Akkreditiert gemäß
DIN EN 45011
DACH
DAC-ZE-002-08

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-14160-01-00

ISEGA – Forschungs- und Untersuchungs-Gesellschaft mbH Aschaffenburg

63704 Aschaffenburg, Postfach 100565
63741 Aschaffenburg, Zeppelinstr. 3-5
Germany
Telefon +49 (0) 60 21 / 49 89-0
Telefax +49 (0) 60 21 / 49 89-30
Email info@isega.de
http://www.isega.de

Aschaffenburg, 6 September 2011

From: Zarthe
hoe

REPORT

Order No.: 4349/18 **Page 1 of 9 pages**

Client: iimak International Imaging Materials Europe bvba
Liesdonk 5B
2440 Geel / Belgium

Date of order: 7 July 2011

Receipt of sample material: 15 July 2011

Origin of sample material: From the client

Purpose: Analysis of thermal transfer ribbons for their compliance with the demands on food contact materials

(Behrendt)

(Zarthe)
Officially certified
diplomaed food chemist

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

Non-accredited determinations have not been validated at the date of the accreditation. Individual determinations were not intended for accreditation owing to their restricted field of application. In these cases, the necessary accuracy for the evaluation is ensured by the internal quality management system.

Sample Material

For analysis the following sample material was in hand:

Sample 1:	SP-330 CES11019
Sample 2:	PM-225 CES11023
Sample 3:	Netmark TTM-93 CES055MX
Sample 4:	Netmark IQ CES055QM
Sample 5:	Flexmark Eco Clean CES11029

Carrying out of the Tests

Examination period: 29 July 2011 to 18 August 2011

1. Determination of the Migration *

The determination was carried out according to the methods for the "Examination of consumer goods" corresponding to the directives B 80.30, 1 to 3 (EG) of the Official Collection of Analytical Methods according to § 64 LFGB and according to the rules of the series of standards EN 1186, EN 13130 and CEN/TS 14234 „Materials and articles in contact with foodstuffs - Plastics".

If not stated differently, the results are given as average values of determinations in triplicate.

Conditions:	24 hours at 40 °C
Test simulants:	acetic acid 3 % (w/w)
Testing procedure:	total immersion
Primary Aromatic Amines:	The determination was performed by means of HPLC and MS detection.

Result in mg/dm^2:

Sample 1 – 5:

Aniline	not detected	< 0.0005
4-Aminodiphenyl	not detected	< 0.0005
Benzidine	not detected	< 0.0005
4-Chloro-o-toluidine	not detected	< 0.0005
2-Naphthylamine	not detected	< 0.0005
o-Aminoazotoluene	not detected	< 0.0005
2-Amino-4-nitrotoluene	not detected	< 0.0005
4-Chloroaniline	not detected	< 0.0005
2,4-Diaminoanisole	not detected	< 0.0005
4,4`-Diaminodiphenylmethane	not detected	< 0.0005
3,3`-Dichlorobenzidine	not detected	< 0.0005
3,3`-Dimethoxybenzidine	not detected	< 0.0005
3,3`-Dimethylbenzidine	not detected	< 0.0005

3,3`-Dimethyl-4,4`-diaminodiphenylmethane	not detected	<	0.0005
p-Cresidine	not detected	<	0.0005
4,4`-Methylene-bis(2-chloroaniline)	not detected	<	0.0005
4,4`-Oxydianiline	not detected	<	0.0005
4,4`-Thiodianiline	not detected	<	0.0005
o-Toluidine	not detected	<	0.0005
2,4-Toluylenediamine	not detected	<	0.0005
2,4,5-Trimethylaniline	not detected	<	0.0005
o-Anisidine	not detected	<	0.0005
4-Aminoazobenzene	not detected	<	0.0005
2,4-Dimethylaniline	not detected	<	0.0005
2,4-Dichloraniline	not detected	<	0.0005
1,3-Phenylene diamine	not detected	<	0.0005
p-Aminoanisanilide	not detected	<	0.0005
Chloromethoxyaniline	not detected	<	0.0005
2-Methoxy-4-Nitroaniline	not detected	<	0.0005
4-Chloro-2,5-dimethoxyaniline	not detected	<	0.0005
5-Chloro-2-methylaniline	not detected	<	0.0005
2,6-Toluenediamine	not detected	<	0.0005

2. Determination of Polycyclic Aromatic Hydrocarbons (PAH)

The determination was performed by HPLC.

