

Produktprüfung
Zertifizierung
Qualitätssicherung

ECO
INSTITUT

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Li & Co GmbH

Palü Daint

7537 Müstair, Schweiz

Test report No. 20934-1

Ordering party:	Li & Co GmbH, Müstair, Schweiz
Sample description according to ordering party:	Pronto Ledo
Sample no:	20934-1
Type of sample:	Natural leather readymade flooring
Sample provision:	by ordering party
Sample receipt:	14 May 2009
Date of provision:	16 July 2009
Number of pages of test report:	14
Testing goals:	<ol style="list-style-type: none">1. Emission analysis: Volatile organic compounds (VOC) Formaldehyde2. Constituent analysis: Chromium VI Amines (Azo colourants) Preservative
Test laboratories:	eco-INSTITUT GmbH, Cologne



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Test report

1 Emission analysis

1.1 Volatile organic compounds (VOCs)

Testing goal:

Volatile organic compounds (VOC), testing chamber, air sampling 3 and 7 days after loading of test chamber

Test method:

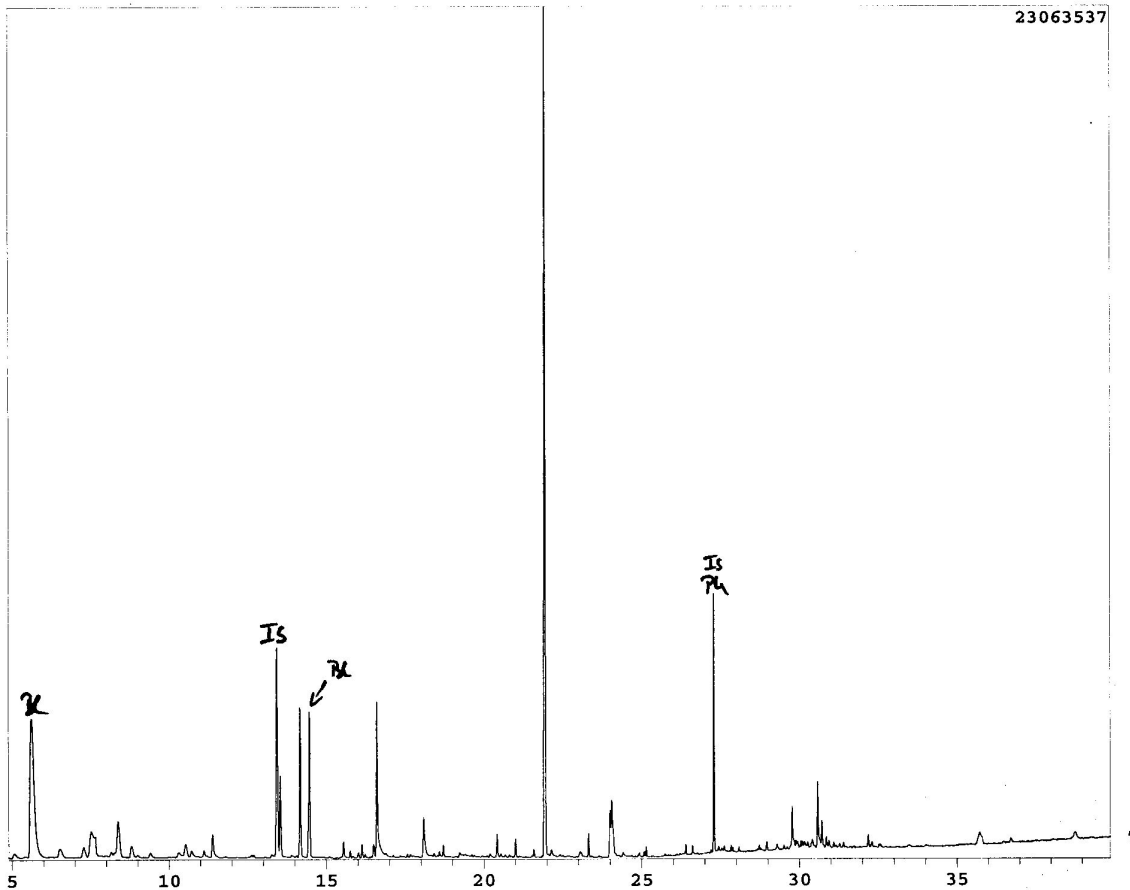
Manufacture of specimen:	DIN EN ISO 16000-11	
	Pre-treatment:	n/a
	Masking of backside:	yes
	Masking of edges:	yes
	Proportions of open edges to surface:	n/a
	Load:	relating to area
	Size:	12,5 x 20,0 x 1,3 cm
Test chamber conditions:	DIN EN ISO 16000-9	
	Volume of chamber:	0,125 m ³
	Temperature:	23°C
	Relative humidity:	50 %
	Air pressure:	normal
	Air:	purified
	Air change rate:	0.5 h ⁻¹
	Flow rate:	0.3 m/s
	Load:	0.4 m ² /m ³
	Specific airflow rate:	1.25 m ³ /m ² *h
	Air sampling:	3 and 7 days after loading of test chamber
Analytical chemistry:	DIN ISO 16000-6	
	Limit of quantitation:	1 µg/m ³ (KMR-VOC) 5 µg/m ³ (further VOC)

