

Gestione della sostenibilità delle imprese della filiera del sistema moda



RSL (RESTRICTED SUBSTANCES LIST) (RSL) FOR NATURAL FIBERS TEXTILE PRODUCTS MADE WITH RECYCLED MATERIALS

1. INTRODUCTION

The idea of circularity in the fashion industry is today considered key to solve environmental issues related to the massive production and disposal of garments.

The current take-make-waste extractive industrial model is requested to move to a takemake-reuse model that will help preserve natural resources and use materials again and again.

That is the reason why, in the last years, the textile industry has increasingly looked for using recycled materials in new productions.

Typically, recycling is divided into pre-consumer recycling and post- consumer recycling.

Pre-consumer recycling is the reclamation of waste materials that were created during the process of manufacturing or delivering goods prior to their delivery to a consumer.

Post-consumer recycling is typically the reclamation of waste materials after they have been used by consumers.

Especially for post- consumer recycling processes, the material that is recycled may be used to create new garments even after decades from its original production and this may impact on the overall final chemical characteristics of the newly produced item.

Since the transition to the circular economy is indeed a quite recent development of the textile industry, for most of the existing chemical limitations in consumer products (weather legally binding or voluntary) the presence of recycled materials and second use products has not been considered.

This is the reason why, the industry has been the need to understand what the state of the art was, and to create based on objective data a specific dedicated RSL addressing the chemical requirements of garments made using natural recycled fibers.

This RSL is expected to fulfill this need and be the link between possibility to use natural recycled fibers and the actual needs in terms of consumer safety and environmental protection.

2. ADVANTAGES OF RECYCLING WOOL AND NATURAL FIBERS

The use of recycled wool to produce new fabric materials may really represent an important opportunity to reduce the environmental footprint of fabric production, coming



to reduced use of chemicals, reduced water consumption and GHG emission as well as reduced energy consumption, compared to an equivalent fabric made with generic virgin wool.

Source: https://manteco.com/life-cycle-assessments/

3. ENVIRONMENTAL AND CONSUMER PROTECTION

The ambition to recycle as much fibers as possible may sometimes apparently conflict with the aim to prevent adverse environmental and human health impacts, due to the chemical characteristics of the recycled garment which may not meet the actual expectations in terms of chemical quality.

That is why, while in all production process (those related to new materials and those related to recycled materials) the same sets of expectations can be applied (such as for example the principles of the ZDHC Roadmap to Zero Programme and the application of ZDHC MRSL), for chemical quality of the final products, to apply the same set of expectations to garments made using new fibers vs garments made using recycled fibers will in practice reduce the potential to scale the circular economy concept.

An RSL for consumer products made using recycled fibers is needed to set a unified highlevel expectations, able to grant high chemical quality of products and protection of the consumers, but also allow the transition to a circular economy and the possibility to re-use natural fiber as much as possible.

Limits defined by the RSL shall, therefore, not only be challenging for the industry and able to grant the maximum level of protection, but also allow the possibility to recycle, considering some peculiar characteristics of the raw materials used, such as that:

- they are coming from different part of the world with different limits and approaches to product safety;
- they may have been produced years ago, even decades ago, where different limitations were in place;
- they have been used, stored, and washed by consumers using mixtures that are actually on the market which are not subject to the same limitations applied to garments and textile products.

4. PURPOSE OF THE RSL

The attached RSL has been developed to promote the safety of products made using recycled natural fibers: wool, cotton and silk. This is supposed to be the first published unified expectation for the chemical quality of garments made using natural recycled



fibers. The RSL is at the moment applicable for all garment excluded those made for children. The working group did non have enough data to cover also children garments at the time of development of the RSL, if further data will be made available the RSL can be revised to cover them also.

All the substances listed in the RSL are those known for their human health and environmental concerns in natural recycled fibers. Limits for each substance are lower than any existing global legally binding limits and, have been defined in order grant the highest possible level of safety for consumers (considering the nature of recycled fibers).

Moreover, they are aligned with some of the most stringent industry recognized expectations in terms of chemical safety of garments.

Detection limits for testing have been set much lower than the limits of the RSL.

