

**TEST REPORT**

Requested by:

Euro Pool System International  
Attn. Mr. van Zuidam  
P.O. Box 1887  
2280 DW Rijswijk  
Netherlands

**Subject:** Migration test of fish tray

Dear Mr. van Zuidam

Hereby I present to you the results of the laboratory investigation, which was carried out on your request (ref. SO18038).

The general conditions of delivery of Intertek Polychemlab B.V., located in Geleen, the Netherlands, are applicable. These conditions are an integral part of all research carried out and the services and consultations provided; where appropriate, expanded upon by agreements specific to the client. This report applies only to the sample(s) tested. If information about the measurement uncertainty of a method is required, this can be provided on request.

Hoping this information will meet your approval,

Yours sincerely,

Intertek Polychemlab B.V.

Job Ridderbecks  
Application Specialist Food Contact



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Telephone: +31 (0)88 - 126 8888 Fax: +31 (0)88 - 126 8876 Chamber of Commerce Limburg nr. 24 39 55 64 BTW nr. NL815792402.B01  
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## TEST REPORT

### 1 Samples

Date samples received

November 29, 2016

Description of samples

*Table 1: Sample description*

Sample description	LIMS number
Fish Tray type F01 Exxon HMA 035 HDPE Tosaf VE64553A	22415829

### 2 Methods

2.1 Overall Migration testing (performed under SO16807, original report RE16807-2)

The overall migration test has been performed according to rules as laid down in Commission Regulation (EU) No 10/2011 (and amendments) relating to plastic materials and articles intended to come into contact with food.

Test methods as described in:

- EN 1186-1; *Guide to the selection of conditions and test methods for overall migration.*
- EN 1186-2; *Test methods for overall migration into olive oil by total immersion.*
- EN 1186-3; *Test methods for overall migration into aqueous food simulants by total immersion.*

Simulants and test conditions are worst case chosen for all types of food for the intended use of the boxes.

To screen for specific migration of non-volatile substances, determination of an overall migration under test conditions at least as severe as specific migration conditions can be applied. This is described in Annex V , paragraph 2.2.1 of Commission Regulation (EU) No 10/2011. These results can be used to potentially exclude non-volatile specific migration components in future testing.

*Table 2: Test conditions overall migration / specific migration screening conditions*

Simulants	Test condition*
3% acetic acid	10 days at 50 °C / Repeated use
10% ethanol	10 days at 50 °C / Repeated use
Olive oil	10 days at 50 °C / Repeated use

The tests with the aqueous simulants are performed in triplicate and the test with olive oil in quadruplicate. Overall migration limit is 10 mg/dm<sup>2</sup> contact area.

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### 2.2 Heavy metals testing according to EU Directive 94/62/EC (performed under SO16807, original report RE16807-2)

Lead (Pb), Cadmium (Cd) and Chromium (Cr) by ICP-OES, after destruction of cryogenically grinded material specimen by in-house method.

Mercury (Hg) by FIMS analyzer of cool cryogenically material specimen by in-house method.

Chromium VI (Cr(VI)) by spectrometric analysis after extraction of cryogenically grinded material specimen by in house method (derived from EPA7196A)

Lowest limit is < 100 mg/kg material.

### 2.3 Specific migration

Specific migration has been performed according as described in Commission Regulation (EU) No 10/2011 (and amendments) relating to plastic materials and articles intended to come into contact with food.

Test methods are according to the relevant parts of EN13130 or on in-house methods. Simulants and test conditions were chosen for use with fish, based on the provisions in Commission Regulation (EU) 10/2011, where applicable in deviation from EN 13130.

Simulant	Test condition
10% ethanol (A)	10 days at 50°C
Olive oil (D2)	10 days at 50°C

Specific migration tests were performed on the following material. Specific migration limits are based on Commission Regulation (EU) 10/2011 for plastics or Chapter XI of the Dutch "Warenwetbesluit Verpakkingen en Gebruiksartikelen" for colorants and pigments.

Material	Component	CAS-no.	SML (mg/kg food)	Method	Simulant
Exxon HMA 035	Calcium Stearate		-	No restriction as of Regulation 2016/1416	
Tosaf VE64553A	Tinuvin 622	65447-77-0	30	Excluded based on overall migration results	
	Chimassorb 944	71878-19-8	3	Outsourced	10% ethanol Olive oil
	Antimony (Sb)	-	0.04 <sup>1</sup>	ICP-MS	10% ethanol Olive oil
	Chromium (Cr)	-	0.1 <sup>1</sup>	ICP-MS	10% ethanol Olive oil

<sup>1</sup>Specific migration limit from Chapter XI of the Dutch "Warenwetbesluit Verpakkingen en Gebruiksartikelen" for colorants and pigments.

