VAUDE
The Spirit of Mountain Sports

VAUDE WASTE WATER GUIDELINE

Version 1.1 / January 2020

Content:

VAUDE Waste Water Guidelines align with ZDHC Waste Water Guidelines Version 2.0.

For more information please see:

https://www.roadmaptozero.com/post/updated-zdhc-wastewater-guidelines-v1-1-released

VAUDE recognises the importance of addressing hazardous substances that may be discharged into the environment during the manufacturing processes of textile, apparel and footwear products. That includes hazardous substances which could be used deep within the value chain and not just substances that could be traced or remain in finished products.
The discharge of wastewater containing hazardous chemicals a significant impact on the environment and human health. Besides addressing conventional wastewater discharge parameters such as total suspended solids (TSS), biological oxygen demand (BOD), and chemical oxygen demand (COD), these Guidelines address the priority hazardous chemical substances identified in the VAUDE Manufacturing Restricted Substances List. The VAUDE MRSL is a list of chemical substances banned from intentional use in the textile, aparell and footwear industry.

These Guidelines specify a unified set of testing parameters, limit values and recommended analytical test methods.

For more information about sampling and analysis procedures and Sludge Sampling and Analysis Plan please refer to ZDHC waste water Guidelines.

VAUDE, as a ZDHC Brand, encourages its suppliers to share their testing results in
a systematic, efficient manner via an online platform called the ZDHC Gateway – Wastewater Module.

Testing Requirements:

Type of sample (see *Appendix B* for sampling points)	Direct and Indirect Discharge Supplier (with NO on-site ZLD Treatment System)						Supplier with on-site ZLD Treatment System	
	Option 1			Option 2				
	ZDHC Conventional Parameters (*Tables 1A-1B*)	Legal Parameters (any additional parameters required by legal wastewater discharge permit and/or receiving central effluent treatment plant (CETP) not listed in *Tables 1A-1B*)	ZDHC MRSL Parameters (*Tables 2A-2N* for wastewater and *Table 3* for sludge)	ZDHC Conventional Parameters (*Tables 1A-1B*)	Legal Parameters (any additional parameters required by legal wastewater discharge permit and/or receiving central effluent treatment plant (CETP) not listed in *Tables 1A-1B*)	ZDHC MRSL Parameters (*Tables 2A-2N*)	Metals (*Table 1B*)	ZDHC MRSL Parameters (*Tables 2A-2N* for wastewater or *Table 3* for sludge)
1. Raw Wastewater	Not applicable			C & T Test **only** according to *Table 1B*	Not applicable	C & T	C & T	C & T
2. Discharged Wastewater	C & T	C & T	C & T	C & T	C & T	C & T**	Not applicable***	
3. Sludge	Not applicable	Not applicable	C & T*	Not applicable			Not applicable	C & T

C & T = Collect and Test sample.

** For an Indirect Discharge Supplier: test sludge sample **only** if it is available (meaning if the supplier in question generates sludge), such as when there is primary (flocculation) treatment done.*

***For an Indirect Discharge Supplier: Test the discharged wastewater sample **only** if there is any pretreatment, otherwise no need to test as it is the same as raw wastewater.*

****A supplier with an on-site ZLD system is expected to not have any liquid discharge.*

Expectations for suppliers with non-Conformance(s)

If a test report indicates non-conformances towards VAUDE limits, the supplier is expected to:

- Notify the applicable authorities about any legal permit violation, as well as VAUDE and/or other clients.
- Develop a root cause analysis and corrective action plan with defined completion date for each finding. An input stream management review should be part of the initial root cause analysis, with action such as checking if chemical formulations used in production processes are conform to MRSL, sending out specifications to raw material suppliers, or checking chemicals used in non-production related areas, e.g. APEOs used in cleaning products.
- Submit the root cause analysis and corrective action plan with defined completion date on the ZDHC gateway Wastewater Module. Submission is expected to happen within 30 days.
- Suppliers are encouraged to use ZDHC Root Cause Analysis and Corrective Action templates available in the ZDHC Gateway.
- Suppliers may resolve non-compliance or non-conformances in a way they deem best. For instance, they could contact external experts or brands to see if they can offer advice. Or reach out to technical experts to help determine the root cause and identify suitable solutions.

Appendix A
Tables 1A-1B: Conventional Parameters for Wastewater

Table 1A: Sum Parameters and Anions

The conventional parameters showing foundational, progressive and aspirational limits, and the standard methods for analysis.

* Δ is the degree above ambient temperature of receiving water body.