Laboratories will be requested to perform testing using these detection limits with the final goal to use testing data to periodically review the RSL's limits and create a continuous improvement path that tends to unify expectations related to the quality of the raw materials made with recycled fibers to those related to raw materials made with new fibers.

The aim is to start a growth path of the natural fiber recycling industry that leads to an even greater chemical product quality in the next few years.

In addition to what already mentioned above, there is an explicit commitment towards substances included in the so-called "candidate list" that will be tested even in absence of specific limitations to collect data that will enable us to set proper limits for the industry.

5. ADDITIONAL INFORMATION

The RSL has been created by a working group composed by Italian technical experts, mills, brands, laboratories and associations (please refer to the section titled Working Group for more information). This represents the knowledge of the members of the working group and it does not substitute any existing legislation. The use of this RSL or its parts is absolutely voluntary and should be approved by the legal counsel of each company. No part of the document constitute legal advice. The working group disclaims any liability of any kind whatsoever resulting from any use of or reliance on this document.

This RSL has been created with the purpose to serve textile, apparel and footwear companies and their suppliers, engaged in encouraging circular approaches that are able to grant an high level of safety in the end products.

The RSL will be updated on regular basis using additional data that will be collected during testing. The working group is planning to meet on an early basis to examine any new data available and evaluate the need to revise the RSL.



Test methods indicated in the RSL are those that have been identified by the working group as the more adequate to grant a common testing approach between different labs. Each test method shall be used in the most recent published version. In case of impossibility to use one of the indicated test methods labs can use a different approach provided that the same detection limit is granted.

6. WORKING GROUP

Thanks to all the members for the working group for their expertises and hard work and for making available data in support to the development of the PRSL:

- Alessandro Calogero CRAB Medicina Ambiente S.r.l.
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7. PERIOD OF PUBLIC CONSULTATION

In order to ensure the maximum representativeness of the document and to take into account any data not available at the time of the study, for one month from the date of publication of the document, it will be possible to submit technical comments supported by scientific data to the e- mail address: <u>circularity@consorziodetox.it</u>

Comments received no later than March 21, 2022 will be examined by the working group in order to evaluate any necessary changes to the RSL or establish a schedule for the future update work.

Milan, 21/02/22

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Gestione della sostenibilità delle imprese della filiera del sistema moda

Restricted Substances List (RSL) for natural fibers textile products made with recycled materials			V_1_02_2022
Substance	Limits	Suitable Test Method	Reporting limit
Formaldehyde [mg/kg]	75	ISO 14184-1	16
Extractable (heavy) metals [mg/kg]			
Sb (Antimony)	30,0	ISO 16711-2	0,1
Cd (Cadmium)	0,1	ISO 16711-2	0,1
Cr (Chromium)	5,0 * with derogation for Silk at 8	ISO 16711-2	0,1
Cr(VI)	1,0	ISO 16711-2	0,1
As (Arsenic)	1,0	ISO 16711-2	0,1
Pb (Lead)	1,0	ISO 16711-2	0,1

Co (Cobalt)	4,0	ISO 16711-2	0,1
Ni (Nickel)	4,0	ISO 16711-2	0,1
Cu (Copper)	50,0	ISO 16711-2	0,1
Hg (Mercury)	0,02	ISO 16711-2	0,02
Ba (Barium)	1000	ISO 16711-2	0,1
Se (Selenium)	100	ISO 16711-2	0,1
Zn (Zinc)		ISO 16711-2	0,1
Mn (Manganese)		ISO 16711-2	0,1
Chlorinated phenols [mg/kg]			
Pentachlorophenol (PCP)	0,5	ISO 17070	0,1
Tetrachlorophenols (TeCP), Sum	0,5	ISO 17070	0,1
Trichlorophenols (TrCP), Sum	0,5	ISO 17070	0,1
Dichlorophenols (DCP), Sum	0,5	ISO 17070	0,1
Monochlorophenols (MCP), Sum	0,5	ISO 17070	0,1

