INSTITUT PRO TESTOVÁNÍ A CERTIFIKACI, a. s.
třída Tomáše Bati 299, Louky, 763 02 Zlín, Czech Republic
Testing Laboratory No. 1004
accredited by ČIA according to ČSN EN ISO/IEC 17025:2018

L 1004

Testing laboratory * Calibration laboratory * Product certification body * Quality management systems certification body
Inspection body * Authorized body * Notified body

ACCREDITED LABORATORY TEST REPORT ref.No. 472113473-01

Sample: "ReCap, CAP made from 100% recycled PP"-
– for detailed description see page 2

Sample received on: August 18, 2020

Report elaborated by: Dipl. Ing. Daniel Vít

Place and date of issue: Zlín, September 4, 2020

AKREDITOVANÁ LABORATOŘ 1004 Institut pro testování a certifikaci, a.s. Zlín

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Dipl. Ing. Jiří Samsonek, PhD.
Head of Accredited Testing Laboratory

Sample description and identification:

Table No. I – List of the supplied samples

ITC's identification number	Sample identification by the client	Description of submitted sample
472113473/01	ReCap, CAP made from 100% recycled PP	

Sampling method used:
The test sample was collected and supplied to the laboratory by the client. The laboratory is not responsible for this way of sampling.

Work requested:

1. Overall migrations in food simulants: demineralised water, A, B and D2 - OM2 conditions
2. Specific migration of metals according to requirements of Commission regulation 10/2011 as amended, annex II
3. Specific migration of primary aromatic amines according to requirements of Commission Regulation 10/2011 as amended, annex I and II
4. Sensory analysis
5. Colour fastness tests
6. Tests according to the requirements of FDA 21 CFR § 177.1520(c) – end tests

Notes:
A = 10% ethanol
B = 3% acetic acid
D2 = olive oil
OM = Overall Migration

Testing method used:

1.	Overall migration into aqueous food simulants according to ČSN EN 1186-3
2.	Overall migration into olive oil according to ČSN EN 1186-2
3.	Determination of specific migration of elements in the leachate by means of ICP-MS method according to the ITC´s test procedure No. A-10-97
4.	Determination of specific migration of primary aromatic amines by LC-MSMS method according to ITC's test procedure A-95-28
5.	Off-taste and off-odour determination according to DIN 10955
6.	Determination of colorant migration according to the ITC´s test procedure No. A 08-87
7.	Determination of density according to the ITC´s test procedure No. A-11-99
8.	Determination of melting point according to ITC´s test procedure No. A-12-105
9.	Extractable fractions in n-hexane at reflux according to the FDA 21 CFR 177.1520 d(3)
10.	Maximum soluble fraction in xylene at 25°C according to the FDA 21 CFR 177.1520 d(4)

Test conditions:

1.	Food simulants: A, B Contact temperature and contact time: 40 °C / 10 days (OM2) 1 cap /100 ml of the food simulant, contact by total immersion, evaluation of the first migration The test results were expressed as mg released from one cap in accordance with the rules given by Commission Regulation 10/2011, Chapter V "Compliance"; Article 17 "Expression of migration test results".
2.	Food simulants: D2 Contact temperature and contact time: 40 °C / 10 days (OM2) 1 cap /100 ml of the food simulant, contact by total immersion, evaluation of the first migration The test results were expressed as mg released from one cap in accordance with the rules given by Commission Regulation 10/2011, Chapter V "Compliance"; Article 17 "Expression of migration test results".
3.	Food simulants: B Contact temperature and contact time: 60 °C / 10 days 1 cap /100 ml of the food simulant, contact by total immersion, evaluation of the first migration The test results were expressed as mg of compound (metal) released from one cap in accordance with the rules given by Commission Regulation 10/2011, Chapter V "Compliance"; Article 17 "Expression of migration test results".
4.	Food simulants: B Contact temperature and contact time: 60 °C / 10 days 1 cap /100 ml of the food simulant, contact by total immersion, evaluation of the first migration The test results were expressed as mg of compound (amine) released from one cap in accordance with the rules given by Commission Regulation 10/2011, Chapter V "Compliance"; Article 17 "Expression of migration test results".
5.	Food simulants: over-boiled drinking water Contact conditions: 40°C / 48 hrs, contact by total immersion, 100 cm^2 of the sample /100 ml of the food simulant The number of assessors: 6 ; Type of evaluation : paired multi-comparison test
6.	The test was performed into food simulants (3% acetic acid, 10% ethanol and olive oil). The paper filters were soaked with simulant. The samples were exposed to the contact with the soaked filters for 5 hours at 50°C under the pressure of 1 kg/ dm^2.
7.	Temperature 23±2°C, immersion liquid (ethanol/water), density of immersion liquid determined by

	ultrasonic density-meter, with correction for uplift pressure
8.	Hot stage microscopy method according to ASTM D 2117
9.	reflux, 2 hours
10.	The sample was dissolved in hot xylene and then cooled down to 25°C and kept for 1 hour