** Validated cuvette methods can be used alternatively.

mg/L unless otherwise noted	Limits			Standard Method for Analysis/Testing			
	Foundational	Progressive	Aspirational	ISO	European Union	United States	China
Sum parameters							
Temperature [°C] *	Δ15 or max. 35	Δ10 or max. 30	Δ5 or max. 25	No standard	No standard	US EPA 17.01	GB/T 13195
TSS	50	15	5	ISO 11923	ISO 11923	US EPA 160.2, APHA 2540D	GB/T 11901
COD	150	80	40	ISO 6060**	ISO 6060**	US EPA 410.4, APHA 5220D**	GB/T 11914**
Total-N	20	10	5	ISO 5663, ISO 29441	ISO 5663, ISO 29441	US EPA 351.2, APHA 4500P-J, APHA 4500N-C	HJ 636, GB 11891
pH		6-9		ISO 10523	EN ISO 10523	US EPA 150.1	GB/T 6920
Colour [m^{-1}] (436nm; 525; 620nm)	7; 5; 3	5; 3; 2	2; 1; 1	ISO 7887-B	-	-	-
BOD_5	30	15	5	ISO 5815-1, -2 (5 days)	EN 1899-1 (5days)	US EPA 405.1 (5 days), APHA 5210B (5 days)	HJ 505
Ammonium-N	10	1	0.5	ISO 11732, ISO 7150	EN ISO 11732	US EPA 350.1, APHA 4500 NH_3-N	HJ 535, HJ 536
Total-P	3	0.5	0.1	ISO 11885, ISO 6878	EN ISO 11885	US EPA 365.4, APHA 4500P-J	GB/T 11893
AOX	5	1	0.1	ISO 9562	EN ISO 9563	US EPA 1650	HJ/T 83-2001
Oil and Grease	10	2	0.5	ISO 9377-2	EN ISO 9377-2	US EPA 1664	HJ 637
Phenol	0.5	0.01	0.001	ISO 14402	EN ISO 14402	APHA 5530 B, C&D	HJ 503
Coliform [bacteria/100 ml]	400	100	25	ISO 9308-1	EN ISO 9308-1	US EPA 9132	GB/T 5750.12
Persistent Foam	Refer to respective information in section 9.6.A			N/A	N/A	N/A	N/A
Anions							
Cyanide - Total	0.2	0.1	0.05	ISO 6703-1,-2,-3, ISO 14403-1,-2	ISO 6703-1,-2,-3, ISO 14403-1,-2	US EPA 335.2, APHA 4500-CN	HJ 484
Sulfide	0.5	0.05	0.01	ISO 10530	ISO 10530	APHA 4500-S2-D	GB/T 16489
Sulfite	2	0.5	0.2	ISO 10304-3	EN ISO 10304-3	US EPA 377.1	**

Table 1B: Metals

The conventional parameters showing foundational, progressive and aspirational limits, and the standard methods for analysis.

*** Data collection only for polyester production.

mg/L unless otherwise noted	Limits			Standard Method for Analysis/Testing			
	Foundational	Progressive	Aspirational	ISO	European Union	United States	China
Metals							
Antimony***	0.1	0.05	0.01	ISO 11885	EN ISO 11885	US EPA 200.7, US EPA 200.8, US EPA 6010c, US EPA 6020a	GB 7475, HJ 700
Chromium, total	0.2	0.1	0.05				GB 7466, HJ 700
Cobalt	0.05	0.02	0.01				HJ 700
Copper	1	0.5	0.25				GB 7475, HJ 700
Nickle	0.2	0.1	0.05				GB 11907, HJ 700
Silver	0.1	0.05	0.005				GB 11907, HJ 700
Zinc	5.0	1.0	0.5				GB 7472, GB 7475, HJ 700
Arsenic	0.05	0.01	0.005	ISO 11885	EN ISO 11885	US EPA 200.7, US EPA 200.8, US EPA 6010c, US EPA 6020a	GB 7475, HJ 700
Cadmium	0.1	0.05	0.01	ISO 11885	EN ISO 11885	US EPA 200.7, US EPA 200.8, US EPA 6010c, US EPA 6020a	GB 7475, HJ 700
Chromium (VI)	0.05	0.005	0.001	ISO 18412	EN ISO 18412	US EPA 218.6	GB 7467
Lead	0.1	0.05	0.01	ISO 11885	EN ISO 11885	US EPA 200.7, US EPA 200.8, US EPA 6010c, US EPA 6020a	GB 7475, HJ 700
Mercury	0.01	0.005	0.001	ISO 12846 or ISO 17852	EN ISO 18412 or ISO 17852	US EPA 200.7, US EPA 200.8, US EPA 6010c, US EPA 6020a	HJ 597

Appendix A
Tables 2A-2N: ZDHC MRSL V1.1 Parameters for Wastewater

Reporting limits mentioned in the following tables apply to each single chemical substance of the respective substance group.