Phthalates / Phthalate [w-%]			
Each phthalate		ISO 14389	0,001
Sum of all	0,05	ISO 14389	0,001
Organic tin compounds [mg/kg]			
TBT, TPhT	2,0	ISO 22744-1	0,01
DBT, DMT, DOT, DPhT, DPT, MBT, MOT, MMT, MPhT, TeBT, TeET, TCyHT, TMT, TOT, TPT	2,0	ISO 22744-1	0,01
Carcinogenic Arylamines / Cleavable carcinogenic arylamines [mg/kg]	20	ISO 14362-1	0,5
cleavable Aniline/ free Aniline [mg/kg]			0,5
Carcinogens dyestuffs [mg/kg]	50	DIN 54231 ISO 16373-2 ISO 16373-3	1
Allergens dyestuffs [mg/kg]	50	DIN 54231 ISO 16373-2 ISO 16373-3	1
DMFu [mg/kg]	0,1	EN 17130	0,1
Chlorinated benzenes and toluenes [mg/kg]			
Sum / Summe	1	EN 17137	0,01
Polycyclic aromatic hydrocarbons (PAHs) [mg/kg]			
Benzo[a]pyrene	1,0	EN 17132	0,5

Benzo[e]pyrene	1,0	EN 17132	0,5
Benzo[a]anthracene	1,0	EN 17132	0,5
Chrysene	1,0	EN 17132	0,5
Benzo[b]fluoranthene	1,0	EN 17132	0,1
Benzo[j]fluoranthene	1,0	EN 17132	0,1
Benzo[k]fluoranthene	1,0	EN 17132	0,1
Dibenzo[a,h]anthracene	1,0	EN 17132	0,5
Naphthalene	10,0	EN 17132	1
Sum 24 PAHs	10,0	EN 17132	2
Surfactant, wetting agent residues [mg/kg]			
NP, OP, HpP, PeP; / Sum	10	ISO 21084	1

NP, OP, HpP, PeP, NP(EO), OP(EO); / Sum	100 * derogation for recycled fibres non-water washable at 500, with 250 as Aspirational (this differentiation has been done in accordance to the last Reach regulation valid for the receycled wool water washable)	ISO 18254-2	1
PFCs, Per- and polyfluorinated compounds			
PFOS, PFOSA, PFOSF, N-Me-FOSA, N-Et-FOSA, N-Me-FOSE, N-Et-FOSE; / Sum [µg/m2]	1,0	CEN/TS 15968	0,01
PFOA and salts Sum [mg/kg]	0,025	ISO 23702-1 CEN/TS 15968	0,001
PFHpA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
PFNA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
PFDA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
PFUdA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
PFDoA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
PFTrDA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
PFTeDA [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
Further Perfluorinated carboxylic acids, each; [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
Perfluorinated sulfonic acids, each; [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
Partially fluorinated carboxylic / sulfonic acids, each; [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
Partially fluorinated linear alcohols, each; [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001
Esters of fluorinated alcohols with acrylic acid, each; [mg/kg]	candidate list	ISO 23702-1 CEN/TS 15968	0,001

PFOA related substances sum [mg/kg]	1,0	ISO 23702-1 CEN/TS 15968	0,001
Flame retardant, each [mg/kg]	10,0	ISO 17881-1 ISO 17881-2	0,1
Chlorinated solvents [mg/kg]			
Dichloromethane	10	EPA 8260B EPA 5021A:2014 + EPA 8260D:2017 (ref. GB 19340- 2003)	0,1
Trichloromethane (Chloroform)	10	EPA 8260B	0,1
Tetrachloromethane	10	EPA 8260B	0,1
1,1-Dichloroethane	10	EPA 8260B	0,1
1,2-Dichloroethane	10	EPA 8260B	0,1
1,1,1-Trichloroethane	10	EPA 8260B	0,1
1,1,2-Trichloroethane	10	EPA 8260B	0,1
1,1,1,2-Tetrachloroethane	10	EPA 8260B	0,1
1,1,2,2-Tetrachloroethane	10	EPA 8260B	0,1
Pentachloroethane	10	EPA 8260B	0,1
1,1-Dichloroethylene	10	EPA 8260B	0,1
1,2-Dichloroethylene	10	EPA 8260B	0,1
Trichloroethylene	10	EPA 8260B	0,1
Tetra(per)chloroethylene	500	EPA 8260B	1
Sum of the 14 chlorinated solvents	candidate list		
VOCs / solvents [mg/kg]			
Methylethylketone	candidate list		
Ethylbenzene	candidate list		
Xylene	candidate list		
Cyclohexanone	candidate list		
2-Ethoxyethylacetate	candidate list		
1,2,3-Trichloropropane	candidate list		