Test result:

Evaluation, measurement after 3 days

Emissionen nach 3 Tagen Emission after 3 days				Retentionbereich Retention range	Quantifizierung Quantification	Identifikation Identification	C _i [µg/m³]	SER _i [µg/m³h]	Zuordnung Classification [canc./NIK/0.NIK] [carc./LCI/no LCI]	R _i	lfd. Nr. Serial number	ADAM_2009_04_Ubersicht	Legende Legend VVOC = < C6 VOC = C6 - C16 SVOC = C16 - C22 a = substanzspezifisch substance-specific b = substanzähnlich substance-like c = Toluoläquivalent toluene equivalent d = DNPH 1 = Klasse 1 class 1 2 = Klasse 2 class 2 3 = Klasse 3 class 3												
Natur-Leder Fertigboden	Kommentar Comment	CAS-No.	RT [min]																						
getundene Substanzen Detected substances													Daten nur über den Button "Messergebnisse eingeben/löschen" in diese Tabelle eintragen Data to be entered only via the button "enter/delete results"												
Formaldehyd		50-00-0	1,00	VVOC	d	1	5,00	6,250	ohne NIK				0												
Acetaldehyd		75-07-0	1,00	VVOC	d	1	5,00	6,250	ohne NIK				0												
Essigsäure		64-19-7	7,66	VOC	a	1	13,00	16,250	500	0,026	9-1	1													
Toluol		108-88-3	13,54	VOC	a	1	9,00	11,250	1.900	0,005	1-1	1													
Hexanal		66-25-1	14,16	VOC	a	1	13,00	16,250	890	0,015	7-3	1													
Ethylenglykol-monobutylether		111-76-2	16,59	VOC	a	1	22,00	27,500	980	0,022	6-3	1													
Cyclohexanon		108-94-1	16,60	VOC	a	1	6,00	7,500	410	0,015	8-5	1													
Octamethylcyclotetra-siloxan		556-67-2	18,09	VOC	a	1	7,00	8,750	1.200	0,006	12-4	1													
2-Ethylhexylacetat	außerh.d.Kalibratio	103-09-3	21,94	VOC	a	1	82,00	102,500	1.400	0,059	10-12	1													
Dipropylglykol-mono-n-butylether		29911-28-2	24,06	VOC	a	1	13,00	16,250	810	0,016	6-31	1													
Benzophenonderivat		30,58	30,58	SVOC	c	3	7,00	8,750	ohne NIK				0												