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### 2.4 Visual migration

Visual migration tests were performed according to Dutch National legislation - Warenwetbesluit verpakkingen en gebruiksartikelen, Chapter XI – Colorants and pigments, section 4b.

Testing method, simulants and test conditions are used as described in Appendix part B, Chapter I, part 5.3.6 of this regulation.

Simulants	Test conditions
3% acetic acid	5 hours at 40 °C

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### 3 Results

#### 3.1 Overall migration (results from RE16807-2)

Contact area: 1.1 dm<sup>2</sup>  
Volume simulant: 100 ml

Table 3: Overall migration results

Method Replicates	EN 1186-3 Migration into 3% acetic acid	EN 1186-3 Migration into 10% ethanol	EN 1186-2 Migration into Olive oil
	10 days at 50°C, repeated use 3 <sup>rd</sup> run  (mg/dm <sup>2</sup> )	10 days at 50°C, repeated use 3 <sup>rd</sup> run  (mg/dm <sup>2</sup> )	10 days at 50°C, repeated use Run 3 – Run 2  (mg/dm <sup>2</sup> )
1	< 0.5	< 0.5	< 1
2	< 0.5	< 0.5	< 1
3	< 0.5	< 0.5	< 1
4	-	-	< 1
<b>Mean result</b>	<b>&lt; 0.5</b>	<b>&lt; 0.5</b>	<b>&lt; 1</b>

#### Conclusion

The overall migration results obtained of the sample "Fish Tray" were found to be in compliance with the restriction for the overall migration limit (< 10 mg/dm<sup>2</sup>) as defined in Commission Regulation (EU) No 10/2011 for food contact materials for the tests under the above mentioned test conditions.

#### 3.2 Heavy metals testing according to EU Directive 94/62/EC (results from RE16807-2)

Table 4: Heavy metals results

Sample description	Cd (mg/kg)	Cr (total) (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Cr(VI) (mg/kg)
Fish Tray	<10	<10	<10	<1	<2

#### Conclusion:

The results obtained of the sample "Fish Tray" were found to be in compliance for the heavy metals tests with the restriction of < 100 mg/kg material as defined in European Parliament and Council Directive 94/62/EC.

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### 3.3 Specific migration

Contact area: 0.9 dm<sup>2</sup>  
Amount of simulant: 100 ml

Results are expressed in mg/kg food, taking into account the conventional EU ratio of 6 dm<sup>2</sup> of surface area in contact with 1 kg of food.

Material	Component	SML (mg/kg food)	Migration into 10% ethanol (mg/kg)	Migration into olive oil (mg/kg)
Tosaf VE64553A	Tinuvin 622	30	Excluded based on overall migration results	
	Chimassorb 944	3	< 0.2 < 0.2 < 0.2 <b>Mean: &lt; 0.2<sup>1</sup></b>	< 0.2 < 0.2 < 0.2 <b>Mean: &lt; 0.2<sup>1</sup></b>
	Antimony (Sb)	0.04	< 0.004 < 0.004 < 0.004 <b>Mean: &lt; 0.004</b>	< 0.02 < 0.02 < 0.02 <b>Mean: &lt; 0.02</b>
	Chromium (Cr)	0.1	< 0.01 < 0.01 < 0.01 <b>Mean: &lt; 0.01</b>	< 0.025 < 0.025 < 0.025 <b>Mean: &lt; 0.025</b>

<sup>1</sup>Results from outsourced analysis, see Appendix I for the full report

### Conclusion

The specific migration results obtained of the sample "Fish Tray" were found to be in compliance with the restriction for the specific migration limits as defined in Commission Regulation (EU) No 10/2011 for food contact materials for the tests under the above mentioned test conditions.

### 3.4 Visual migration

Simulants	Test conditions	Measurement 1	Measurement 2
3% acetic acid	5 hours at 40 °C	No visual migration	No visual migration

### Conclusion

The observed visual migration results are in compliance with the requirement of no visual migration laid down in the Dutch Warenwetbesluit verpakkingen en gebruiksartikelen, Chapter XI – Colorants and pigments, section 4b.