Table 2A:

Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs): Including All Isomers

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/Testing
Nonylphenol (NP), mixed isomers	104-40-5 11066-49-2 25154-52-3 84852-15-3	5	NP/OP: ISO 18857 -2 (modified dichloromethane extraction) or ASTM D7065 (GC/MS or LC/MS(-MS) OPEO/NPEO (n>2): ISO 18254-1 OPEO/NPEO (n=1,2): ISO 18857-2 or ASTM D7065
Octylphenol (OP), mixed isomers	140-66-9 1806-26-4 27193-28-8		
Octylphenol ethoxylates (OPEO)	9002-93-1 9036-19-5 68987-90-6		
Nonylphenol ethoxylates (NPEO)	9016-45-9 26027-38-3 37205-87-1 68412-54-4 127087-87-0		

Table 2B:

Chlorobenzenes and Chlorotoluenes

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Monochlorobenzene	108-90-7	0,2	USEPA 8260B, 8270D. Dichloro-methane extraction followed by GC/MS
1,2-Dichlorobenzene	95-50-1		
1,3-Dichlorobenzene	541-73-1		
1,4-Dichlorobenzene	106-46-7		
1,2,3-Trichlorobenzene	87-61-6		
1,2,4-Trichlorobenzene	120-82-1		
1,3,5-Trichlorobenzene	108-70-3		
1,2,3,4-Tetrachlorobenzene	634-66-2		
1,2,3,5-Tetrachlorobenzene	634-90-2		
1,2,4,5-Tetrachlorobenzene	95-94-3		
Pentachlorobenzene	608-93-5		
Hexachlorobenzene	118-74-1		
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		
2,3,6-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	76057-12-0		
2,3,5,6-Tetrachlorotoluene	29733-70-8		
2,3,4,6-Tetrachlorotoluene	875-40-1		
Pentachlorotoluene	877-11-2		

Table 2C:
Chlorophenols

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
2-chlorophenol	95-57-8	0.5	USEPA 8270 D. Solvent extraction, derivatisation with KOH, acetic anhydride followed by GC/MS ISO 14154:2005
3-chlorophenol	108-43-0		
4-chlorophenol	106-48-9		
2,3-dichlorophenol	576-24-9		
2,4-dichlorophenol	120-83-2		
2,5-dichlorophenol	583-78-8		
2,6-dichlorophenol	87-65-0		
3,4-dichlorophenol	95-77-2		
3,5-dichlorophenol	591-35-5		
2,3,4-trichlorophenol	15950-66-0		
2,3,5-trichlorophenol	933-78-8		
2,3,6-trichlorophenol	933-75-5		
2,4,5-trichlorophenol	95-95-4		
2,4,6-trichlorophenol	88-06-2		
3,4,5-trichlorophenol	609-19-8		
2,3,4,5-tetrachlorophenol	4901-51-3		
2,3,4,6-tetrachlorophenol	58-90-2		
2,3,5,6-tetrachlorophenol	935-95-5		
Pentachlorophenol	87-86-5		

Table 2D:
Dyes – Azo (Forming Restricted Amines)

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
4,4'-methylene-bis-(2-chloro-aniline)	101-14-4	0.1	EN 14362-1 EN 14362-3 Reduction step with sodium dithionite, solvent extraction, GC/MS or LC/MS
4,4'-methylenedianiline	101-77-9		
4,4'-oxydianiline	101-80-4		
4-chloroaniline	106-47-8		
3,3'-dimethoxylbenzidine	119-90-4		
3,3'-dimethylbenzidine	119-93-7		
6-methoxy-m-toluidine	120-71-8		
2,4,5-trimethylaniline	137-17-7		
4,4'-thiodianiline	139-65-1		
4-aminoazobenzene	60-09-3		
4-methoxy-m-phenylenediamine	615-05-4		
4,4'-methylenedi-o-toluidine	838-88-0		
2,6-xylidine	87-62-7		
o-anisidine	90-04-0		
2-naphthylamine	91-59-8		
3,3'-dichlorobenzidine	91-94-1		
4-aminodiphenyl	92-67-1		
Benzidine	92-87-5		
o-toluidine	95-53-4		
2,4-xylidine	95-68-1		
4-chloro-o-toluidine	95-69-2		
4-methyl-m-phenylenediamine	95-80-7		
o-aminoazotoluene	97-56-3		

Table 2E:

Dyes – Carcinogenic or Equivalent Concern

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
C.I. Direct Black 38	1937-37-7	500	Liquid extraction, LC/MS
C.I. Direct Blue 6	2602-46-2		
C.I. Acid Red 26	3761-53-3		
C.I. Basic Red 9	569-61-9		
C.I. Direct Red 28	573-58-0		
C.I. Basic Violet 14	632-99-5		
C.I. Disperse Blue 1	2475-45-8		
C.I. Disperse Blue 3	2475-46-9		
C.I. Basic Blue 26 (with Michler's Ketone > 0.1%)	2580-56-5		
C.I. Basic Green 4 (Malachite Green Chloride)	569-64-2		
C.I. Basic Green 4 (Malachite Green Oxalate)	2437-29-8		
C.I. Basic Green 4 (Malachite Green)	10309-95-2		
Disperse Orange 11	82-28-0		

