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Date 30.07.2024  
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## Test Report

**DEKRA Order No.:**

**55056459**

**Test Report-No.:**

**PB2449176**

**Version 1**

**Client:** KRALTON SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ  
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**Date of order:** Jul 01, 2024

**Sample received:** Apr 24, 2024

**Project:** PVC foil (film for stretch ceiling)

(see sample list below for further information)

**Scope of investigation:** Testing of material samples according to the following parameters  
(according to customer request):

1. Phthalates according to REACH Annex XVII, entry 51
2. Cadmium, lead and tin according to REACH Annex XVII, entry 23 (Cd), entry 63 (Pb) and entry 20 (Sn; Tinorganic compounds)
  - 3.1. PFCAs: PFNA, PFDeA, PFUnA, PFDoA, PFTrA, PFTA and corresponding salts according to REACH Annex XVII, entry 68
  - 3.2. PFCAs, PFSAs: PFOS, PFOA, PFHxS and corresponding salts according to (EU) 2019/1021 (POP)
  - 3.3. PFCAs, PFSAs: Entry 86, 87, 88, 89, 139, 141, 168, 171, 174, 198, 205, 232 and corresponding salts according to REACH SVHC-list (Jan 23, 2024)
4. RoHS according to Directive 2011/65/EU including all amendments

**Akkreditiertes Analyselabor D-PL-11060-03-00 in Stuttgart und Halle.**  
CPSC Identification Number for DEKRA Industrial Laboratory Services: 1236

## 5. Migration of certain elements (EN 71-3, category 3)

## Result:

Testing of material samples according to the following parameters:

## 1. Phthalates according to REACH Annex XVII, entry 51:

Requirements (REACH Annex XVII): **pass**

All tested materials (see sample list below) fulfill the requirements.

## 2. Cadmium, lead and tin according to REACH Annex XVII, entry 23 (Cd), entry 63 (Pb) and entry 20 (Sn; Tinorganic compounds):

Requirements: **pass**

All tested materials (see sample list below) fulfill the requirements.

## 3.1. PFCAs: PFNA, PFDeA, PFUnA, PFDoA, PFTrA, PFTA and corresponding salts according to REACH Annex XVII, entry 68

Requirements: pass

## 3.2. PFCAs, PFSAs: PFOS, PFOA, PFHxS and corresponding salts according to (EU) 2019/1021 (POP)

Requirements: pass

## 3.3. PFCAs, PFSAs: Entry 86, 87, 88, 89, 139, 141, 168, 171, 174, 198, 205, 232 and corresponding salts according to REACH SVHC-list (Jan 23, 2024)

Requirements: pass

## 4. RoHS according to Directive 2011/65/EU including all amendments:

Requirements: **pass**

All tested materials keep the limitations according to Directive 2011/65/EU including all amendments.

## 5. Migration of certain elements (EN 71-3, category 3)

Requirements: **pass**

All tested samples fulfill the requirements.

Project: 2172891747-3 // -

Testing period: 24.04.2024 - 29.07.2024

**Sample list:**

The following samples were tested at DEKRA:

Sample no.	Sample designation	Sample sources *
55056459001	PVC foil (film for stretch ceiling)	-

\* Only in case of mixing samples.

**Picture of the samples:**

**Picture 1:** PVC foil (film for stretch ceiling).

**Remarks:**

The test results refer exclusively to the samples specified. The decision rule for the evaluation of conformity of test results can be found in the annex of this report or at <https://www.dekra.de/media/entscheidungsregel-bewertung-konformitaet-pruefergebnisse-gb-web.pdf>. A reproduction in excerpts of the test report must not be made without the written consent of the test laboratory. Chemical and material blanks are taken into account when determining the results. Samples will be stored for max. 6 months (for exceptions and specific storage times see QMH).

