

BILAG 6

Hvilke udfordringer løser pyrolyse anlægget

Slam fra Arwos Spildevand analyseret for miljøfremmede stoffer herunder PAH og PFAS/PFOS

Kunde: Arwos Spildevand ApS, Forsyningsvejen 2, 6200 Aabenraa, Att. Jeanette Eriksen

Prøvenr.:	57917/23	57918/23		
Prøve ID:	7794-375 Afvandet slam	7794-376 Pyrolyse slam		
Kommentar	*1	*1		
Parameter			Enhed	Metode
Terstofindhold	22.3	99.9	%	DS 204:1980
Bly, Pb	18	24	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Bly, Pb	450	310	mg/kg Tot.P	Beregning
Cadmium, Cd	0.96	0.87	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Cadmium, Cd	24	11	mg/kg Tot.P	Beregning
Chrom (total), Cr	24	32	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Kobber, Cu	290	280	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Kviksalv, Hg	0.49	0.016	mg/kg TS	DS 259:2003+DS/EN 16175-1:2016
Kviksalv, Hg	12	0.21	mg/kg Tot.P	Beregning
Nikkel, Ni	15	17	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Nikkel, Ni	380	220	mg/kg Tot.P	Beregning
Zink, Zn	1300	2200	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Total kvælstof, N	47000	21000	mg/kg TS	DS/EN 16168:2012
Total kvælstof, N	4.7	2.1	% af TS	DS/EN 16168:2012
Total fosfor, P	40000	79000	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Total fosfor, P	4.0	7.8	% af TS	DS 259:2003+DS/EN 16170:2016
Miljøfremmede stoffer, PAH'er				
Acenaphten	<0.020	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Fluoranthren	0.057	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Fluoren	<0.020	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Phenanthren	<0.020	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Pyren	0.097	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Benzo(b+j+k)fluoranthren	0.10	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Benzo(a)pyren	0.028	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Indeno(1,2,3-cd)pyren	0.025	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.
Benzo(ghi)perylene	0.087	<0.020	mg/kg TS	DS/ISO 13859:2014, mod.

Prøve ID:	7794-375 Afvandet slam	7794-376 Pyrolyse slam		
Kommentar	*1	*1		
Parameter			Enhed	Metode
PAH, sum jf. slambek	0.39	<0.2	mg/kg TS	DS/ISO 13859:2014, mod.
Miljøfremmede stoffer, DEHP				
DEHP (Diethylhexylphthalat)	3.6	<1.0	mg/kg TS	DS/CEN/TS 16183:2012
Miljøfremmede stoffer, NPE				
Nonylphenol	0.40	<0.10	mg/kg TS	DS/CEN/TS 16182:2012, mod.
Nonylphenolmonoethoxylater (NP1EO)	<0.10	<0.10	mg/kg TS	DS/CEN/TS 16182:2012, mod.
Nonylphenoldiethoxylater (NP2EO)	<0.10	<0.10	mg/kg TS	DS/CEN/TS 16182:2012, mod.
NPE, sum jf. slambek	0.40	<0.30	mg/kg TS	DS/CEN/TS 16182:2012, mod.
Miljøfremmede stoffer LAS				
LAS	<50	<50	mg/kg TS	AK87 - LC/UV
PFAS 22 i slam				
PFHxS, Perfluorhexansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFOS, Perfluoroctansulfonsyre	*3 3.82	<0.50	µg/kg TS	DIN 38414-14:2011
PFOA, Perfluoroctansyre	*3 1.19	<0.50	µg/kg TS	DIN 38414-14:2011
PFNA, Perfluornonansyre	*3 3.53	<0.50	µg/kg TS	DIN 38414-14:2011
PFBA, Perfluorbutansyre	*3 <10.0	<0.50	µg/kg TS	DIN 38414-14:2011
PFPeA, Perfluorpentansyre	*3 5.66	<0.50	µg/kg TS	DIN 38414-14:2011
PFHxA, Perfluorhexansyre	*3 10.1	<0.50	µg/kg TS	DIN 38414-14:2011
PFHpA, Perfluorheptansyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFDA, Perfluordecansyre	*3 1.69	<0.50	µg/kg TS	DIN 38414-14:2011
PFUnDA, Perfluorundecansyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFDoDA, Perfluordodecansyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFTrDA, Perfluortridecansyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFBS, Perfluorbutansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFPeS, Perfluorpentansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFHpS, Perfluorheptansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFNS, Perfluornonansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFDS, Perfluordecansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFDoDS, Perfluordodecansulfonsyre	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFTrDoS, Perfluortridecansulfonsyre	*3 0.51	<0.50	µg/kg TS	DIN 38414-14:2011
PFOSA, Perfluoroctansulfonamid	*3 <0.50	<0.50	µg/kg TS	DIN 38414-14:2011
PFTriS, Perfluortridecansulfonsyre	*2 <2.50	<2.50	µg/kg TS	DIN 38414-14:2011
PFUnDS, Perfluorundecansulfonsyre	*3 <2.50	<2.50	µg/kg TS	DIN 38414-14:2011
Sum af PFAS, 22 stoffer	*2 26.5	<7.50	µg/kg TS	DIN 38414-14:2011
Sum af PFOA, PFOS, PFNA, PFHxS	*2 8.54	<1.00	µg/kg TS	DIN 38414-14:2011