Acetophenone	candidate list		
2-Phenyl-2-propanole	candidate list		
Bis(2-methoxyethyl)ether	candidate list		
Styrene	candidate list		
Benzene	5,0	EPA 8260B	0,1
Toluene	10,0	EPA 8260B	0,1
1-Methyl-2-pyrrolidone (NMP)	candidate list		
N,N-Dimethylacetamide (DMAc)	candidate list		
N,N-Dimethylformamide (DMF)	candidate list	EN 17131	
2-Ethoxyethanol	candidate list		
Ethylene glycol dimethyl ether	candidate list		
2-Methoxyethanol	candidate list		
2-Methoxyethylacetate	candidate list		
2-Methoxypropylacetate	candidate list		
Triethylene glycol dimethyl ether	candidate list		

Chlorinated phenols

Name	<u>CAS-Nr</u> .	Name	<u>CAS-Nr</u> .
Pentachlorophenol / Pentachlorphenol	87-86-5	2,3-Dichlorophenol / 2,3-Dichlorphenol	576-24-9
2,3,4,5-Tetrachlorophenol / 2,3,4,5-Tetrachlorphenol	4901-51-3	2,4-Dichlorophenol / 2,4-Dichlorphenol	120-83-2
2,3,4,6-Tetrachlorophenol / 2,3,4,6-Tetrachlorphenol	58-90-2	2,5-Dichlorophenol / 2,5-Dichlorphenol	583-78-8
2,3,5,6-Tetrachlorophenol / 2,3,5,6-Tetrachlorphenol	935-95-5	2,6-Dichlorophenol / 2,6-Dichlorphenol	87-65-0
2,3,4-Trichlorophenol / 2,3,4-Trichlorphenol	15950-66-0	3,4-Dichlorophenol / 3,4-Dichlorphenol	95-77-2
2,3,5-Trichlorophenol / 2,3,5-Trichlorphenol	933-78-8	3,5-Dichlorophenol / 3,5-Dichlorphenol	591-35-5
2,3,6-Trichlorophenol / 2,3,6-Trichlorphenol	933-75-5	2-Chlorophenol / 2-Chlorphenol	95-57-8
2,4,5-Trichlorophenol / 2,4,5-Trichlorphenol	95-95-4	3-Chlorophenol / 3-Chlorphenol	108-43-0
2,4,6-Trichlorophenol / 2,4,6-Trichlorphenol	88-06-2	4-Chlorophenol / 4-Chlorphenol	106-48-9
3,4,5-Trichlorophenol / 3,4,5-Trichlorphenol	609-19-8		

Phthalates	
Name	<u>CAS-Nr</u> .
Benzylbutylphthalate	85-68-7
Dibutylphthalate	84-74-2
Diethylphthalate	84-66-2
Dimethylphthalate	131-11-3
Di-(2-ethylhexyl)phthalate	117-81-7
Di-(2-methoxyethyl)phthalate	117-82-8
Di-C6-8-branched alkylphthalates, C7 rich	71888-89-6
Di-C7-11-branched and linear alkylphthalates	68515-42-4
Dicyclohexylphthalate	84-61-7
Dihexylphthalates, branched and linear	68515-50-4
Di-iso-butylphthalate	84-69-5
Di-iso-hexylphthalate	71850-09-4
Di-iso-octylphthalate	27554-26-3
Di-iso-nonylphthalate	28553-12-0, 68515-48-0
Di-iso-decylphthalate	26761-40-0, 68515-49-1
Di-n-propylphthalate	131-16-8
Di-n-hexylphthalate	84-75-3
Di-n-octylphthalate	117-84-0
Di-n-nonylphthalate	84-76-4
Di-pentylphthalate (n-, iso-, or mixed)	131-18-0, 605-50-5,
	776297-69-9, 84777-06-0
1,2-Benzenedicarboxylic acid, di-C6-10 alkyl esters	68515-51-5
1,2-Benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters	68648-93-1