Table 2F:

Dyes – Disperse (Sensitising)

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Disperse Yellow 1	119-15-3	50	Liquid extraction, LC/MS
Disperse Blue 102	12222-97-8		
Disperse Blue 106	12223-01-7		
Disperse Yellow 39	12236-29-2		
Disperse Orange 37/59/76	13301-61-6		
Disperse Brown 1	23355-64-8		
Disperse Orange 1	2581-69-3		
Disperse Yellow 3	2832-40-8		
Disperse Red 11	2872-48-2		
Disperse Red 1	2872-52-8		
Disperse Red 17	3179-89-3		
Disperse Blue 7	3179-90-6		
Disperse Blue 26	3860-63-7		
Disperse Yellow 49	54824-37-2		
Disperse Blue 35	12222-75-2		
Disperse Blue 124	61951-51-7		
Disperse Yellow 9	6373-73-5		
Disperse Orange 3	730-40-5		
Disperse Blue 35	56524-77-7		

Table 2G:

Flame Retardants

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Tris(2-chloroethyl)phosphate (TCEP)	115-96-8	5	US EPA 8270 ISO 22032, USEPA 527 and USEPA 8321B. Dichloro-methane extraction GC/MS or LC/MS (-MS)
Decabromodiphenyl ether (DecaBDE)	1163-19-5		
Tris(2,3,-dibromopropyl) phosphate (TRIS)	126-72-7		
Pentabromodiphenyl ether (PentaBDE)	32534-81-9		
Octabromodiphenyl ether (OctaBDE)	32536-52-0		
Bis(2,3-dibromopropyl) phosphate (BIS)	5412-25-9		
Tris(1-aziridinyl) phosphine oxide (TEPA)	545-55-1		
Polybromobiphenyls (PBB)	59536-65-1		
Tetrabromobisphenol A (TBBPA)	79-94-7		
Hexabromocyclododecane (HBCDD)	3194-55-6		
2,2-bis(bromomethyl)-1,3-propanediol (BBMP)	3296-90-0		
Tris(1,3-dichloro-isopropyl) phosphate (TDCP)	13674-87-8		
Short-chain chlorinated Paraffins (SCCP) (C10-C13)	85535-84-8		

Table 2H:

Glycols

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Bis(2-methoxyethyl)-ether	111-96-6	50	US EPA 8270 Liquid extraction, LC/MS GC-MS
2-ethoxyethanol	110-80-5		
2-ethoxyethyl acetate	111-15-9		
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		

Table 2I:

Halogenated Solvents

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
1,2-dichloroethane	107-06-2	1	USEPA 8260B Headspace GC/MS or Purge-and-Trap-GC/MS
Methylene chloride	75-09-2		
Trichloroethylene	79-01-6		
Tetrachloroethylene	127-18-4		

Table 2J:

Organotin Compounds

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Mono-, di- and tri-methyltin derivatives	Multiple	0.01	ISO 17353 Derivatisation with NaB(C2H5) GC/MS
Mono-, di- and tri-butyltin derivatives	Multiple		
Mono-, di- and tri-phenyltin derivatives	Multiple		
Mono-, di- and tri-octyltin derivatives	Multiple		

Table 2K:

Perfluorinated and Polyfluorinated Chemicals (PFCs)

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
PFOS	1763-23-1	0.01	DIN 38407-42 (modified) Ionic PFC: Concentration or direct injection, LC/MS(-MS); Non-ionic PFC (FTOH): derivatisation with acetic anhydride followed by GC/MS
PFOA	335-67-1		
PFBS	375-73-5 29420-49-3 29420-43-3		
PFHxA	307-24-4		
8:2 FTOH	678-39-7	1	
6:2 FTOH	647-42-7		

Table 2L:

Ortho-Phthalates – Including all ortho esters of phthalic acid

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Di(ethylhexyl) phthalate (DEHP)	117-81-7	10	US EPA 8270D, ISO 18856 Dichloromethane extraction GC/MS
Bis(2-methoxyethyl) phthalate (DMEP)	117-82-8		
Di-n-octyl phthalate (DNOP)	117-84-0		
Di-iso-decyl phthalate (DIDP)	26761-40-0		
Di-isononyl phthalate (DINP)	28553-12-0		
Di-n-hexyl phthalate (DnHP)	84-75-3		
Dibutyl phthalate (DBP)	84-74-2		
Butyl benzyl phthalate (BBP)	85-68-7		
Dinonyl phthalate (DNP)	84-76-4		
Diethyl phthalate (DEP)	84-66-2		
Di-n-propyl phthalate (DPRP)	131-16-8		
Di-isobutyl phthalate (DIBP)	84-69-5		
Di-cyclohexyl phthalate (DCHP)	84-61-7		
Di-iso-octyl phthalate (DIOP)	27554-26-3		
1,2-benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4		
1,2-benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	71888-89-6		

Table 2M:

Polycyclic Aromatic Hydrocarbons (PAHs)

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/ Testing
Benzo[a]pyrene (BaP)	50-32-8	1	US EPA 8270 DIN 38407-39 Solvent extraction GC/MS
Anthracene	120-12-7		
Pyrene	129-00-0		
Benzo[ghi]perylene	191-24-2		
Benzo[e]pyrene	192-97-2		
Indeno[1,2,3-cd]pyrene	193-39-5		
Benzo[j]fluoranthene	205-82-3		
Benzo[b]fluoranthene	205-99-2		
Fluoranthene	206-44-0		
Benzo[k]fluoranthene	207-08-9		
Acenaphthylene	208-96-8		
Chrysene	218-01-9		
Dibenz[a,h]anthracene	53-70-3		
Benzo[a]anthracene	56-55-3		
Acenaphthene	83-32-9		
Phenanthrene	85-01-8		
Fluorene	86-73-7		
Naphthalene	91-20-3		

Table 2N:

Volatile Organic Compounds (VOC)

Substance or Substance Group	CAS	Reporting Limit (µg/L)	Standard Method for Analysis/Testing
Benzene	71-43-2	1	ISO 11423-1 Headspace- or Purge-and-Trap-GC/MS US EPA 8260
Xylene	1330-20-7		
o-cresol	95-48-7		
p-cresol	106-44-5		
m-cresol	108-39-4		

Appendix A
Table 3: Sludge Parameters

Table 3: Sludge Parameters

For information on single substances and CAS numbers please refer to *Tables 2A - 2N.*

Sludge Parameter	Reporting Limit (mg/kg - Dry Weight)	Description of Lab Method	Standard Method for Analysis/Testing			
			ISO	European Union	United States	China
Conventional						
Dry Mass (total solids)	-	**Analysis:** Dry @ 105°C, gravimetric			US EPA 160.3 / 209A	
Anions						
Cyanide	1 mg/kg	**Preparation:** CN converted to HCN by reflux-distillation to NaOH			US EPA 9013	
		Analysis: Colourimetry (EPA 9014), or ISE (EPA 9213)	ISO 11262, 2011		US EPA 9014 US EPA 9213	HJ 745
Metals						
Arsenic	2 mg/kg	**Preparation:** Acid/peroxide digestion			US EPA 3050	
		Analysis: ICP/OES (EPA 6010 D), or ICP/MS (EPA 6020 B)			US EPA 6010 D US EPA 6020 B	
Cadmium	2 mg/kg	**Preparation:** Acid/peroxide digestion			US EPA 3050	
		Analysis: ICP/OES (EPA 6010 D), or ICP/MS (EPA 6020 B)			US EPA 6010 D US EPA 6020 B	
Lead	2 mg/kg	**Preparation:** Acid/peroxide digestion			US EPA 3050	
		Analysis: ICP/OES (EPA 6010 D), or ICP/MS (EPA 6020 B)			US EPA 6010 D US EPA 6020 B	
Chromium (VI)	2 mg/kg	**Preparation:** Alkaline digestion			US EPA 3060a	
		Analysis: Colourimetric UV/VIS (EPA 7196), or Colourimetric IC (EPA 7199)			US EPA 7196 US EPA 7199	
Mercury	0.2 mg/kg	**Preparation:** Dissolution, acid digestion			US EPA 7471 b, US EPA 3051a	
		Analysis: CVAA (EPA 7471 b), or ICP MS (EPA 6020 b)		US EPA 7471 b, US EPA 6020b	US EPA 7471 b, US EPA 6020b	

Table 3: Sludge Parameters (continued)

For information on single substances and CAS numbers please refer to *Tables 2A - 2N*.

Sludge Parameter	Reporting Limit (mg/kg - Dry Weight)	Description of Lab Method	Standard Method for Analysis/Testing			
			ISO	European Union	United States	China
ZDHC MRSL V1.1						
Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs): including all isomers	0.4 mg/kg	**Preparation:** Modified dichloromethane extraction with mechanical agitation			US EPA 3540/3541 soxhlet US EPA 3550 ultrasonic US EPA 3560 SFE	
		Analysis: NP/OP, GC/MS, LC/MS	ISO 18857-2	ASTM D7065		
		Analysis: OPEO/NPEO (n>2): GC/MS; LC/MS	ISO 18254-1			
		Analysis: OPEO/NPEO (n=1,2), GC/MS, LC/MS	ISO 18857-2	ASTM D7065		
Chlorobenzenes and Chlorotoluenes	0.2 mg/kg	**Preparation:** Dichloromethane extraction with mechanical agitation			US EPA 3540/3541 soxhlet US EPA 3550 ultrasonic US EPA 3560 SFE	
		Clean up: GPC			US EPA 3650	
		Analysis: GC/MS			US EPA 8270	
Chlorophenols	0.05 mg/kg	**Preparation:** Acid/base liquid extraction, acetylation, liq/liq extraction	ISO 14154			
		Analysis: GC/MS	ISO 14154			
Dyes – Azo (forming restricted amines)	0.2 mg/kg	**Preparation:** Reduction with sodium thionite, solvent extraction				
		Analysis: GC/MS (ISO 14362-1), or LC/MS (ISO 14362-3)	ISO 14362-1, 14362-3			
Dyes – Carcinogenic or equivalent concern	10 mg/kg	**Preparation:** Liquid extraction				
		Analysis: LC/MS	ISO 16373, 2014			
Dyes – Disperse (sensitising)	2 mg/kg	**Preparation:** Liquid extraction				
		Analysis: LC/MS	ISO 16373, 2014			
Flame Retardants	1 mg/kg	**Preparation:** Dichloromethane extraction	ISO 22032			
		Analysis: GC/MS or LC/MS-MS	ISO 22032			
Glycols	10 mg/kg	**Preparation:** Liquid extraction			US EPA 8270D	
		Analysis: LC/MS, GC/MS	ISO 22892, 2006			