Halle, July 30<sup>th</sup> 2024

**DEKRA Automobil GmbH**  
Laboratory for Environmental and Product Analysis



Ramona Wende  
Project manager

**Test result:**

- see following pages -

## Parameter list:

Parameter	Test method	Limit of Quantification	Limit
<b>Phthalates (REACH)</b>			
diisobutyl phthalate (DiBP) dibutyl phthalate (DBP) benzylbutyl phthalate (BBP) Bis(2-ethylhexyl)phthalate (DEHP)	Lab-AA-2378:2015-09 <sup>(a)</sup>	see table of results	0.1 % (REACH Annex XVII) $\Sigma$ 0.1% (REACH Annex XVII) 0.1% (REACH-SVHC-threshold value)
<b>Selected elements (REACH)</b>			
cadmium	DIN EN ISO 11885 (E22):2009-09 <sup>(a)</sup>	0.002 %	0.01% (REACH-Annex XVII)
lead	DIN EN ISO 11885 (E22):2009-09 <sup>(a)</sup>	0.002 %	0.05% (REACH-Annex XVII)
tin	DIN EN ISO 11885 (E22):2009-09 <sup>(a)</sup>	0.002 %	0.1% (REACH-Annex XVII)
<b>PFCAs</b>			
PFCAs + corresponding salts	E DIN EN 17681-1:2023-12, 12.02.01.07_PFAS (2023-01) <sup>(fa)</sup>	see table of results	
<b>RoHS</b>			
Specimen disassembly	DIN EN 62321-02 2023-07 (a) (corresponds to IEC 62321-2:2021)	-	-
RoHS phthalates: diisobutyl phthalate (DiBP) dibutyl phthalate (DBP) benzylbutyl phthalate (BBP) Bis(2-ethylhexyl)phthalate (DEHP)	DIN EN 62321-8:2017 (a) (corresponds to IEC 62321-8:2017) / Lab-AA-2378:2015-09 (a)	0.005 % 0.005 % 0.005 % 0.005 %	0.1% 0.1% 0.1% 0.1%
RoHS flame retardants: polybrominated biphenyle (PBB) polybrominated diphenylether (PBDE)	DIN EN 62321-3-1:2014-10 (a) (corresponds to IEC 62321-3-1:2013) / DIN EN 62321-6:2016-05 (a) (corresponds to IEC 62321-6:2015)	0.005 % 0.005 %	0.1% 0.1%

Parameter	Test method	Limit of Quantification	Limit
<b>RoHS</b>			
RoHS cadmium (Cd) (CAS: 7440-43-9)	DIN EN 62321-3-1:2014-10 (a) (corresponds to IEC 62321-3-1:2013) / DIN EN 62321-5:2014-10 (a) (corresponds to IEC 62321-5:2013)	0.0002 %	0.01%
RoHS lead (Pb) (CAS: 7439-92-1)		0.001 %	0.1%
RoHS hexavalent chromium (Cr-VI) (CAS: 7789-00-6 / 7778-50-9)	DIN EN 62321-3-1:2014-10 (a) (corresponds to IEC 62321-3-1:2013) / DIN EN 62321-7-1:2016-09 (a) (corresponds to IEC 62321-7-1:2015) / DIN EN 62321-7-2:2017-12 (a) (corresponds to IEC 62321-7-2:2017)	0.001 %	0.1%
RoHS mercury (Hg) (CAS: 7439-97-6)	DIN EN 62321-3-1:2014-10 (a) (corresponds to IEC 62321-3-1:2013) / DIN EN 62321-4:2018-05 (a) (corresponds to IEC 62321-4:2013 + A1:2017)	0.001 %	0.1%
<b>Migration of certain elements (category 3)</b>			
Migration of certain elements (category 3)	DIN EN 71-3:2021-06 (a)	see table of results	

a = accredited test procedure, n = not accredited test procedure, n\* = procedure in accreditation process; s = analysis carried out by DEKRA lab Stuttgart, fa = analysis by subcontracting (accredited method in a partner labor), fn = analysis by subcontracting (non-accredited method in a partner labor).