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**TEST REPORT****Appendix I – Test report PA/4071/17****Test report****Determination of Chimassorb ® 944 in 10% ethanol and olive oil migration solutions**

The results of the test report are property of the client. However duplication in an excerpted version or publication is subject to a written agreement with the Fraunhofer Institute for Process Engineering and Packaging.

Customer:	Intertek Life Sciences Koolwaterstofstraat 1 6161 RA Geleen, Netherlands
IVV Order no.:	PA/4071/17
Date of order:	24.01.2017
Sample receipt:	24.01.2017
Testing period:	06.02. – 03.03.2017
Date of report:	06.03.2017
Sample storage:	Remaining test material will be stored in the institute for six months.
Total pages of the report:	4

The results relate only to the investigated samples.

Fraunhofer-Institut für Verfahrenstechnik und Verpackung, Giggenhauser Str. 35, D-85354 Freising

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PA/4071/17  
Test report  
06.03.2017**1 Scope**

Poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diyl]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] (CAS: 71878-19-8, trade name e.g. Chimassorb® 944) was quantified in 10% ethanol and olive oil migration solutions provided by the customer.

**2 Sample material**

The customer provided the following sample material (10 % ethanol and olive oil migration solutions):

**Sample 1 (10% ethanol):** SO19033-22415829  
ITM1176MIG

**Sample 2 (olive oil):** SO19033-22415829  
ITM1176MIG

The migration solutions were provided in triplicate. In addition, blank samples were provided by the customer.

**3 Methods****3.1 Determination of poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diyl]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] in 10 % ethanol**

Fraunhofer IVV method 1.4015 (not accredited)

For quantification of poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diyl]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] (CAS: 71878-19-8, trade name e.g. Chimassorb® 944), 0.5 ml of the 10% ethanol migrates were diluted with 0.5 ml of 100 % ethanol.

Analysis was performed by LC-MS using a mixture of water with ammonia and a mixture of methanol with ammonia as mobile phase. The mass spectrometric detection was done after heated electrospray ionisation (HESI) in the *selected reaction monitoring* (SRM) mode.

For the calibration curve 0.5 ml of 10 % ethanol were spiked with standard solutions and diluted with 0.5 ml of 100 % ethanol.

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Additionally, a standard addition analysis was done for verification of the results. All analyses were performed in duplicate.

- 3.2 Determination of poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diy]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] in *olive oil*

Fraunhofer IVV method 1.4015 (not accredited)

For quantification of poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diy]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] (CAS: 71878-19-8, trade name e.g. Chimassorb® 944), the olive oil migrates were diluted with heptane and extracted with methanol. The methanol phase was analysed by LC-MS.

Analysis was performed by LC-MS using a mixture of water with ammonia and a mixture of methanol with ammonia as mobile phase. The mass spectrometric detection was done after heated electrospray ionisation (HESI) in the *selected reaction monitoring* (SRM) mode.

For the calibration curve olive oil was spiked with standard solutions, diluted with heptane and extracted with methanol in the same way as the migration samples.

Additionally, a standard addition analysis was done for verification of the results. All analyses were performed in duplicate.

### 4 Results

- 4.1 Poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diy]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] in 10 % ethanol

Sample	Concentration [µg/ml]
SO19033 – 22415829, ITM1174MIG 1	< d.l. (d. l.: 0.26)
SO19033 – 22415829, ITM1174MIG 2	< d.l. (d. l.: 0.26)
SO19033 – 22415829, ITM1174MIG 3	< d.l. (d. l.: 0.26)
blank	< d.l. (d. l.: 0.26)

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4.2 Poly[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diyl]-[(2,2,6,6-tetramethyl-4-piperidyl)-imino] hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl) imino] in *olive oil*

Sample	Concentration [µg/g]
SO19033 – 22415829, ITM1176MIG 1	< d.l. – $\frac{1}{1}$ – (d. l.: 0.16)
SO19033 – 22415829, ITM1176MIG 2	< d.l. (d. l.: 0.16)
SO19033 – 22415829, ITM1176MIG 3	< d.l. (d. l.: 0.16)
blank	< d.l. (d. l.: 0.16)

d. l.: analytical detection limit

5 Signatures

Fraunhofer Institute  
Process Engineering  
and Packaging

Freising, 06.03.2017

  
Petra Schmid  
(Scientist in Charge)

  
Margit Gmeiner  
(Technician)

Fraunhofer-Institut für Verfahrenstechnik und Verpackung, Giggenhauser Str. 35, D-85354 Freising

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