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Aschaffenburg, 8 September 2017

From: Ils-pf
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REPORT

Order No.: 2127/57 **Page 1 of 7 pages**

Client: KRPA Paper a.s.
Nádrazni 266
543 71 Hostinné
Czech Republic

Date of order: 25 July 2017

Receipt of sample material: 26 July 2017

Origin of sample material: From the client

Purpose: Analysis of three paper grades for their compliance with the demands on food contact materials

(Dr. Derra)
Managing Director

(Ils)
Officially certified
food chemist
Project manager

The present report refers exclusively to the samples as laid out therein. Information and statistical data on the results can be obtained on request.

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-14160-01-01
D-PL-14160-01-02

Sample Material

For analysis the following sample material was in hand:

Sample 1:	KH PACK Superior, 40gsm, T 973397
Sample 2:	KH PACK Laminated, 64gsm, NS – 201701110001
Sample 3:	KH PACK Basic Resistance, 34gm, T 96676

Carrying out of the Tests

Examination period: 28 July 2017 to 5 September 2017

1. Determination of the Grammage *

The determination was performed according to DIN EN ISO 536 after conditioning of the sample at 23 °C/50 % atmospheric humidity which is prescribed as norm climate with a reduced amount of test specimens.

Result:

Sample 1:	41.4	g/m²	≙	38.8	g dry matter/m²
Sample 2:	66.7	g/m²	≙	62.9	g dry matter/m²
Sample 3:	34.4	g/m²	≙	32.3	g dry matter/m²

2. Determination of the Moisture Content *

The determination was performed as single determination according to DIN EN ISO 638 in the condition as received.

Result:

Sample 1:	6.2	%
Sample 2:	5.5	%
Sample 3:	6.3	%

3. Preparation of Extracts *

The extracts were prepared according to the "Methodensammlung zur Untersuchung von Papier, Karton und Pappe für den Lebensmittelkontakt" (collection of methods for the examination of paper and board for food contact) of the BfR as well as according to DIN EN 645, 647 and 15519. The selection of suitable procedures for simulating the transfer of substances was performed according to the corresponding BfR guideline ("Leitfaden zur Überprüfung der Stoffübergänge von Bedarfsgegenständen aus Papier, Karton und Pappe").

Water:	24 hours at 23 °C
Isooctane:	24 hours at 20 °C

4. Determination of the Dry Matter in the Water Extract *

The determination was performed according to DIN EN 920 gravimetrically after drying at 105 °C:

Result:

Sample 1:	5.4	mg/dm²	≙	14	mg/g dry matter
Sample 2:	4.8	mg/dm²	≙	7.6	mg/g dry matter
Sample 3:	2.6	mg/dm²	≙	8.0	mg/g dry matter

5. Determination of Methanal (Formaldehyde) in the Water Extract *

The determination was performed according to DIN EN 1541 photometrically in line with the acetylacetone method.

Result:

Sample 1 - 3:	not determinable	<	0.004	mg/g dry matter

6. Determination of Glyoxal in the Water Extract *

The determination was performed according to DIN 54603.

Result:

Sample 1 - 3:	not determinable	<	0.005	mg/g dry matter

7. Determination of the Heavy Metals Contents in the Water Extract *

The determination was performed according to DIN EN 12498.

Result:

Sample 1 - 3:

Cadmium	(Cd):	not determinable	<	0.001	mg/l water extract
Lead	(Pb):	not determinable	<	0.001	mg/l water extract
Chromium	(Cr):	not determinable	<	0.004	mg/l water extract

8. IR-Spectroscopic Testing of the Dry Matter from the Water Extract *

The dry matter was ground up with KBr and examined by IR-spectroscopy.

Result:

Sample 1 - 3: Substances which might endanger health as well as deviations from the composition stated, which are detectable by this method, were not found.

9. Gaschromatographic Analysis of the Organic Solvent Extract*

The determination was performed according to SOP 160.200 by means of GC-FID. All compounds which elute between tetradecane (C_{14}) and tetracontane (C_{40}) were summed up semi-quantitatively against the internal standard tridecane (C_{13}). Analogously, a separate evaluation of the dialkyl ketones was performed considering the following substances:

Dipentadecyl ketone (Palmitone) Pentadecylheptadecyl ketone Diheptadecyl ketone (Stearone)
Heptadecylnonadecyl ketone Dinonadecyl ketone Nonadecylheneicosyl ketone
Diheneicosyl ketone

Result:

Sample 1:

Sum C_{14} - C_{40}	0.1	mg/dm²	≙	0.1	mg/g dry matter
Dialkyl ketones	not determinable		<	0.05	mg/g dry matter

Sample 2:

Sum C_{14} - C_{40}	9.4	mg/dm²	≙	15	mg/g dry matter
Dialkyl ketones	not determinable		<	0.05	mg/g dry matter

Sample 3:

Sum C_{14} - C_{40}	0.1	mg/dm²	≙	0.1	mg/g dry matter
Dialkyl ketones	0.02	mg/dm²	≙	0.06	mg/g dry matter

10. Determination of Polychlorinated Biphenyls (PCB) *

The determination was performed according to DIN EN ISO 15318 by means of gas chromatography. The demands of the method B 80.56-1 within the Official Collection of Analytical Methods according to § 64 LFGB for consumer goods are considered. The numbers refer to the Ballschmiter nomenclature.