## 1. Test results: Phthalates (for REACH)

<b>Sample no.</b>	55056459001				
<b>Sample designation</b>	PVC foil (film for stretch ceiling)				
<b>Parameter</b>	<b>CAS</b>	<b>Unit</b>	<b>Limit of Quantification</b>	<b>Result</b>	<b>Limit</b>
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	mg/kg	50	< 50	SVHC, REACH 17 (51)
Diisobutyl phthalate (DIBP)	84-69-5	mg/kg	50	< 50	SVHC, REACH 17 (51)
Dibutyl phthalate (DBP)	84-74-2	mg/kg	50	< 50	SVHC, REACH 17 (51)
Benzyl butyl phthalate (BBP)	85-68-7	mg/kg	50	< 50	SVHC, REACH 17 (51)
Limits REACH Annex XVII, entry 51: 1000 mg/kg (sum and single substances)					
REACH Annex XVII, entry 52: Not assessed because material is not for toys and baby articles.					
REACH SVHC: 1000 mg/kg (threshold value)					
Results below the limit of quantification are not taken into account for the sum value.					
Quantification limits may be adapted due to matrix effects.					

## 2. Test results: Lead, cadmium and tin

<b>sample no.</b>	55056459001				
<b>sample designation</b>	PVC foil (film for stretch ceiling)				
<b>Parameter</b>	<b>Unit</b>	<b>Limit of Quantification</b>	<b>Result</b>	<b>Limit</b>	
lead	mg/kg	20	< 20	500	
cadmium	mg/kg	20	< 20	100	
tin	mg/kg	20	< 20	1000	
Limits REACH Annex XVII, entry 23 (cadmium) und entry 63 (lead):500 mg/kg (Pb), 100 mg/kg (Cd)					
Limits REACH Annex XVII, entry 20 (tin; Tinorganic compounds): 1000 mg/kg.					
Limits REACH Annex XVII, entry 21 (Di- $\mu$ -oxo-di-n-butylstanniohydroxyboran, Dibutylzinnhydrogenborat C <sub>8</sub> H <sub>19</sub> BO <sub>3</sub> Sn (DBB)): 1000 mg/kg.					
REACH SVHC: 1000 mg/kg (threshold value)					
Results below the limit of quantification are not taken into account for the sum value.					
Quantification limits may be adapted due to matrix effects.					

### 3. Test results: PFCAs, PFSAs

Parameter	CAS	LoQ [µg/kg]	Unit	Result 55056459001	Limit <sup>2)</sup>
Perfluorotridecanoic acid (PFTrA)	72629-94-8	15	µg/kg	< 15	SVHC (86), REACH 17
Perfluorododecanoic acid (PFDoA)	307-55-1	15	µg/kg	< 15	SVHC (87), REACH 17
Perfluoroundecanoic acid (PFUnA)	2058-94-8	15	µg/kg	< 15	SVHC (88), REACH 17
Perfluorotetradecanoic acid (PFTA)	376-06-7	15	µg/kg	< 15	SVHC (89), REACH 17
Perfluorooctanoic acid (PFOA)	335-67-1	10	µg/kg	< 10	SVHC (139), POP
Ammonium pentadecafluorooctanoate (APFO)	3825-26-1	10 <sup>1)</sup>	µg/kg	< 10 <sup>1)</sup>	SVHC (141)
Perfluorononaic acid (PFNA)	375-95-1	10	µg/kg	< 10	SVHC (168), REACH 17
Perfluorodecanoic acid (PFDeA)	335-76-2	15	µg/kg	< 15	SVHC (171), REACH 17
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	10	µg/kg	< 10	SVHC (174), POP
HFPO-DA (GenX)	13252-13-6	10	µg/kg	< 10	SVHC (198)
Perfluorobutanesulfonic acid (PFBS)	375-73-5	10	µg/kg	< 10	SVHC (205)
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	µg/kg	< 10	SVHC (232)
Perfluorooctanoic sulfonic acid (PFOS)	1763-23-1	10	µg/kg	< 10	POP

The analytical concentration for a selected PFCA-compound is the sum of PFCA-concentration + corresponding salts of the selected PFCA.

LoQ = Limit of quantification. Individual results below the limit of quantification are not taken into account for sum values.

<sup>1)</sup> Ammonium pentadecafluorooctanoate (APFO, CAS 3825-26-1) is included in the analytical result for Perfluorooctanoic acid (PFOA, CAS 335-67-1), because the analytical concentrations for selected PFCA-compounds include the corresponding salts of the selected PFCAs.

<sup>2)</sup> REACH 17: Assessment according to REACH Annex XVII entry 68; Applied limit: Sum (PFNA, PFDeA, PFUnA, PFDoA, PFTrA, PFTA and corresponding salts) < 25 µg/kg for the sample tested in this report.

