

Van Merksteijn Plastics B.V.  
t.a.v. Jan Willem Logtenberg  
Verzetslaan 20  
7548 EN Enschede.

Hengelo (ov), 2 sep. 13

**Test specimen:**      **Specimen:**      **Colour:**      **Client reference number:**  
   **A.**      Mulit color      Apple design

**Examination:**      **Testnumber:**      **Testname:**  
             Summary  
   1.      Heavy metals  
   2.      Phthalates, specific migration  
   3.      Chloroform content  
   4.      Over all migration  
   5.      Peroxides value  
   6.      Phthalates  
   7.      Formaldehyde, specific migration  
   8.      Methyl methacrylate, (specific migration with 3% acetic acid)  
   9.      Sensory test  
   10.      Dimethylfumarate

**Results**      See following pages

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**Summary of test results**  
 Tested according to "LFGB" requirements



Tests required	Conclusion	Remark
Chloroform & Methylenechloride content	Pass	
Dimethylfumarate (DMFu)	Pass	
Formaldehyde, specific migration	Pass	
Heavy metals, migration	Pass	
Over all migration – simulant B – 3% acetic acid in aqueous solution	Pass	
Over all migration – simulant D – Isooctane	Pass	
Over all migration – simulant F – 50% Ethanol in aqueous solution	Pass	
Peroxides value	Pass	
Phthalates, specific migration	Pass	
Phthalates	Pass	
Sensory test – change of odour	Pass	
Sensory test – change of taste	Pass	
Methyl methacrylate, specific migration with isooctan	Pass	

Based on the above test results the tested product passes the LFGB requirements. The test results are referring only to the received test specimen.

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Test : 1. Heavy metals  
 Norm : EN 13130-1 (specific migration, determination with ICP-MS)

Results Test 1 Sample	A.		
Parameter	Limit	Result	Rating
Barium (Ba)	≤ 1 mg/kg	<0.1 mg/kg	Pass
Cobalt (Co)	≤ 0.05 mg/kg	<0.005 mg/kg	Pass
Copper (Cu)	≤ 5 mg/kg	<0.5 mg/kg	Pass
Iron (Fe)	≤ 48 mg/kg	<5 mg/kg	Pass
Lithium (Li)	≤ 0.6 mg/kg	<0.1 mg/kg	Pass
Manganese (Mn)	≤ 0.6 mg/kg	<0.1 mg/kg	Pass
Zinc (Zn)	≤ 25 mg/kg	<3 mg/kg	Pass

**Remark:**  
 migration 1 h at 40°C with 3% Acetic acid – result from 3 rd migrate

Test : 2. Phthalates, specific migration  
 Norm : Specific extraction with foodstuff simulants and analysis by LC-MS

Results Test 2 Sample	A.		
Parameter	Limit	Result	Rating
Dibutylphthalate (DBP)	≤ 0.3 mg/kg	<0.3 mg/kg	Pass
Benzylbutylphthalate (BBP)	≤ 30 mg/kg	<1 mg/kg	Pass
Diethylhexylphthalate (DEHP)	≤ 1.5 mg/kg	<1 mg/kg	Pass
Di-iso-nonylphthalate (DINP)	≤ 9 mg/kg	<1 mg/kg	Pass
Di-iso-decylphthalate (DIDP)	≤ 9 mg/kg	<1 mg/kg	Pass

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Test : 3. Phthalates

Norm : BVCP5 Inhouse extraction with THF/MeOH, analysis with GC-MS or LC-MS

Results Test 3 Sample	A.		
Parameter	Limit	Result	Rating
Dibutylphthalate (DBP)	≤ 0.05 %	<0.005 %	Pass
Benzylbutylphthalate (BBP)	≤ 0.1 %	<0.005 %	Pass
Di(2-ethylhexyl)phthalate (DEHP)	≤ 0.1 %	0.039 %	Pass
Di-iso-nonylphthalate (DINP)	≤ 0.1 %	0.087 %	Pass
Di-iso-decylphthalate (DIDP)	≤ 0.1 %	<0.005 %	Pass

Test : 4. Chloroform content

Norm : Headspace GC/MS

Results Test 4 Sample	A.		
Parameter	Limit	Result	Rating
Sum of chloroform and methylene chloride	≤ 0.2 % w/w	not detected	Pass