Chromatogram, measurement after 3 days

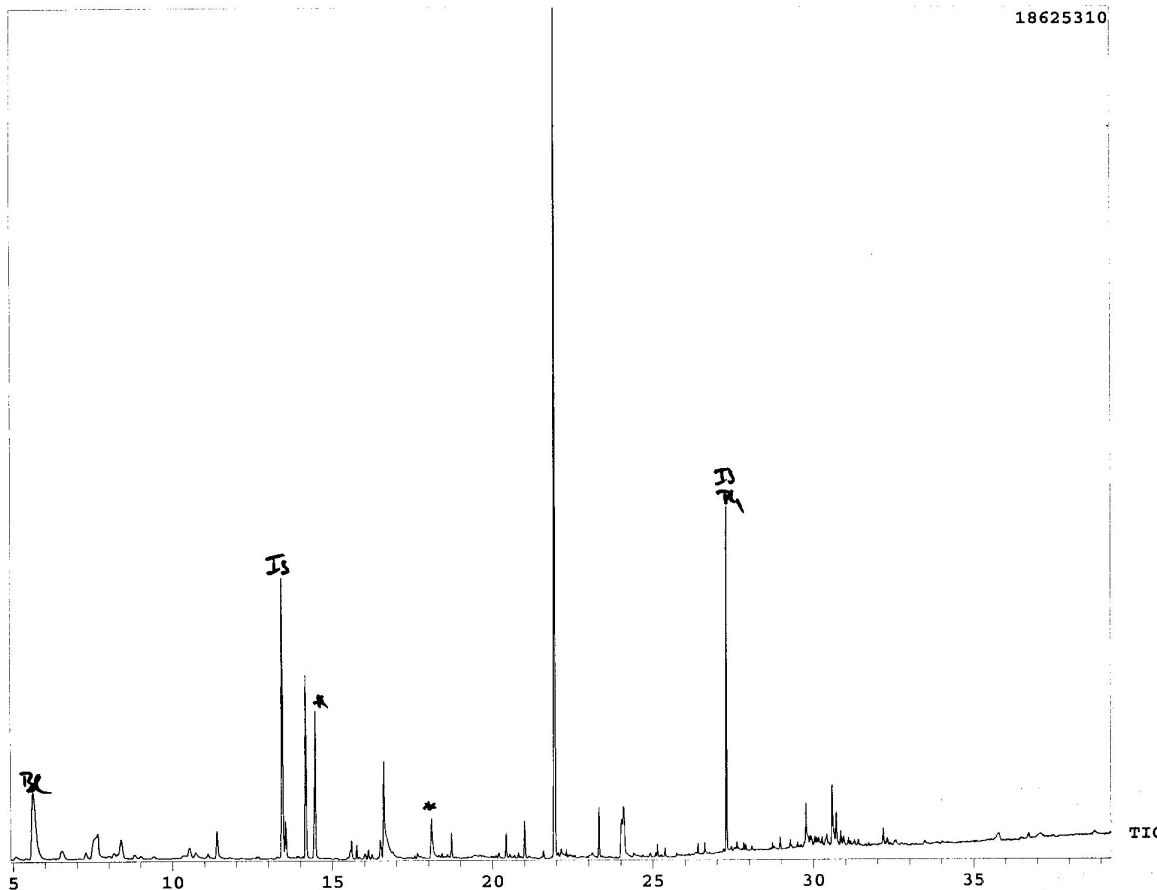


Note: The test results only apply to the submitted specimen. The report loses its validity as soon as the composition or the manufacturing method of the specimen is altered. A complete or partial publication of the test report is subject to approval.