SVHC (entry number): Assessment according to REACH article 33; Applied limit: Threshold value of 1000 mg/kg for listed substances

POP: Assessment according to (EU) 2019/1021 (POP); Applied limit:

Article 4 (present as an unintentional trace content, article); Limit PFOS (+ corresponding salts): 1000 mg/kg and limit PFOA (+ corresponding salts): 25 µg/kg;

Article 7 (contamination of waste, article); Limit PFOS (+ corresponding salts): 50 mg/kg

Article 7 (contamination of waste, article); Limit PFHxS (+ corresponding salts): 1 mg/kg



#### 4.1. Test results: RoHS heavy metals

DEKRA sample no.	Sample designation	Cd [ppm]	Pb [ppm]	Cr-VI [ppm]	Hg [ppm]
55056459001	PVC foil (film for stretch ceiling)	< 0.01	< 0.1	< 0.1	< 0.1

All measurements without index were performed by XRF.

- (a) The verification and quantification of Cadmium (Cd) respectively Lead (Pb) was performed by ICP-OES;
- (b) The verification and quantification of Chromium/Chromium VI (Cr/Cr VI) was performed by ICP-OES/ photometrical analysis.
- (c) The verification and quantification of Mercury (Hg) was performed by ICP-OES.

#### Exemptions of the RoHS restrictions:

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#### 4.2. Test results: RoHS organic pollutants

DEKRA sample no.	Sample designation	PBB [ppm]	PBDE [ppm]	DBP [ppm]	BBP [ppm]	DiBP [ppm]	DEHP [ppm]
55056459001	PVC foil (film for stretch ceiling)	< 0.1	< 0.1	(d) < 0.1	< 0.1	< 0.1	< 0.1

All measurements of PBB/PBDE without index were performed by XRF; The verification and quantification of the RoHS phthalates was performed by GC-MS.

- (d) The verification and quantification of PBB/PBDE was performed by GC-MS.

## 5. Test results: Migration of certain elements (category 3)

<b>Sample no.</b>	55056459001			
<b>Sample designation</b>	PVC foil (film for stretch ceiling)			
<b>Migration of certain elements EN 71-3</b>				
<b>Parameter</b>	<b>Unit</b>	<b>Result</b>	<b>Limit of quantification</b>	<b>Limit Category 3</b>
Migration of Nickel (Ni)	mg/kg	< 1	1	930
Migration of Aluminium (Al)	mg/kg	< 1	1	28.130
Migration of Manganese (Mn)	mg/kg	< 1	1	15.000
Migration of Tin (Sn)	mg/kg	< 1	1	180.000
Migration of Organotin compounds	mg/kg	< 3	3	12
Migration of Strontium (Sr)	mg/kg	< 1	1	56.000
Migration of Zinc (Zn)	mg/kg	< 10	10	46.000
Migration of Cobalt (Co)	mg/kg	< 0.1	0.1	130
Migration of Copper (Cu)	mg/kg	< 1	1	7.700
Migration of Boron (B)	mg/kg	< 1	1	15.000
Migration of Arsenic (As)	mg/kg	< 1	1	47
Migration of Barium (Ba)	mg/kg	< 1	1	18.750
Migration of Cadmium (Cd)	mg/kg	< 0.1	0.1	17
Migration of Chromium (Cr)	mg/kg	< 0.02	0.02	-
Migration of Chromium III (Cr III)	mg/kg	< 0.02	0.02	460
Migration of Chromium VI (Cr VI)	mg/kg	< 0.02	0.02	0,053
Migration of Mercury (Hg)	mg/kg	< 0,1	0.1	94
Migration of Lead (Pb)	mg/kg	< 1	0.1	23
Migration of Antimony (Sb)	mg/kg	< 1	1	560
Migration of Selenium (Se)	mg/kg	< 1	1	460