Hvilke udfordringer løser pyrolyse anlægget

Slam fra Odsherred Spildevand analyseret for PFAS/PFOS

Analyserapport

Prøvetype:	Slam				
Prøvetager:	Rekvirenten				
Prøveudtagning:	10.05.2022 kl. 08.00	til	10.05.2022 kl. 16.00		
Analyseperiode:	12.05.2022 - 25.05.2022				
Prøvemærke:	Slamprøve 2, SK-container, Bl, prøve				
Lab prøver:	936-2022-81127916	Enhed	DL	Metode	Urel (%)
Tørstof	16.0	%	0.25	SS-EN 12880:2000 Thermo gravimetr	5
PFAS-forbindelser					
PFBA (Perfluorbutansyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFBS (Perfluorbutansulfonsyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFPeA (Perfluorpentansyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFPeS (Perfluorpentansulfonsyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHxA (Perfluorhexansyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHxS (Perfluorhexansulfonsyre)	1.4	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHpA (Perfluorheptansyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHpS (Perfluorheptansulfonsyre)	0.44	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFOA (Perfluoroktansyre)	1.1	µg/kg ts.	0.05	* DIN 38414-14 mod. LC-MS/MS	23
FFOS (Perfluoroktansulfonsyre)	49	µg/kg ts.	0.05	* DIN 38414-14 mod. LC-MS/MS	23
6:2 FTS (Fluorotelomersulfonat)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFOSA (Perfluoroktansulfonamic)	1.4	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFNA (Perfluoronansyre)	0.44	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFNS (Perfluoronansulfonsyre)	<0.75	µg/kg ts.	0.2	* DIN 38414-14 mod. LC-MS/MS	23
PFDA (Perfluordekansyre)	2.1	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFDS (Perfluordekansulfonsyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFUnDA (Perfluorundekansyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFUnDS (Perfluorundekansulfonsyre)	<3.8	µg/kg ts.	1	* DIN 38414-14 mod. LC-MS/MS	23
PFDoDA (Perfluordodekansyre)	0.75	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFDoDS (Perfluordodekansulfonsyre)	<3.8	µg/kg ts.	1	* DIN 38414-14 mod. LC-MS/MS	23
PFTrDA (Perfluortridekansyre)	<0.38	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFTrDS (Perfluortridekansulfonsyre)	<3.8	µg/kg ts.	1	* DIN 38414-14 mod. LC-MS/MS	23
Sum af PFOA,PFOS,PFNA og FFHxS	0.062	mg/kg ts.		* Beregning	Grænseværdi: 10 µg/kg
Sum af PFOA,PFOS,PFNA og FFHxS	52	µg/kg ts.		* Beregning	
Sum af 22 PFAS	0.057	mg/kg ts.		* Beregning	Grænseværdi: 400 µg/kg
Sum af 22 PFAS	37	µg/kg ts.		* Beregning	

Analyserapport

Prøvetype:	Anden fast prøve				
Prøvetager:	Rekvirenten				
Prøveudtagning:	10.05.2022 kl. 08.00	til	10.05.2022 kl. 10.00		
Analyseperiode:	12.05.2022 - 25.05.2022				
Prøvemærke:	Bio-lokø Bl. prøve				
Lab prøver:	936-2022-81127915	Enhed	DL	Metode	Urel (%)
Tørstof	04.5	%	0.25	SS-EN 12880:2000 Thermo gravimetri	5
PFAS-forbindelser					
PFBA (Perfluorbutansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFBS (Perfluorbutansulfonsyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFPeA (Perfluorpentansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFPeS (Perfluorpentansulfonsyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHxA (Perfluorhexansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHxS (Perfluorhexansulfonsyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHpA (Perfluorheptansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFHpS (Perfluorheptansulfonsyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFOA (Perfluoroktansyre)	<0.10	µg/kg ts.	0.05	* DIN 38414-14 mod. LC-MS/MS	23
FFOS (Perfluoroktansulfonsyre)	<0.10	µg/kg ts.	0.05	* DIN 38414-14 mod. LC-MS/MS	23
6:2 FTS (Fluorotelomersulfonat)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFOSA (Perfluoroktansulfonamic)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFNA (Perfluoronansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
FFNS (Perfluoronansulfonsyre)	<0.40	µg/kg ts.	0.2	* DIN 38414-14 mod. LC-MS/MS	23
PFDA (Perfluordekansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFDS (Perfluordekansulfonsyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFUnDA (Perfluorundekansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFUnDS (Perfluorundekansulfonsyre)	<2.0	µg/kg ts.	1	* DIN 38414-14 mod. LC-MS/MS	23
PFDoDA (Perfluordodekansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFDoDS (Perfluordodekansulfonsyre)	<2.0	µg/kg ts.	1	* DIN 38414-14 mod. LC-MS/MS	23
PFTrDA (Perfluortridekansyre)	<0.20	µg/kg ts.	0.1	* DIN 38414-14 mod. LC-MS/MS	23
PFTrDS (Perfluortridekansulfonsyre)	<2.0	µg/kg ts.	1	* DIN 38414-14 mod. LC-MS/MS	23
Sum af PFDA,PFDS,PFNA og FFHxS	#	mg/kg ts.		* Beregning	
Sum af PFOA,PFOS,PFNA og FFHxS	#	µg/kg ts.		* Beregning	
Sum af 22 PFAS	#	mg/kg ts.		* Beregning	
Sum af 22 PFAS	#	µg/kg ts.		* Beregning	