Evaluation, measurement after 7 days

Emissionen nach 7 Tagen Emission after 7 days				Retentionbereich Retention range	Quantifizierung Quantification	Identifikation Identification	C ₁ [µg/m³]	SER ₁ [µg/m³h]	Zuordnung Classification [canc./NIK/o.NIK] [canc./LCI/no LCI]	R ₁	Ifd. Nr. Serial number	ADAM 2003_04_Ubersicht	Legende Legend VVOC = < C6 VOC = C6 - C16 SVOC = C16 - C22 a = substanzspezifisch substance-specific b = substanzähnlich substance-like c = Toluoläquivalent toluene equivalent d = DNPH 1 = Klasse 1 class 1 2 = Klasse 2 class 2 3 = Klasse 3 class 3
Natur-Leder Fertigboden	Kommentar Comment	CAS-No.	RT [min]										
getundene Substanzen Detected substances													
Daten nur über den Button "Messergebnisse eingeben/löschen" in diese Tabelle eintragen Data to be entered only via the button "enter/delete results"													
Formaldehyd		50-00-0	1,00	VVOC	d	1	5,00	6,250	ohne NIK				0
Acetaldehyd		75-07-0	1,00	VVOC	d	1	6,00	7,500	ohne NIK				0
Essigsäure		64-19-7	7,66	VOC	a	1	13,00	16,250	500,00	0,026	9-1	1	1
Hexanal		66-25-1	14,16	VOC	a	1	12,00	15,000	890,00	0,013	7-3	1	1
Ethylenglykol-monobutylether		111-76-2	16,60	VOC	a	1	17,00	21,250	980,00	0,017	6-3	1	1
Octamethylcyclotetra-siloxan		556-67-2	18,09	VOC	a	1	5,00	6,250	1.200,00	0,004	12-4	1	1
2-Ethylhexylacetat		103-09-3	21,94	VOC	a	1	67,00	83,750	1.400,00	0,048	10-12	1	1
Dipropylglykol-mono-n-butylether		29911-28-2	24,09	VOC	a	1	10,00	12,500	810,00	0,012	6-31	1	1

Chromatogram, measurement after 7 days



Note: The test results only apply to the submitted specimen. The report loses its validity as soon as the composition or the manufacturing method of the specimen is altered. A complete or partial publication of the test report is subject to approval.

Evaluation mask

Probenbezeichnung Marking of the sample	Natur-Leder Fertigboden							
Aktenzeichen beim DIBt File number of DIBt	0							
Prüfinstitut Testing laboratory	eco-Institut GmbH							
Ergebnisüberblick General view of the results ADAM_2008_04_Urversion	3 Tage (days)			7 Tage (days)			28 Tage (days) Keine Daten vorhanden - No data available	
	Ergebnisse results	AgBB Anforderungen requirements	Abbruchkriterien break-off criteria	Ergebnisse results	Abbruchkriterien break-off criteria	Ergebnisse results	AgBB Anforderungen requirements	
	µg/m³	mg/m³	mg/m³	µg/m³	mg/m³	µg/m³	mg/m³	
[A] TVOC (C₆ - C₁₆)	165	0 ≤ 10 mg/m³	0,2 ≤ 0,3 mg/m³	124	0,1 ≤ 0,5 mg/m³	0	0,0 ≤ 1,0 mg/m³	
[B] Σ SVOC (C₁₆ - C₂₂)	7	keine none	0,01 ≤ 0,03 mg/m³	0	0,00 ≤ 0,05 mg/m³	0	0,0 ≤ 0,1 mg/m³	
[C] R (dimensionslos/dimensionless)	0,164	keine none	0,2 ≤ 0,5	0,120	0,1 ≤ 0,5	0,000	0 ≤ 1	
[D] Σ VOC o. NIK without LCI	0	keine none	0,00 ≤ 0,05 mg/m³	0	0,00 ≤ 0,05 mg/m³	0	0,0 ≤ 0,1 mg/m³	
[E] Σ Cancerogene	0	0,00 ≤ 0,01 mg/m³	0,000 ≤ 0,001 mg/m³	0	0,000 ≤ 0,001 mg/m³	0	0,000 ≤ 0,001 mg/m³	
Dieser Block liefert zusätzliche Information This part gives some additional information								
[F] VVOC (< C₆)	10			11		0		
[G] VOC (C₆ - C₁₆) als Toluoläquivalent as toluene equivalent	180	Wert manuell eingeben! Enter value manually!		130	Wert manuell eingeben! Enter value manually!		Wert manuell eingeben! Enter value manually!	

Note: Differing from the given, 1.2 µg/m³ applies as the limit of TVOC after 3 days and 0.3 mg/m³ as the limit of TVOC after 28 days. Break-off criteria of TVOC after 7 days also accounts to 0.3 mg/m³.