<u>Acronym</u> BBP DBP DEP DMP DEHP DMEP DIHP DHNUP DCHP DHxP DIBP DIHxP DIOP DINP DIDP DPrP DHP DNOP DNP DPP

Organic Tin Compounds	
Name	Acronym
Dibutyltin	DBT
Dimethyltin	DMT
Dioctyltin	DOT
Diphenyltin	DPhT
Dipropyltin	DPT
Monomethyltin	MMT
Monobutyltin	MBT
Monooctyltin	MOT
Monophenyltin	MPhT
Tetrabutyltin	TeBT
Tetraethyltin	TeET
Tributyltin	TBT
Tricylcohexyltin	TCyHT
Trimethyltin	TMT
Trioctyltin	TOT
Triphenyltin	TPhT
Tripropyltin	TPT

Arylamines having carcinogenic properties, cleavable arylamines

Name	CAS-Nr.	Name	<u>CAS-Nr</u> .
4-Aminobiphenyl	92-67-1	4-Chloro-o-toluidine	95-69-2
Benzidine	92-87-5	2-Naphthylamine	91-59-8
o-Aminoazotoluene	97-56-3	4,4'-Methylene-bis-(2-chloroaniline)	101-14-4
2-Amino-4-nitrotoluene	99-55-8	4,4'-Oxydianiline	101-80-4
4-Chloroaniline	106-47-8	4,4'-Thiodianiline	139-65-1
2,4-Diaminoanisole	615-05-4	o-Toluidine	95-53-4
4,4'-Diaminodiphenylmethane	101-77-9	2,4-Toluylenediamine	95-80-7
3,3'-Dichlorobenzidine	91-94-1	2,4,5-Trimethylaniline	137-17-7
3,3'-Dimethoxybenzidine	119-90-4	o-Anisidine (2-Methoxyaniline)	90-04-0
3,3'-Dimethylbenzidine	119-93-7	4-Aminoazobenzene	60-09-3
4,4'-Methylenedi-o-toluidine	838-88-0	2,4-Xylidine	95-68-1
p-Cresidine	120-71-8	2,6-Xylidine	87-62-7

Other Arylamines, cleavable arylamines

Aniline

62-53-3

Dyestuffs and pigments classified as carcinogenic

C.I. Generic Name	C.I. Structure number	<u>CAS-Nr</u> .
C.I. Acid Red 26	C.I. 16 150	3761-53-3
C.I. Acid Red 114		6459-94-5
C.I. Basic Blue 26 (with ≥ 0.1 % Michler's ketone or base)		2580-56-5
C.I. Basic Red 9	C.I. 42 500	569-61-9
C.I. Basic Violet 3 (with ≥ 0.1 % Michler's ketone or base)		548-62-9
C.I. Basic Violet 14	C.I. 42 510	632-99-5
C.I. Direct Black 38	C.I. 30 235	1937-37-7
C.I. Direct Blue 6	C.I. 22 610	2602-46-2
C.I. Direct Blue 15		2429-74-5
C.I. Direct Brown 95		16071-86-6
C.I. Direct Red 28	C.I. 22 120	573-58-0
C.I. Disperse Blue 1	C.I. 64 500	2475-45-8
C.I. Disperse Orange 11	C.I. 60 700	82-28-0
C.I. Disperse Yellow 3	C.I. 11 855	2832-40-8
C.I. Solvent Yellow 1 (4-Aminoazobenzene / Aniline Yellow)	C.I. 11100	60-09-3
C.I. Solvent Yellow 3 (o-Aminoazotoluene / o-Aminoazotoluol)		97-56-3
C.I. Pigment Red 104 (Lead chromate molybdate sulphate red)	C.I. 77 605	12656-85-8
C.I. Pigment Yellow 34 (Lead sulfochromate yellow)	C.I. 77 603	1344-37-2
Dyestuffs classified as allergenic		
C.I. Generic Name	C.I. Structure number	<u>CAS-Nr</u> .
C.I. Disperse Blue 1	C.I. 64 500	2475-45-8
C.I. Disperse Blue 3	C.I. 61 505	2475-46-9
C.I. Disperse Blue 7	C.I. 62 500	3179-90-6
C.I. Disperse Blue 26	C.I. 63 305	12222-75-2
C.I. Disperse Blue 35		
C.I. Disperse Blue 102		12222-97-8
C.I. Disperse Blue 106		12223-01-7
C.I. Disperse Blue 124		61951-51-7
C.I. Disperse Brown 1		23355-64-8
C.I. Disperse Orange 1	C.I. 11 080	2581-69-3
C.I. Disperse Orange 3	C.I. 11 005	730-40-5
C.I. Disperse Orange 37 (= 59 / = 76)	C.I. 11 132	51811-42-8,
		13301-61-6,
C.I. Disperse Orange 59	C.I. 11 132	12223-33-5
	C 11 132	
C Disperse Red 1	C 11 110	2872-52-8
C Disperse Red 11	C 62 015	2012-32-0 2872-19 2
C Disperse Red 17	C 11 210	3170-80-3
	0.1. 11 210	5175-05-5