Result:

Sample 1:

Naphthalene	not determinable	<	0.3	mg/kg
Acenaphthene	not determinable	<	0.3	mg/kg
Acenaphthylene			- [2]	mg/kg
Fluorene	not determinable	<	0.6[1]	mg/kg
Phenanthrene	not determinable	<	0.3	mg/kg
Anthracene	not determinable	<	0.3	mg/kg
Fluoranthene	not determinable	<	0.3	mg/kg
Pyrene	not determinable	<	0.3	mg/kg
Benzo(a)anthracene	not determinable	<	0.3	mg/kg
Chrysene	not determinable	<	0.3	mg/kg
Benzo(b)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(k)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(a)pyrene	not determinable	<	0.3	mg/kg
Dibenzo(a,h)anthracene	not determinable	<	0.3	mg/kg
Benzo(g,h,i)perylene	not determinable	<	0.3	mg/kg
Indeno(1,2,3-c,d)pyrene	not determinable	<	0.6	mg/kg

[1] Due to an interference the determination limit had to be raised.
[2] Due to a very strong interference no evaluation is possible.

Sample 2:

Naphthalene	not determinable	<	0.3	mg/kg
Acenaphthene	not determinable	<	0.3	mg/kg
Acenaphthylene	not determinable	<	1.5[1]	mg/kg
Fluorene	not determinable	<	0.6[1]	mg/kg
Phenanthrene	not determinable	<	0.3	mg/kg
Anthracene	not determinable	<	0.3	mg/kg
Fluoranthene	not determinable	<	0.3	mg/kg
Pyrene	not determinable	<	0.3	mg/kg
Benzo(a)anthracene	not determinable	<	0.3	mg/kg
Chrysene	not determinable	<	0.3	mg/kg
Benzo(b)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(k)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(a)pyrene	not determinable	<	0.3	mg/kg
Dibenzo(a,h)anthracene	not determinable	<	0.3	mg/kg
Benzo(g,h,i)perylene	not determinable	<	0.3	mg/kg
Indeno(1,2,3-c,d)pyrene	not determinable	<	0.6	mg/kg

[1] Due to an interference the determination limit had to be raised.

Sample 3:

Naphthalene			0.5	mg/kg
Acenaphthene	not determinable	<	0.3	mg/kg
Acenaphthylene			2,5	mg/kg
Fluorene	not determinable	<	0.6[1]	mg/kg
Phenanthrene			13	mg/kg
Anthracene			0.9	mg/kg
Fluoranthene			5.8	mg/kg
Pyrene			3.9	mg/kg
Benzo(a)anthracene	not determinable	<	0.3	mg/kg
Chrysene	not determinable	<	0.6[1]	mg/kg
Benzo(b)fluoranthene	not determinable	<	0.6[1]	mg/kg
Benzo(k)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(a)pyrene	not determinable	<	0.3	mg/kg
Dibenzo(a,h)anthracene	not determinable	<	0.3	mg/kg
Benzo(g,h,i)perylene	not determinable	<	0.3	mg/kg
Indeno(1,2,3-c,d)pyrene	not determinable	<	0.6	mg/kg

[1] Due to an interference the determination limit had to be raised.

Sample 4:

Naphthalene	not determinable	<	0.3	mg/kg
Acenaphthene	not determinable	<	0.3	mg/kg
Acenaphthylene	not determinable	<	1.5[1]	mg/kg
Fluorene	not determinable	<	0.6[1]	mg/kg
Phenanthrene	not determinable	<	0.3	mg/kg
Anthracene	not determinable	<	0.3	mg/kg
Fluoranthene	not determinable	<	0.3	mg/kg
Pyrene	not determinable	<	0.3	mg/kg
Benzo(a)anthracene	not determinable	<	0.3	mg/kg
Chrysene	not determinable	<	0.3	mg/kg
Benzo(b)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(k)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(a)pyrene	not determinable	<	0.3	mg/kg
Dibenzo(a,h)anthracene	not determinable	<	0.3	mg/kg
Benzo(g,h,i)perylene	not determinable	<	0.3	mg/kg
Indeno(1,2,3-c,d)pyrene	not determinable	<	0.6	mg/kg

[1] Due to an interference the determination limit had to be raised.