1.2 Formaldehyde

Testing goal:

Formaldehyde, testing chamber, air sampling 3 and 7 days after loading of test chamber

Test chamber:

Manufacture of specimen:	DIN EN 717-1 in general see 1.1 volatile organic compounds
Test chamber conditions:	DIN EN 717-1 with deviations as follows: <ul style="list-style-type: none">- no determination of balancing concentration; formaldehyde emission is determined at measuring point as aforementioned- size of test chamber see chamber volume- Relative humidity: 50% Parameter emission test chamber: see. 1.1 volatile organic compounds
Air sampling:	3 and 7 days after loading of test chamber
Chemical analysis:	DIN EN 16000-3
Limit of quantitation:	0.003 ppm

Test result:

Substance	Concentration (test chamber air) [ppm]	Concentration (test chamber air) [ppm]
	Measurement after 3 days	Measurement after 7 days
Formaldehyde	0,004	0,004

2 Constituent analysis

2.1 Chromium VI

Test parameter:

Chromium VI

Test method:

Analytics: | DIN 53314

Detection limit: | 3 mg/kg

Test result:

Substance	Content (Material) [mg/kg]
Chromium VI	< 3

2.2 Amines (Azo colourants)

Test parameter:

Amines (Azo colourants)

Test method:

Analytics: | § 64 LFGB 82.02-3, in conformity with DIN ISO/TS 17234
(prenorm)

Detection limit: | 30 mg/kg

Test result:

Test method	Content (Material) [mg/kg]
leather	< 30

2.3 Preservatives

Test method:

Analytics:

Phenoles: extraction with methanol/acetone
 derivatisation with pentafluorobenzoylchloride
 segregation, identification and quantification capillary
 gaschromatographic by GC/ECD and/or GC/MS

Isothiazolinones: extraction with methanol
 if necessary clean up via silicagel column
 segregation, identification and quantification by HPLC/DAD

Detection limits:

see below

Test result:

Parameter	Content (Material) [mg/kg]	Detection limit [mg/kg]
Phenole	n.d.	2
2-Methylphenole	12	2
4-Methylphenole	5	2
Σ Phenol, Methylphenole	17	
4-Chlorophenole	n.d.	0,5
2,4-Dichlorophenole	n.d.	1
2,4,5-Trichlorophenole	n.d.	1
2,4,6-Trichlorophenole	n.d.	1
2,3,5,6/2,3,4,6- Tetrachlorophenole	n.d.	1
2,3,4,5-Tetrachlorophenole	n.d.	1
Pentachlorophenole	n.d.	0,5
4-Chloro-3-Methylphenole	2,0	0,5
Tribromphenole	85	0,5
2,6-Dimethylphenole	n.d.	2
2-Phenylphenole	2,5	0,5
4-Phenylphenole	n.d.	1
Triclosan	6	2
Σ Chlorophenoles and other preservatives	96	

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Parameter	Content (Material) [mg/kg]	Detection limit [mg/kg]
Chloromethyl-Isothiazolinone (CIT)	n.d.	30
Methyl-Isothiazolinone (MIT)	n.d.	50
2-Octyl-4-Isothiazolin-3-on (OIT)	110	5
Thiocynomethylthiobenothiazole (TCMTB)	320	5
Σ Isothiazolinones	430	

Cologne, 16 July 2009



Dr. rer. nat. Hans-Ulrich Krieg
(Testing manager)

Surveyor's evaluation

The product Pronto Ledo was ecologically product-tested by order of Li & Co GmbH . Basis of the evaluation are the test criteria of the Kork-label. The results as they are documented in the test report are evaluated as follows.

Pos.	Test parameter	Concentration (test chamber air) [mg/m ³]	Limit [mg/m ³]	Limit kept [yes/no]
1	VOC			
1.1	Measurement date after 3 days			
	TVOC	0.165	≤ 1.2	yes
	KMR-VOC	< 0.001	≤ 0.01	yes
1.2	Measurement date after 7 days			
	TVOC	0.124	≤ 0,3	yes
	Sum SVOC	< 0.005	≤ 0.05	yes
	Sum VOC without LCI	< 0.005	≤ 0.05	yes
	KMR-VOC	< 0.005	≤ 0.001	yes
1.3	Measurement date after 28 days			
	TVOC	not tested	≤ 0,3	not applicable
	Sum SVOC	not tested	≤ 0.1	not applicable
	Sum VOC without LCI	not tested	≤ 0.1	not applicable
	KMR-VOC	not tested	≤ 0.001	not applicable

