/flavor (this intensity does not determine the probable maximum)

[2] European Directorate for the Quality of Medicines & HealthCare of the Council of Europe (EDQM) document "Paper and board used in food contact materials and articles" (May, 2021) defines that the intensity of any taste or odor imparted from the final food contact material or article to the food is less than 3.

Test results - Permeability of antimicrobial components

Methods	**Permeability of antimicrobial components -** EN 1104:2019-02 Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.
Results	No permeability of antimicrobial components.
Compliance assessment	Results in accordance with BfR recommendation XXXVI (as of 01.08.2024).

Test results - Elements in aqueous extracts of paper and board

Methods

Determination of elements (Pb, Cd, Al, Hg) in water by the ICP-MS method.

Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the aqueous extract according to EN 645 - 10 grams of the sample were immersed in 200 ml of distilled water and left to extract for 24 hours at 23 ± 2°C. After 24 hours, the solution was decanted, and the sample was washed twice with distilled water. The combined extract and washings were filtered into a 250 ml volumetric flask and added with distilled water up to the mark. This leachate was then analysed.

Results

Parameter	Unit[1,2]	Result[3]	Criteria[4]	Compliance[4]
Aluminum (Al)	mg/kg	< 0.54	≤ 1	Compliant
Cadmium (Cd)	µg/l	< 0.001	≤ 5	Compliant
Lead (Pb)	µg/l	< 0.005	≤ 10	Compliant
Mercury (Hg)	µg/l	< 0.005	-	-

[1] Unit mg/kg: Result expressed as mg/kg of water extract. By convention, the result is considered equivalent to migration in mg/kg of food. This corresponds to 13.3 dm2/kg food if the mass of paper or board is 300g/m2 (BfR Rec. XXXVI; EDQM Paper and board used in food contact materials and articles, 1st Edition).

[2] Unit µg/l: content of the element in the cold water extract.

[3] The lower limit of the measuring range of the accredited method, which is also the limit of quantification set by the laboratory.

[4] BfR recommendation XXXVI. Paper and board for food contact (as of 01.08.2024).

Test results - Formaldehyde in aqueous extract of paper and board

Test methods

Determination of formaldehyde (CAS 50-00-0) in water by photometric method. Test method accredited for paper and cardboard. Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the aqueous extract according to EN 645 - 10 grams of the sample were immersed in 200 ml of distilled water and left to extract for 24 hours at 23 ± 2°C. After 24 hours, the solution was decanted, and the sample was washed twice with distilled water. The combined extract and washings were filtered into a 250 ml volumetric flask and added with distilled water up to the mark. This leachate was then analysed.

Compound	CAS number	Unit[2]	Result	Criteria	Compliance
Formaldehyde	50-00-0	mg/dm^2	< 0.001	≤ 1	compliant[3]

[2] mg/dm^2: content of extractable formaldehyde per dm^2 of sample.

[3] BfR recommendation XXXVI. Paper and board for food contact (as of 01.08.2024).

Test results - Isothiazolinones content in paper and board

Test methods

Determination of specific migration of organic compounds (BIT, MIT, and CMIT) in water by the LC-MS method.

Test performed by an ISO/IEC 17025 accredited external service provider with an accreditation number xxxxx.

Preparation of the 95% ethanol extract according to EN 15519 - 10 grams of the sample were immersed in 200 ml of 95% ethanol and left to extract for 2 hours at 20 °C. After 2 hours, the solution was decanted, and the sample was washed twice with 95% ethanol. The combined extract and washings were filtered into a 250 ml volumetric flask and added with 95% ethanol up to the mark. This leachate was then analysed.

Compound	CAS number	Unit[1]	Result	Criteria	Compliance
1,2-benzoisothiazol-3(2H)-one (BIT)	2634-33-5	mg/l	< 0.01	-	-
2-methyl-4-isothiazolin-3-one (MIT)	2682-20-4	mg/l	< 0.01	-	-
5-chloro-2-methyl-4-isothiazolin-3-one (CMIT)	26172-55-4	mg/l	< 0.01	-	-
1,2-benzoisothiazol-3(2H)-one (BIT)	2634-33-5	µg/dm2	< 0.06	see footnote[2]	compliant[3]
2-methyl-4-isothiazolin-3-one (MIT)	2682-20-4	µg/dm2	< 0.06	see footnote[2]	compliant[3]
5-chloro-2-methyl-4-isothiazolin-3-one (CMIT)	26172-55-4	µg/dm2	< 0.06	see footnote[2]	compliant[3]
Kathon (CMIT:MIT, 3:1)	55965-84-9	µg/dm2	Below limit of quantification	see footnote[2]	compliant[3]

[1] mg/l: content of substance in cold water extract.
µg/dm^2: content of substance in dm^2 of sample.

[2] According to the BfR recommendation XXXVI Paper and board for food contact (as of 01.08.2024), the following limits must not be exceeded:

- 1,2-Benzoisothiazol-3(2H)-one (BIT) 10 µg/dm²
- 2-methyl-4-isothiazolin-3-one (MIT) 1 µg/dm²
- Mixture 3:1 CMIT and MIT 0.5 µg/dm²

[3] BfR recommendation XXXVI Paper and board for food contact (as of 01.08.2024).

End of the test report