Result:

Sample 1 - 3:

18	2,2′,5-Trichlorobiphenyl	not determinable	<	0.01	mg/kg dry matter
28	2,4,4′-Trichlorobiphenyl	not determinable	<	0.01	mg/kg dry matter
52	2,2′,5,5′-Tetrachlorobiphenyl	not determinable	<	0.01	mg/kg dry matter
101	2,2′,4,5,5′-Pentachlorobiphenyl	not determinable	<	0.01	mg/kg dry matter
138	2,2′,3,4,4′,5′-Hexachlorobiphenyl	not determinable	<	0.01	mg/kg dry matter
153	2,2′,4,4′,5,5′-Hexachlorobiphenyl	not determinable	<	0.01	mg/kg dry matter
180	2,2′,3,4,4′,5,5′-Heptachlorobiphenyl	not determinable	<	0.01	mg/kg dry matter

11. Determination of the Transfer of Antimicrobial Constituents *

The determination was made according to DIN EN 1104. Test specimens of a diameter of 10 mm were placed onto an inoculated nutrient medium and then incubated. The inhibition zone is indicated as total diameter (including the test specimen).

Result:

Sample 1 – 3:

with *Aspergillus niger*: Microbial growth up to the edges of the test specimens

with *Bacillus subtilis*: Microbial growth up to the edges of the test specimens

Comment:

According to the current state of standardization, proof of the presence of an inhibition zone is provided by the absence of test microorganism growth in a minimum diameter of 14 mm. Therefore, a transfer of antimicrobial constituents is considered as not detected.

12. Test for Fluorescent Substances *

The test was made by UV irradiation.

Result:

Sample 1 - 3: The samples did not contain optically brightened fibres.

13. Determination of Anthraquinone *

The sample was extracted with 95 % ethanol (v/v) at 60 °C. The determination was performed according to SOP 160.200 by means of gas chromatography and mass spectrometric detection.

Result:

Sample 1 - 3:	not determinable	<	0.13	mg/kg dry matter

14. Determination of the Fluorine Content *

The determination was performed after combustion in an argon/oxygen flow by means of an ion chromatography according to SOP 162.200.

Result:

Sample 1:	0.26	mg/dm^2	≙	0.66	mg/g dry matter

15. Determination of the Epichlorohydrin Hydrolysis Products *

The determination was performed after solid phase extraction by means of gas chromatography in accordance with the Official Collection of Analytical Methods according to § 64 of the LFGB, method B 80.56-2 with mass spectrometric detection.

The water extract was prepared according to DIN EN 645.

Result:

Sample 1:

1,3-Dichloro-2-propanol:	not detected	<	2	µg/l water extract
3-Monochloro-1,2-propanediol:			4	µg/l water extract

Sample 2:

1,3-Dichloro-2-propanol:	not detected	<	2	µg/l water extract
3-Monochloro-1,2-propanediol:	not detected	<	2	µg/l water extract

Sample 3:

1,3-Dichloro-2-propanol:	not detected	<	2	µg/l water extract
3-Monochloro-1,2-propanediol:			4	µg/l water extract

16. Determination of the Heavy Metals Contents *

The determination was performed after microwave disintegration by AAS/hydride technique or ICP-AES, respectively.

Result:

Sample 1 - 3:

Arsenic	(As):	not determinable	<	2	mg/kg
Cadmium	(Cd):	not determinable	<	0.5	mg/kg
Chromium	(Cr):	not determinable	<	1	mg/kg
Mercury	(Hg):	not determinable	<	0.25	mg/kg
Lead	(Pb):	not determinable	<	5	mg/kg

17. Extraction Tests According to the FDA Regulations *

The tests were performed according to FDA 21 CFR Ch. I, § 176.170 in triplicate.

a) Extraction with Water

The extraction was made for 24 hours at 49 °C.

Result:

Sample 1:	0.37	mg/sq inch
Sample 2:	0.23	mg/sq inch
Sample 3:	0.31	mg/sq inch

Chloroform soluble portion: The determination is not necessary as test results are already in conformity with the limit value.

b) Extraction with n-Heptane

The extraction was made for 30 min at 21 °C.

Result:

Sample 1:	not determinable	<	0.01	mg/sq inch
Sample 2:			0.46	mg/sq inch
Sample 3:			0.03	mg/sq inch

Chloroform soluble portion: The determination is not necessary as test results are already in conformity with the limit value.

The accreditation applies to the methods marked with * in the test report (Register no. D-PL-14160-01-01 and D-PL-14160-01-02).

End of report