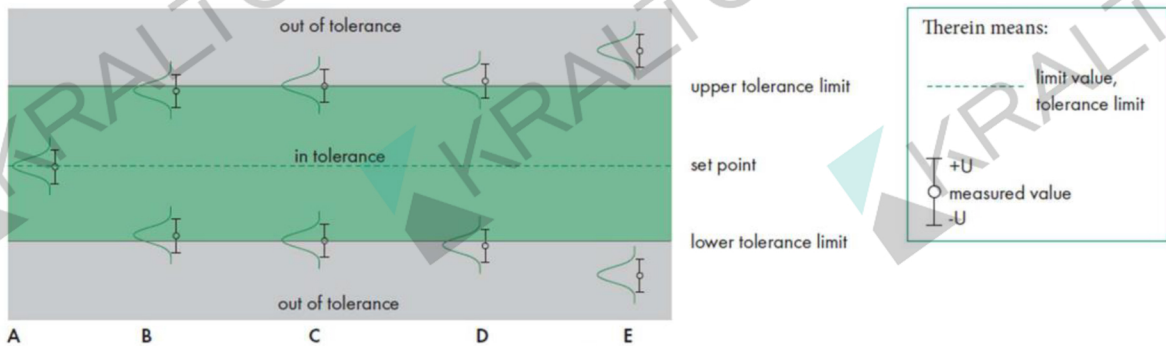
## Annex:

### Decision rule for the evaluation of conformity of test results

Every measurement result is subject to a measurement uncertainty. The measurement uncertainty can be specified as an interval within which the correct/true value lies with a certain confidence level. The measurement uncertainty is calculated with a 95% confidence level.

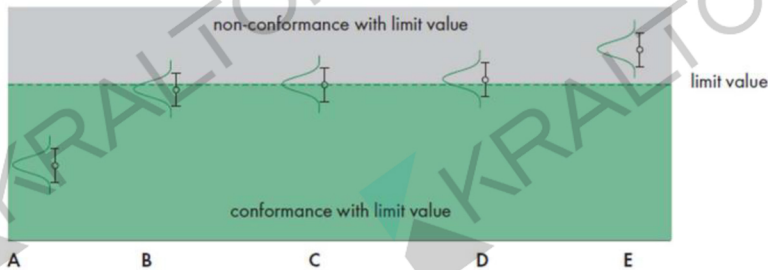
If measurement results are to be used for a conformity assessment, e.g. comparison with a limit value or an otherwise defined specification, and if the measurement result is close to the limit value, the measurement uncertainty is of decisive importance.

When comparing measurement results with tolerance limits, 5 cases have to be distinguished:



Test results and their measurement uncertainties in relation to an upper and lower tolerance limit

When comparing measurement results with a limit value, 5 cases also have to be distinguished:



Test results and their measurement uncertainties in relation to an upper limit value

**Case A:** Measurement result is below the limit value/within the tolerance limits even with consideration of the measurement uncertainty.

**Case B:** Measurement result is below the limit value/within the tolerance limits. But with consideration of the measurement uncertainty it is not safely below the limit value / within the tolerance limits (confidence level 95%).

**Case C:** Measurement result is on the limit value/on the tolerance limits.

**Case D:** Measurement result is above the limit value/outside the tolerance limits. But with consideration of the measurement uncertainty it is not safely above the limit value/not safely outside the tolerance limits (confidence level 95%).

**Case E:** Measurement result is above the limit value/outside the tolerance limits even with consideration of the measurement uncertainty.

If there are no specifications in the applicable standard or regulation and also no customer-specific requirements for the conformity assessment, the above-mentioned laboratories of DEKRA Automobil GmbH apply the following decision rule as standard:

**Case A and B:** For measurement results which, including their measurement uncertainty, are below the limit value/within the tolerance limits and measurement results which are below the limit value/ within the tolerance limits but whose measurement uncertainty range **exceeds this limit value/ tolerance limit, the limit value/tolerance is pass.**

**Case C and D:** In the case of measurement results that lie at the limit value/on the tolerance limit and measurement results that lie above the limit value/outside the tolerance limits, but whose measurement uncertainty range falls below this limit value/tolerance limit, the limit value/tolerance **limit is considered to be met only partially.** Taking the measurement uncertainty into account, the measurement result could still meet the requirements, but the risk of exceeding is high.

**Case E:** In the case of measurement results which, including their measurement uncertainty, are **above the limit value/outside the tolerance, the limit value/tolerance fail.**

\*\*\* end of test report \*\*\*