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Test : 5. Over all migration

Norm : EN 1186

**Simulant B (3% acetic acid in aqueous solution)**

Results Test 5 Sample		A.	
Parameter	Limit	Result	Rating
Test duration	≤ 10 mg/dm <sup>2</sup>	1 hour	No specification
Analysis of		3 migrate	No specification
Temperature		40°C	No specification
Test result		<2.5 mg/dm <sup>2</sup>	Pass
Volume		30 ml	No specification
Surface area		0.43 dm <sup>2</sup>	No specification

**Simulant D (Isooctane)**

Results Test 5 Sample		A.	
Parameter	Limit	Result	Rating
Test duration	≤ 10 mg/dm <sup>2</sup>	30 minutes	No specification
Analysis of		3 migrate	No specification
Temperature		20°C	No specification
Test result		5.66 mg/dm <sup>2</sup>	Pass
Volume		30 ml	No specification
Surface area		0.43 dm <sup>2</sup>	No specification

**Simulant F (50% Ethanol in aqueous solution)**

Results Test 5 Sample		A.	
Parameter	Limit	Result	Rating
Test duration	≤ 10 mg/dm <sup>2</sup>	1 hour	No specification
Analysis of		3 migrate	No specification
Temperature		40°C	No specification
Test result		<2.5 mg/dm <sup>2</sup>	Pass
Volume		30 ml	No specification
Surface area		0.43 dm <sup>2</sup>	No specification

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**Test** : 6. Peroxides value  
**Norm** : Ph.Eur-Method 2.5.5 (titration with sodiumthiosulphate)

Results Test 6 Sample	A.		
Parameter	Limit	Result	Rating
Peroxides	not detected	not detected	Pass

**Test** : 7. Formaldehyde, specific migration  
**Norm** : Specific extraction, DIN CEN/TS 13130-23

Table cloth green with apples (multicoloured sample)\*

Results Test 7 Sample	A.		
Parameter	Limit	Result	Rating
Formaldehyde	≤ 15 mg/kg	<0.02 mg/kg	Pass

**Test** : 8. Methyl methacrylate, (specific migration with isooctan)  
**Norm** : DIN EN 13130-1

Table cloth green with apples (multicoloured sample)\*

Results Test 8 Sample	A.		
Parameter	Limit	Result	Rating
Methyl methacrylate	≤ 23 mg/kg	<3 mg/kg	Pass

**PLEASE NOTE:**

For samples that are marked with \* the result was generated from a composite sample (mixed swatch/mixed sample/pooling). Due to the not/very difficult separability of the sample single testing has not been conducted. In the case of single testing, there is a change that one of the components from the pooling might not pass the tests.

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Test : 9. Sensory test

Norm : DIN 10955

Change of **odour** through direct contact, fatty food (aqueous) – butter

Results Test 9 Sample		A.	
Parameter	Limit	Result	Rating
Sensory test (grade)	≤ 2.5	0	Pass

Change of **odour** through direct contact, acidic and aqueous food – still water

Results Test 9 Sample		A.	
Parameter	Limit	Result	Rating
Sensory test (grade)	≤ 2.5	0	Pass

Analysis / Test: sensory test – change of odour through direct contact
Rating: 0 = no observable deviation 1 = minor deviation 2 = small deviation 3 = clear deviation 4 = significant deviation

Change of **taste** through direct contact, fatty food (aqueous) – butter

Results Test 9 Sample		A.	
Parameter	Limit	Result	Rating
Sensory test (grade)	≤ 2.5	0	Pass

Change of **taste** through direct contact, acidic and aqueous food – still water

Results Test 9 Sample		A.	
Parameter	Limit	Result	Rating
Sensory test (grade)	≤ 2.5	0	Pass

Analysis / Test: sensory test – change of taste through direct contact
Rating: 0 = no observable deviation 1 = minor deviation 2 = small deviation 3 = clear deviation 4 = significant deviation

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Test : 10. Dimethylfumarate  
Norm : Inhouse method, ultra sound extraction with organic solvent, GC-MS analysis.  
Detection limit : 0.1 mg/kg

Results Test 10 Sample	A.		
Parameter	Limit	Result	Rating
Dimethylfumarate (DMFu)	≤ 0.1 mg/kg	<0.1 mg/kg	Pass

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