Pos.	Test parameter	Value	Limit	Limit kept [yes/no]
2	R value (Calculation on the basis of LCI list 2008)			
	R value after 7 days	0.1	≤ 0.5	yes
	R value after 28 days	not tested	≤ 1	not applicable

Pos.	Test parameter	Concentration (test chamber air) [ppm]	Limit [ppm]	Limit kept [yes/no]
3	Formaldehyde			
	Formaldehyde after 7 days	0.004	≤ 0.05	yes
	Formaldehyde after 28 days	not tested	≤ 0.05	not applicable

The tested product Pronto Ledo by Li & Co GmbH meets the Kork label's requirements for chemical testing (cork flooring) to the full extent as it is stated above.

Cologne, 16 July 2009



Dr. rer.nat. Frank Kuebart
(Project manager)

Appendix

Definition of terms:

VOC (volatile organic compounds)	All single substances with a concentration of $\geq 0.001 \text{ mg/m}^3$ in retention area C_6 (n hexane) to C_{16} (n hexadecane) Substances see LCI-List / AgBB
TVOC (Sum volatile organic compounds)	Sum of all single substances in retention area C_6 to C_{16} .
VVOC (very volatile organic compounds)	All single substances with a concentration of $\geq 0.001 \text{ mg/m}^3$ in retention areas $< C_6$
SVOC (semivolatile organic compounds)	All single substances $\geq 0.001 \text{ mg/m}^3$ in retention area $> C_{16}$ (n hexadecane) to C_{22} (docosanol)
Sum SVOC (Sum semivolatile organic compounds)	Sum of all SVOC in retention area $> C_{16}$ to C_{22}
LCI value	Lowest concentration of interest; reference value for evaluation of individual volatile substances according to the scheme of hygienic evaluation of building products (AgBB)
R value	Risk factor for evaluation of toxicological relevance of verified single substances, determined after 28 days respectively on the date of the last measurement Deduced by the sum of all quotients of concentration of one substance in the test chamber air and the referring LCI value.

List of analysed VOCs:

Aromatic hydrocarbons

Toluene
Ethylbenzene
p-Xylene
m-Xylene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
1,2,3-Trimethylbenzene
2-Ethyltoluene
1-Isopropyl-4-methylbenzene
1,2,4,5-Tetramethylbenzene
n-Butylbenzene
1,3-Diisopropylbenzene
1,4-Diisopropylbenzene
Phenyl octane
1-Phenyl decane²
1-Phenyl undecane²
4-Phenylcyclohexene
Styrene
Phenyl acetylene
2-Phenyl propene
Vinyl toluene
Naphthalene
Indene
Benzene

Saturated aliphatic substances

Hydrocarbons

2-Methyl pentane¹
3-Methyl pentane¹
n-Hexane
Cyclohexane
Methylcyclohexane
1,4-Dimethylcyclohexane

n-Heptane
n-Octane
n-Nonane
n-Decane
n-Undecane
n-Dodecane
n-Tridecane
n-Tetradecane
n-Pentadecane
n-Hexadecane
Methylcyclopentane

Terpenes

δ-3-Carene
α-Pinene
β-Pinene
Limonene
Longifolene
Caryophyllene
Isolongifolene
alpha-Phellandrene
Myrcene
Camphene
alpha-Terpinene
Longipinene
beta-Caryophyllene
beta-Farnesene
alpha-Bisabolene

Aliphatic alcohols and ether

1-Propanol¹
2-Propanol¹
tert-Butanol
2-Methyl-1-propanol
1-Butanol
1-Pentanol
1-Hexanol
Cyclohexanol
2-Ethyl-1-hexanol
1-Octanol
4-Hydroxy-4-methyl-pentan-2-one

1-Heptanol
1-Nonanol
1-Decanol

Aromatic alcohols (phenols)