C.I. Disperse Yellow 1	C.I. 10 345	119-15-3
C.I. Disperse Yellow 3	C.I. 11 855	2832-40-8
C.I. Disperse Yellow 9	C.I. 10 375	6373-73-5
C L Disperse Vellow 20		

C.I. Disperse Yellow 39 C.I. Disperse Yellow 49

Name	<u>CAS-Nr</u> .	Acronym
Dimethylfumarate / Dimethylfumarat	624-49-7	DMFu

Chlorinated benzenes and toluenes

Chlorobenzenes	
Name	CAS-Nr.
Chlorobenzene	108-90-7
Dichlorobenzenes	25321-22-6
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Trichlorobenzenes	12002-48-1
1,2,3-Trichlorobenzene	87-61-6
1,2,4-Trichlorobenzene	120-82-2
1,3,5-Trichlorobenzene	108-70-3
Tetrachlorobenzenes	12408-10-5
1,2,3,4-Tetrachlorobenzene	634-66-2
1,2,3,5-Tetrachlorobenzene	634-90-2
1,2,4,5-Tetrachlorobenzene	95-94-3
1,2,3,4(or 1,2,4,5)-Tetrachlorobenzene	84713-12-2
Pentachlorobenzene	608-93-5
Hexachlorobenzene	118-74-1
Chlorotoluenes	
2-Chlorotoluene	95-49-8
3-Chlorotoluene	108-41-8
4-Chlorotoluene	106-43-4
2,3-Dichlorotoluene	32768-54-0
2,4-Dichlorotoluene	95-73-8
2,5-Dichlorotoluene	19398-61-9
2,6-Dichlorotoluene	118-69-4
3,4-Dichlorotoluene	95-75-0
3,5-Dichlorotoluene	25186-47-4
2,3,4-Trichlorotoluene	7359-72-0
2,3,5-Trichlorotoluene	56961-86-5
2,3,6-Trichlorotoluene	2077-46-5
2,4,5-Trichlorotoluene	6639-30-1
2,4,6-Trichlorotoluene	23749-65-7
3,4,5-Trichlorotoluene	21472-86-6
2,3,4,5-Tetrachlorotoluene	1006-32-2,
2,3,4,6-Tetrachlorotoluene	875-40-1
2,3,5,6-Tetrachlorotoluene	1006-31-1,
2,3,4,5,6-Pentachlorotoluene	877-11-2
a-substituted-Chlorotoluenes	Various

Polycyclic aromatic hydrocarbons (PAHs)

Name	CAS-Nr.	Name	CAS-Nr.
Acenaphtene	83-32-9	Dibenzo[a,h]anthracene	53-70-3
Acenaphthylene	208-96-8	Dibenzo[a,e]pyrene	192-65-4
Anthracene	120-12-7	Dibenzo[a,h]pyrene	189-64-0
Benzo[a]anthracene	56-55-3	Dibenzo[a,i]pyrene	189-55-9
Benzo[a]pyrene	50-32-8	Dibenzo[a,l]pyrene	191-30-0
Benzo[b]fluoranthene	205-99-2	Fluoranthene	206-44-0
Benzo[e]pyrene	192-97-2	Fluorene	86-73-7
Benzo[ghi]perylene	191-24-2	Indeno[1,2,3-cd]pyrene	193-39-5
Benzo[j]fluoranthene	205-82-3	1-Methylpyrene	2381-21-7
Benzo[k]fluoranthene	207-08-9	Naphthalene	91-20-3
Chrysene	218-01-9	Phenanthrene	85-01-8
Cyclopenta[c,d]pyrene	27208-37-3	Pyrene	129-00-0