The laboratory is not responsible for information received from customer, which could have influence on the validity of the results. Further information required by the standard/standards and not given in this Test Report are available at a request at the Laboratory.

Testing laboratory:
All the tests were performed in workplace no.: 1 - třída Tomáše Bati 299, Louky, 763 02 Zlín.

Test results:

Table No. II – Overall Migration into Food Simulants

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Food simulant	Unit	Value obtained [1]					Uncertainty [2]
		1.	2.	3.	4.	Mean	
Migration test by total immersion: 1 cap/100 ml of food simulant; OM2							
A: 10% ethanol	mg/article	0,7	1,2	0,7	-	**0,9**	0,4
B: 3% acetic acid	mg/article	0,5	0,8	< 0,5	-	[3]	-
D2: olive oil	mg/article	3,4	2,3	-	1,7	**2,5**	1,1

Notes to Table No. II.:

1) *Symbol „<" means less than limit of detection of the analytical method (LOD).*
2) *The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.*
3) *Mean value was not calculated, some of the obtained results were below LOD.*

Table No. III. – Specific migration of metals according to Commission Regulation (EU) 10/2011 as amended, Annex II

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Parameter / test conditions	Unit	Value obtained [1]	Uncertainty
Specific migration into 3% acetic acid, 60°C, 10 days, evaluation of the 1st migration			
Aluminium	mg/article	< 0,01	-
Barium	mg/article	< 0,005	-
Cobalt	mg/article	< 0,0005	-
Copper	mg/article	< 0,005	-
Iron	mg/article	< 0,01	-
Lithium	mg/article	< 0,001	-
Manganese	mg/article	< 0,001	-
Zinc	mg/article	< 0,01	-
Nickel	mg/article	< 0,001	-

Notes to Table No. III.:

1) *Symbol „<" means LOD (limit of detection) of used analytical method.*

Table No. IV. – Specific migration of primary aromatic amines according to Commission Regulation (EU) 10/2011 as amended, Annex II

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Parameter	CAS No.	Unit	Value obtained 1)	Uncertainty
Specific migration into 3% acetic acid, 60°C, 10 days, evaluation of the 1st migration				
4-Amino-biphenyle	92-67-1	mg/article	< 0,00005	
Benzidine	92-87-5	mg/article	< 0,00005	
4-Chlor-o-toluidine	95-69-2	mg/article	< 0,00005	
2-Naftylamine	91-59-8	mg/article	< 0,00005	
o-Aminoazotoluene	97-56-3	mg/article	< 0,00005	
2-Amino-4-nitro-toluene	99-55-8	mg/article	< 0,00005	
p-Chlor -aniline	106-47-8	mg/article	< 0,00005	
2,4-Diamino-anisole	615-05-4	mg/article	< 0,00005	
4,4'-Diamino-diphenylmethane	101-77-9	mg/article	< 0,00005	
3,3'-Dichlor-benzidine	91-94-1	mg/article	< 0,00005	
3,3'-Dimethoxy-benzidine	119-90-4	mg/article	< 0,00005	
3,3'-Dimethyl-benzidine	119-93-7	mg/article	< 0,00005	
3,3'-Dimethyl-4,4'- diaminodiphenylmethane	838-88-0	mg/article	< 0,00005	
p-Keresidine	120-71-8	mg/article	< 0,00005	
4,4'-Methylen-bis(2-chloraniline)	101-14-4	mg/article	< 0,00005	
4,4'-Oxy-dianiline	101-80-4	mg/article	< 0,00005	
4,4'-Thio-dianiline	139-65-1	mg/article	< 0,00005	
o-Toluidine	95-53-4	mg/article	< 0,00005	
2,4-Toluenediamine	95-80-7	mg/article	< 0,00005	
2,4,5-Trimethyl-aniline	137-17-7	mg/article	< 0,00005	
o-Anisidine	90-04-0	mg/article	< 0,00005	
o-Aminoazobenzene	60-09-3	mg/article	< 0,00005	
2,4-Dimethylaniline	95-68-1	mg/article	< 0,00005	
2,6-Dimethylaniline	87-62-7	mg/article	< 0,00005	
1,5-Diaminonaphthalene	2243-62-1	mg/article	< 0,00005	
Aniline	62-53-3	mg/article	< 0,00005	
Sum of positive results of primary aromatic amines	-	mg/article	-	