Table 3: Sludge Parameters (continued)

For information on single substances and CAS numbers please refer to *Tables 2A - 2N*.

Sludge Parameter	Reporting Limit (mg/kg - Dry Weight)	Description of Lab Method	Standard Method for Analysis/Testing			
			ISO	European Union	United States	China
ZDHC MRSL V1.1 (continued)						
Halogenated Solvents	2 mg/kg	**Preparation:** Purge and trap (EPA 5035), or headspace (EPA 5021)			US EPA 5035 US EPA 50211	
		Analysis: GC electrolytic conductivity HECD, GC/MS			US EPA 8010	
Organotin	0.2 mg/kg	**Preparation:** Derivatisation NaB (C2H5)	ISO 23161, 2009			
		Analysis: GC/MS	ISO 23161, 2009			
Perfluorinated and Polyfluorinated chemicals (PFCs)	0.10 mg/kg ionic 1 mg/kg non-ionic	**Preparation:** *Ionic:* concentration. *Non-ionic:* derivatisation with acetic anhydride.				
		Analysis: *Ionic:* LC/MS-MS. *Non-ionic (FTOH):* GC/MS		DIN 38407-42		
Ortho Phthalates - including all ortho esters of phthalic acid	2 mg/kg	**Preparation:** Dichloromethane extraction using soxhlet (EPA 3540/3541), or ultrasonic (EPA 3550), or SFE (EPA 3560)			US EPA 3540/3541 US EPA 3550 US EPA 3560	
		Analysis: GC/MS	ISO 18856			
Polycyclic Aromatic Hydrocarbons (PAHs)	0.2 mg/kg	**Preparation:** Dichloromethane extraction with mechanical agitation			US EPA 3540/3541 soxhlet US EPA 3550 ultrasonic US EPA 3560 SFE	
		Clean up: GPC			US EPA 3650	
		Analysis: GC/MS			US EPA 8270	
Volatile Organic Compounds (VOC)	2 mg/kg	**Preparation:** Solvent extraction, purge and trap (EPA 5035), or headspace (EPA 5021)			US EPA 5035 US EPA 5021	
		Analysis: GC/MS	DIN 38407 part 43		US EPA 8260	