Surfactant, wetting agent residues Name	<u>CAS-Nr</u> .	<u>Acronym</u>
Nonylphenol	various	NP
Octylphenol	various	OP
Heptylphenol	various	HpP
Pentylphenol	various	PeP
Nonylphenolethoxylates / Nonylphenolethoxylate	various	NP(EO)
Octylphenolethoxylates / Octylphenolethoxylate	various	OP(EO)

PFCs, Per- and polyfluorinated compounds	<u>CAS-Nr</u> .	Acronym
Name	1700 00 4 et el	DEOS
Perhuorooctane suitonic acid and suitonales	763-23-1, et. al.	PFUS
	754-91-0	PFOSA
N Method perfluereestane sulfenemide	307-35-7	PFOSF / POSF
N-Methyl perfuere setene sulferemide	31500-32-8	
N-Einyi periluorooctarie suifonamide	4151-50-2	N-EL-FOSA
N-Metnyl perfluorooctane sulfonamide ethanol	24448-09-7	N-ME-FUSE
N-Ethyl periodolociane suitonamide ethanol	1691-99-2	N-EI-FOSE
Perfluoroneptanoic acid and saits	375-85-9, et. al.	РЕНРА
Perfluorooctanoic acid and salts	335-67-1, et. al.	PFUA
Perfluorononanoic acid and salts	375-95-1, et. al.	PFNA
Perfluorodecanoic acid and salts	335-76-2, et. al.	PFDA
Henicosafluoroundecanoic acid and salts	2058-94-8, et. al.	PFUdA
I ricosatiuorododecanoic acid and salts	307-55-1, et. al.	PFDoA
Pentacosafluorotridecanoic acid and salts	72629-94-8, et. al.	PFTrDA
Heptacosafluorotetradecanoic acid and salts	376-06-7, et. al.	PFTeDA
Further Perfluorinated carboxylic acids		
Perfluorobutanoic acid and salts	375-22-4, et. al.	PFBA
Perfluoropentanoic acid and salts	2706-90-3, et. al.	PFPeA
Perfluorohexanoic acid and salts	307-24-4, et. al.	PFHxA
Perfluoro(3,7-dimethyloctanoic acid) and salts	172155-07-6, et. al.	PF-3,7-DMOA
Perfluorinated sulfonic acids		
Perfluorobutane sulfonic acid and salts	375-73-5, 59933-66-3, et. al.	PFBS
Perfluorohexane sulfonic acid and salts	355-46-4, et. al.	PFHxS
Perfluoroheptane sulfonic acid and salts	375-92-8, et. al.	PFHpS
Henicosafluorodecane sulfonic acid and salts	335-77-3, et. al.	PFDS
Partially fluorinated carboxylic / sulfonic acids		
7H-Perfluoro heptanoic acid and salts	1546-95-8, et. al.	7HPFHpA
2H,2H,3H,3H-Perfluoroundecanoic acid and salts	34598-33-9, et. al.	4HPFUnA
1H,1H,2H,2H-Perfluorooctane sulfonic acid and salts	27619-97-2, et. al.	1H,1H,2H,2H-PFOS
PFOA related Substances		
	27905-45-9	8:2 F I A
1H,1H,2H,2H-Perfluoro-1-decanol	678-39-7	8:2 FTOH
1H,1H,2H,2H-Perfluorodecanesulphonic acid and its saits	39108-34-4, et. al.	8:2 FTS
Partially fluorinated linear alcohols		
1H,1H,2H,2H-Perfluoro-1-hexanol	2043-47-2	4:2 FTOH
1H,1H,2H,2H-Perfluoro-1-octanol	647-42-7	6:2 FTOH
1H,1H,2H,2H-Perfluoro-1-decanol	678-39-7	8:2 FTOH
1H,1H,2H,2H-Perfluoro-1-dodecanol	865-86-1	10:2 FTOH
Esters of fluorinated alcohols with acrylic acid		
1H,1H,2H,2H-Perfluorooctyl acrylate	17527-29-6	6:2 FTA
1H,1H,2H,2H-Perfluorodecyl acrylate	27905-45-9	8:2 FTA
1H,1H,2H,2H-Perfluorododecyl acrylate	17741-60-5	10:2 FTA