Notes to Table No. IV.:

1) *Symbol "<" means less than the limit of detection of used analytical method.*

Table No. V. – Specific migration of primary aromatic amines according to Commission Regulation (EU) 10/2011 as amended, Annex I

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Parameter	CAS No.	Unit	Value obtained [1]	Uncertainty
Specific migration into 3% acetic acid, 60°C, 10 days, evaluation of the 1st migration				
4,4'-diaminodiphenyl sulphone	80-08-0	mg/article	< 0,001	-
2-aminobenzamide	88-68-6	mg/article	< 0,001	-
1,3-phenylenediamine	108-45-2	mg/article	< 0,001	-
1,3-benzenedimethanamine	1477-55-0	mg/article	< 0,001	-

Notes to Table No. V.:

1) Symbol "<" means less than the limit of detection of used analytical method.

Table No. VI. - Sensory analysis - Evaluation of off odour and off taste

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Assessor	Unit [1]	Odour	Taste
Overboiled drinking water, 40°C, 48 hours			
1	level	1	1
2	level	1,5	1,5
3	level	1	1
4	level	1	1
5	level	2 (chemical)	2 (chemical)
6	level	1	1
Median	**level**	**1**	**1**

Notes to Table No. VI.:

1) The intensity of odour and flavour is expressed according to the scale
Off-odour and off-taste scale:
0 = No perceptible off-odour or off-taste
1 = Just perceptible off-odour or off-taste (off-odour and off-taste determination is very difficult)
2 = Slightly perceptible off-odour or off-taste
3 = Clearly perceptible off-odour or off-taste
4 = Strong off-odour or off-taste

According to Regulation (EC) No. 1935/2004 of the European Parliament and of the Council the articles shall not cause deterioration in the organoleptic characteristics of food. The product is considered to be suitable for food contact if the levels 0 to 2,5 is achieved.

Table No. VII. Test result of colorants migration

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Food simulant	Value obtained [1)]	Requirement [2)]
10% ethanol	No differences	No release of colorants should be observed
3% acetic acid	No differences	No release of colorants should be observed
Olive oil	No differences	No release of colorants should be observed

Notes to the table VII.:

1) *No differences – there does not exist difference between the filter paper soaked with the food simulant that was exposed to the contact with the sample and the filter paper soaked with food simulant that was not exposed to the contact with the sample.*
2) *Requirement according to Resolution EU AP (89)1 as amended.*

Table No. VIII. - Test Results of End Tests according to FDA 21 CFR § 177.1520(c)

Sample 472113473/01 - "ReCap, CAP made from 100% recycled PP"

Parameter	Unit	Value obtained				Uncertainty [1)]	Limit	Evaluation
		1.	2.	3.	Mean value			
Specific density	g/cm^3	0,905	0,905	0,905	**0,905**	0,002	0,880-0,913 [2,3)]	Compliance
Melting point	°C	167	168	168	**168**	2	160-180 [2)] 150-180 [3)]	Compliance
Extractable fractions in n-hexane	w/w %	3,00	3,02	3,10	**3,04**	0,20	max. 6,4 [2,3)]	Compliance
Maximum soluble fraction in xylene	w/w %	7,39	7,35	7,53	**7,42**	0,46	max. 9,8 [2,3)]	Compliance

Notes to the table VIII.:

1) *The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.*
2) *Limit values for Polypropylene according to FDA 21 CFR § 177.1520(c), 1.1a. Polypropylene described in paragraph (a)(1)(i) of this section.*
3) *Limit values for Polypropylene according to FDA 21 CFR § 177.1520(c), 1.1b. Propylene homopolymer described in paragraph (a)(1)(ii) of this section.*

Evaluation of the test results carried out:

Dipl. Ing. Daniel Vít

Dipl. Ing. Věra Vilímková
Head of the analytical and microbiology laboratory