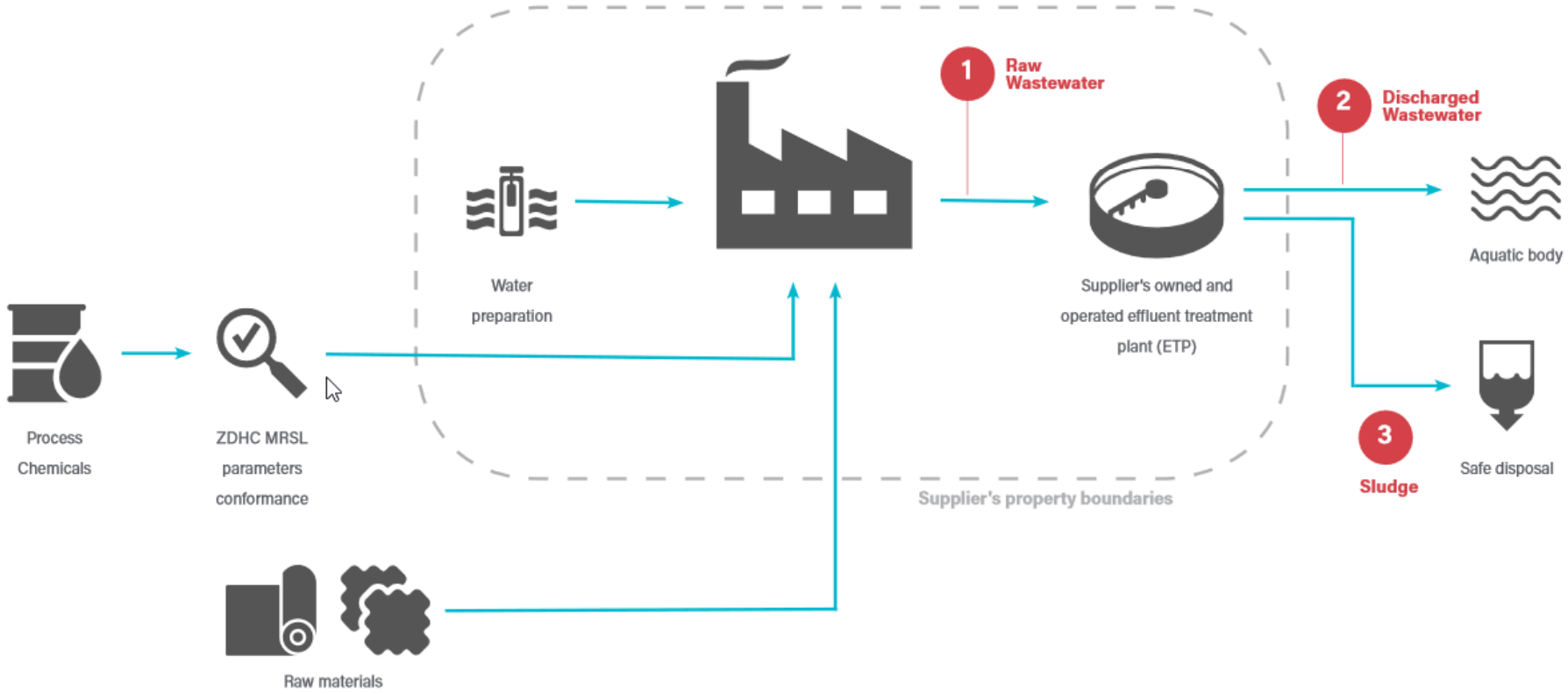
Appendix B
Figure 1: Sampling Points for *Direct* Discharge Suppliers

= sampling points

Important to note:

The sampling of raw wastewater and sludge would depend on the chosen testing option explained in section 9.4.0 and 9.5.0.

There is **NO** need to sample and test both raw wastewater and sludge.



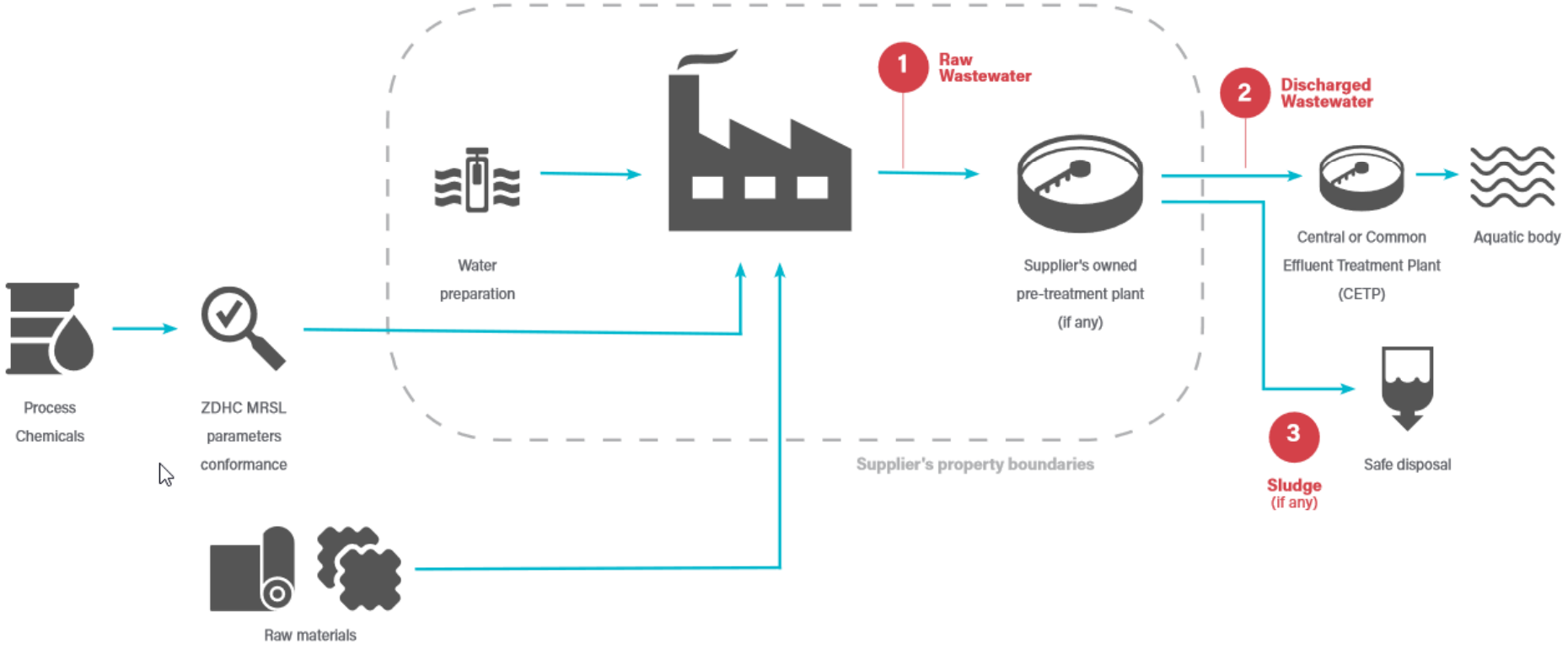
Appendix B
Figure 2: Sampling Points for *Indirect* Discharge Suppliers