Sample 5:

Naphthalene	not determinable	<	0.3	mg/kg
Acenaphthene	not determinable	<	0.3	mg/kg
Acenaphthylene	not determinable	<	15[1]	mg/kg
Fluorene	not determinable	<	0.6[1]	mg/kg
Phenanthrene	not determinable	<	0.3	mg/kg
Anthracene	not determinable	<	0.3	mg/kg
Fluoranthene	not determinable	<	0.3	mg/kg
Pyrene			0.7	mg/kg
Benzo(a)anthracene	not determinable	<	0.3	mg/kg
Chrysene	not determinable	<	0.3	mg/kg
Benzo(b)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(k)fluoranthene	not determinable	<	0.3	mg/kg
Benzo(a)pyrene	not determinable	<	0.3	mg/kg
Dibenzo(a,h)anthracene	not determinable	<	0.3	mg/kg
Benzo(g,h,i)perylene	not determinable	<	0.3	mg/kg
Indeno(1,2,3-c,d)pyrene	not determinable	<	0.6	mg/kg

[1] Due to an interference the determination limit had to be raised.

3. Determination of Volatile Organic Compounds (Headspace-GC/MS-Screening) *

The determination was performed by means of head space chromatography and mass spectrometric detection after a storage of 60 minutes at 80 °C. The air space above the sample material was examined for volatile components and was identified against a spectrum library and additionally according to the retention times.

Besides, it was tested for the listed solvents on the basis of the standard EN 13628-1 for the examination of flexible packaging materials as well as for volatile monomers. If not stated differently, the quantification was performed against the internal standard trichlorotrifluoroethane.

Result:

Sample 1:

Evaluation of direct quantified compounds:

Ethanol	not determinable	<	0.2	mg/m²
Isopropanol	not determinable	<	0.2	mg/m²
Hexane	not determinable	<	0.2	mg/m²
Ethyl acetate	not determinable	<	0.2	mg/m²
1-Ethoxy-2-propanol	not determinable	<	0.2	mg/m²
Butyl acetate	not determinable	<	0.2	mg/m²
Hexanal	not determinable	<	0.2	mg/m²
Cyclohexanone	not determinable	<	0.2	mg/m²
Benzene	not determinable	<	0.04	mg/m²
Toluene			1.1	mg/m²

Evaluation of the compounds quantified against the internal standard:

tert-Butanol	0.03	mg/m²
2-Butanone	6.1	mg/m²
Butanol	0.07	mg/m²
Alkane	0.03	mg/m²
Alkylbenzol	0.2	mg/m²
Alkylbenzol	0.03	mg/m²
Alkylbenzol	0.06	mg/m²

Sample 2:

Evaluation of direct quantified compounds:

Ethanol	not determinable	<	0.2	mg/m²
Isopropanol	not determinable	<	0.2	mg/m²
Hexane	not determinable	<	0.2	mg/m²
Ethyl acetate	not determinable	<	0.2	mg/m²
1-Ethoxy-2-propanol	not determinable	<	0.2	mg/m²
Butyl acetate	not determinable	<	0.2	mg/m²
Hexanal	not determinable	<	0.2	mg/m²
Cyclohexanone	not determinable	<	0.2	mg/m²
Benzene	not determinable	<	0.04	mg/m²
Toluene			1.7	mg/m²

Evaluation of the compounds quantified against the internal standard:

2-Butanone	0.05	mg/m²
Not identifiable compound	0.04	mg/m²
Methoxypropyl acetate	0.19	mg/m²

Sample 3:

Evaluation of direct quantified compounds:

Ethanol	not determinable	<	0.2	mg/m²
Isopropanol	not determinable	<	0.2	mg/m²
Hexane	not determinable	<	0.2	mg/m²
Ethyl acetate	not determinable	<	0.2	mg/m²
1-Ethoxy-2-propanol	not determinable	<	0.2	mg/m²
Butyl acetate	not determinable	<	0.2	mg/m²
Hexanal	not determinable	<	0.2	mg/m²
Cyclohexanone	not determinable	<	0.2	mg/m²
Benzene	not determinable	<	0.04	mg/m²
Toluene			0.9	mg/m²