Flame retardant substances		
Name	CAS-Nr.	Acronym
Polybromobiphenyls (Polybrominated biphenyls)	59536-65-1	PBBs
Monobromobiphenyls	various	MonoBB
Dibromobiphenyls	various	DiBB
Tribromobiphenyls	various	TriBB
Tetrabromobiphenyls	various	TetraBB
Pentabromobiphenyls	various	PentaBB
Hexabromobiphenyls	various	HexaBB
Heptabromobiphenyls	various	HeptaBB
Octabromobiphenyls	various	OctaBB
Nonabromobiphenyls	various	NonaBB
Decabromobiphenyl	13654-09-6	DecaBB
Polybrominated diphenyl ethers	various	PBDEs
Monobromodiphenylethers	various	MonoBDEs
Dibromodiphenylethers	various	DiBDEs
Tribromodiphenylethers	various	TriBDEs
Tetrabromodiphenylethers	various, 40088-47-9	TetraBDEs
Pentabromodiphenylethers	various, 32534-81-9	PentaBDEs
Hexabromodiphenylethers	various, 36483-60-0	HexaBDEs
Heptabromodiphenylethers	various, 68928-80-3	HeptaBDEs
Octabromodiphenylethers	various, 32536-52-0	OctaBDEs
Nonabromodiphenylethers	various, 63936-56-1	NonaBDEs
Decabromodiphenylether	1163-19-5	DecaBDE
Tri(2,3-dibromopropyl)phosphate	126-72-7	TRIS
Tris(2-chloroethyl)phosphate	115-96-8	TCEP
Hexabromocyclododecane and all main diastereomeres identified (alpha-, beta-, gamma-)	various, 3194-55-6, 134237-50-6, 134237-51-7,	HBCDD
Tetrabromobisphenol A	79-94-7	TBBPA
Bis(2,3-dibromopropyl)phosphate	5412-25-9	BIS
2,2-Bis(bromomethyl)-1,3-propanediol	3296-90-0	BBMP
Tris(1,3-dichloro-iso-propyl)phosphate	13674-87-8	TDCPP
Tris(aziridinyl)phosphinoxide	545-55-1	TEPA

Chlorinated solvents	
Name	<u>CAS-Nr.</u>
Dichloromethane	75-09-2
Trichloromethane (Chloroform)	67-66-3
Tetrachloromethane	56-23-5
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
1,1,1,2-Tetrachloroethane	630-20-6
1,1,2,2-Tetrachloroethane	79-34-5
Pentachloroethane	76-01-7
1,1-Dichloroethylene	75-35-4
1,2-Dichloroethylene	540-59-0,156-59-2, 156-60-5
Trichloroethylene	79-01-6
Tetra(per)chloroethylene	127-18-4
Sum of the 14 chlorinated solvents	

VOCs / solvents	
Name	<u>CAS-Nr.</u>
Methylethylketone	78-93-3
Ethylbenzene	100-41-4
Xylene	95-47-6, 108-38-3, 106-42-3, 1330-20-7 (mixture)
Cyclohexanone	108-94-1
2-Ethoxyethylacetate	111-15-9
1,2,3-Trichloropropane	96-18-4
Acetophenone	98-86-2
2-Phenyl-2-propanole	617-94-7
Bis(2-methoxyethyl)ether	111-96-6
Styrene	100-42-5
Benzene	71-43-2
Toluene	108-88-3
1-Methyl-2-pyrrolidone (NMP)	872-50-4
N,N-Dimethylacetamide (DMAc)	127-19-5
N,N-Dimethylformamide (DMF)	68-12-2
2-Ethoxyethanol	110-80-5
Ethylene glycol dimethyl ether	110-71-4
2-Methoxyethanol	109-86-4
2-Methoxyethylacetate	110-49-6
2-Methoxypropylacetate	70657-70-4
Triethylene glycol dimethyl ether	112-49-2