= sampling points

Important to note:

The sampling of raw wastewater and sludge would depend on the chosen testing option explained in section 9.4.0 and 9.5.0.

There is **NO** need to sample and test both raw wastewater and sludge.

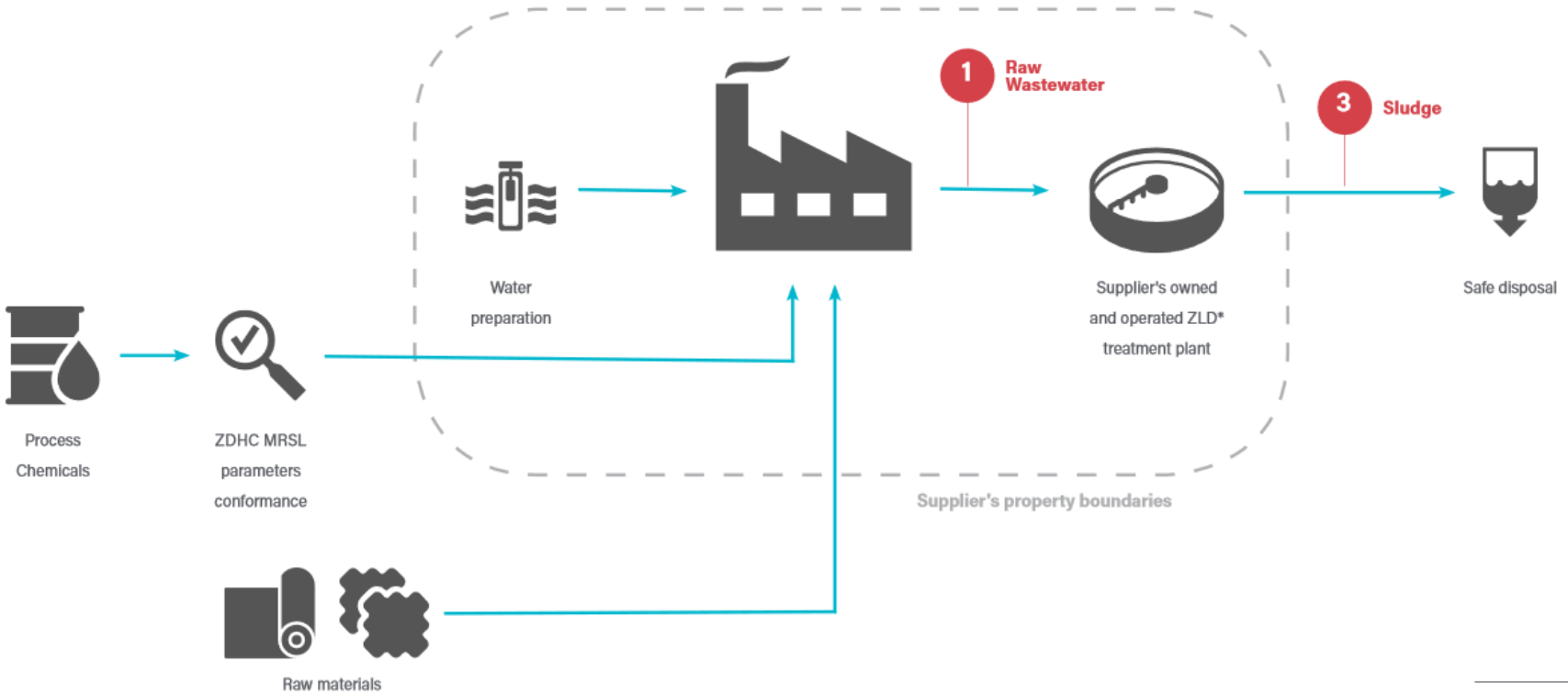


Appendix B
Figure 3: Sampling Points for Suppliers with on-site ZLD* Treatment Syste

= sampling points

Important to note:

A supplier with an on-site ZLD* treatment system is expected to not have any liquid discharge. If for any reason there is a liquid discharge, this supplier is **NOT** considered as a supplier with a ZLD* treatment system.



* ZLD = Zero Liquid Discharge