Evaluation of the compounds quantified against the internal standard:

2-Butanone	0.03	mg/m²
Methyl isobutyl ketone	0.04	mg/m²
Cyclic compound	0.02	mg/m²
Cyclic compound	0.06	mg/m²

Sample 4:

Evaluation of direct quantified compounds:

Ethanol	not determinable	<	0.2	mg/m²
Isopropanol	not determinable	<	0.2	mg/m²
Hexane	not determinable	<	0.2	mg/m²
Ethyl acetate	not determinable	<	0.2	mg/m²
1-Ethoxy-2-propanol	not determinable	<	0.2	mg/m²
Butyl acetate	not determinable	<	0.2	mg/m²
Hexanal	not determinable	<	0.2	mg/m²
Cyclohexanone	not determinable	<	0.2	mg/m²
Benzene	not determinable	<	0.04	mg/m²
Toluene			1.0	mg/m²

Evaluation of the compounds quantified against the internal standard:

2-Butanone	0.03	mg/m²

Sample 5:

Evaluation of direct quantified compounds:

Ethanol	not determinable	<	0.2	mg/m²
Isopropanol	not determinable	<	0.2	mg/m²
Hexane	not determinable	<	0.2	mg/m²
Ethyl acetate	not determinable	<	0.2	mg/m²
1-Ethoxy-2-propanol	not determinable	<	0.2	mg/m²
Butyl acetate	not determinable	<	0.2	mg/m²
Hexanal	not determinable	<	0.2	mg/m²
Cyclohexanone	not determinable	<	0.2	mg/m²
Benzene	not determinable	<	0.04	mg/m²
Toluene			0.04	mg/m²

Evaluation of the compounds quantified against the internal standard:

2-Butanone	0.07	mg/m²
Methoxypropyl acetate	0.02	mg/m²

4. Determination of Vinylacetate *

The determination was performed by headspace gas chromatography.

Result:

Sample 1 – 5: not determinable < 0.004 mg/dm²

5. Determination of the Migration into Tenax (Modified Polyphenylene Oxide) *

The determination was carried out according to the methods for the "Examination of consumer goods" corresponding to the directives B 80.30, 1 to 3 (EG) of the Official Collection of Analytical Methods according to § 64 LFGB and according to the rules of the series of standards EN 1186, EN 13130 and CEN/TS 14234 „Materials and articles in contact with foodstuffs - Plastics".

The migration was performed as a single-fold determination.

Conditions: 10 days at 40 °C

Testing procedure: The storage of the sample in indirect contact with Tenax was conducted in a closed system with a distance of approximately 1 cm to the Tenax.

GC-MS-Screening : The volatile components adsorbed onto tenax were extracted with diethyl ether and summarized by means of gas chromatography and mass spectrometric detection using deuterated nonadecane (C_{19}) as an internal standard. For the identification of further signals in the chromatogram, a commercially available mass spectra library was used and, if not stated differently, the signals were also quantified against the internal standard.

Result:

Sample 1 – 5:

Sum of the volatile components: not detected < 0.1 mg/dm²

Sample 1:

The following compounds could be detected:

2,3-Dimethyl-2,3-diphenylbutane	0.006	mg/dm²
Aromatic compound	0.007	mg/dm²
Not identifiable compound	0.004	mg/dm²
Aromatic compound	0.003	mg/dm²
Amide compound	0.011	mg/dm²

Sample 2:

The following compounds could be detected:

Not identifiable compound	0.005	mg/dm²
Amide compound	0.015	mg/dm²

Sample 3:

The following compounds could be detected:

Not identifiable compound	0.002	mg/dm²
Cyclic compound	0.007	mg/dm²

Sample 4:

No further compounds could be detected.

Sample 5:

The following compounds could be identified:

Sum of alkanes	0.008	mg/dm²
Not identifiable compound	0.005	mg/dm²
Amide compound	0.012	mg/dm²

The accreditation applies to the methods marked with * in the test report (Register no. D-PL-14160-01-00).

End of report