Phenol
BHT (2,6-di-tert-butyl-4-methylphenol)
Benzylalcohol

Glycols, Glycol ether, Glycol ester

Propylenglycol (1,2-Dihydroxypropane)
Ethylene glycol (Ethandiol)
Ethylene glycol monobutyl ether
Diethylene glycol
Diethylene glycol-monobutyl ether
2-Phenoxyethanol
Ethylene carbonate
1-Methoxy-2-propanol
Glycolic acid butyl ester
Texanol
Butyldiglycol acetate
Dipropylenglycol mono-methyl ether
2-Methoxyethanol
2-Ethoxyethanol
2-Propoxyethanol
2-Methylethoxyethanol
2-Hexoxyethanol
1,2-Dimethoxyethane
1,2-Diethoxyethane
2-Methoxyethyl acetate
2-Ethoxyethyl acetate
2-Butoxyethyl acetate
2-(2-Hexoxyethoxy)-ethanol
1-Methoxy-2-(2-methoxy-ethoxy)-ethane
Propylene glycol di-acetate
Dipropylene glycol
Dipropylene glycol monomethylether acetate
Dipropylene glycol mono-n-propylether
Dipropylene glycol mono-t-butylether
1,4-Butanediol
Tripropyleneglycolmonomethyl ether
Triethylene glycol dimethyl ether
1,2-Propylene glycol dimethyl ether
TXIB
Ethylidiglycol
Dipropylene glycol-dimethyl ether

Aldehydes

Butanal^{1,3}
Pentanal³
Hexanal
Heptanal
2-Ethylhexanal
Octanal
Nonanal
Decanal
2-Butenal³
2-Pentenal³
2-Hexenal
2-Heptenal
2-Octenal
2-Nonenal
2-Decenal
2-Undecenal
Furfural
Glutaraldehyde
Benzaldehyde
Acetaldehyde^{1,3}
Propanal^{1,3}
Propenal^{1,3}
Isobutenal

Ketones

Ethylmethylketone³
3-Methyl-2-propanol
Methylisobutylketone
Cyclopentanone
Cyclohexanone

Acetone^{1,3}

2-Methylcyclopentanone
2-Methylcyclohexanone
Acetophenone
1-Hydroxyacetone

Acids

Acetic acid
Propionic acid
Isobutyric acid
Butyric acid
Pivalic acid
n-Valeric acid
n-hexanoic acid
n-Heptanoic acid
n-Octanoic acid
2-Ethylhexanoic acid

Esters and Lactones

Methylacetate¹
Ethyl acetate¹
Vinyl acetate¹
Isopropyl acetate
Propyl acetate
2-Methoxy-1-methylethyl acetate
n-Butyl formate
Methylmethacrylate
Isobutylacetate
1-Butyl acetate
2-Ethylhexyl acetate
Methyl acrylate
Ethyl acrylate
n-Butyl acrylate
2-Ethylhexyl acrylate
Adipic acid dimethyl ester
Fumaric acid dibutyl ester
Succinic acid dimethyl ester
Glutaric acid dimethyl ester
Hexandioldiacrylate
Maleic acid dibutyl ester
Butyrolactone
Dimethylphthalate
Texanol

Chlorinated hydrocarbons

Tetrachlorethene
1,1,1-Trichlorethane
Trichlorethene
1,4-Dichlorbenzene

Others

1,4-Dioxane
Caprolactam
N-Methyl-2-pyrrolidone
Octamethylcyclotetrasiloxane
Methenamine
2-Butanonoxime
Tributyl phosphate
Triethyl phosphate
5-Chlor-2-methyl-4-isothiazolin-3-one
2-Methyl-4-isothiazolin-3-one (MIT)
Triethylamine
Tetrahydrofuran (THF)
1-Decene
1-Octene
2-Pentylfuran
Tetramethyl succinonitrile
Propylencarbonate
Isophorone
Dimethylformamide (DMF)

1 VVOC

2 SVOC

3 Analysis after DIN ISO 16000-3

Note: The test result only applies to the submitted specimen. The report loses its validity as soon as the composition or the manufacturing method of the specimen is altered. A complete or partial publication of the test report is subject to approval.