



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Field Test Experiments and Validation of CEN/TS 1948-4 Dioxin-like PCBs from stationary sources

– CEN/TC 264/WG 1 “Dioxins and PCBs (Emission)” –

Annex 7b

Additional measurement data and
break through investigations
at the shredder plant



Secretariat:

Kommission Reinhaltung der Luft im VDI und DIN – Normenausschuss KRdL

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Matrix	H-08-03-0410 flue gas samples 2008-02-25	H-08-03-0411 flue gas samples 2008-02-25	H-08-03-0412 flue gas samples 2008-02-26	H-08-03-0414 flue gas samples 2008-02-26
Date	107-28412 1A, 6361	107-28412 1B, 6362	107-28412 2A, 6363	107-28412 2B, 6364
Analysis No:				
Sampled volume, m³(s,d)/h	7.357	7.873	7.374	6.653
ng/m³	Average	SD	%RSD	ng/m³
3,3',4,4'-Tetra-CB 77	115	96	19	20%
3,4,4',5-Tetra-CB 81	6.0	5	1	17%
3,3',4,4',5-Penta-CB 126	2.0	2	0	7%
3,3',4,4',5,5'-Hexa-CB 169 ¹⁾	0.030	0	0	12%
Total non-ortho PCB	123	103	20	19%
Total WHO-TEQ non-ortho PCB	0.21	0.20	0.02	8%
2,3,3',4,4'-Penta-CB 105	412	323	44	12%
2,3,4,4',5-Penta-CB 114	36	27	4	14%
2,3',4,4',5-Penta-CB 118	1017	765	126	14%
2',3,4,4',5-Penta-CB 123	18	15	2	10%
2,3,3',4,4',5-Hexa-CB 156	96	86	5	6%
2,3,3',4,4',5-Hexa-CB 157	24	23	0	2%
2,3',4,4',5,5'-Hexa-CB 167	34	29	2	7%
2,3,3',4,4',5,5'-Hepta-CB 189	4.1	3.4	0	10%
Total mono-ortho PCB	1640	1271	184	13%
Total WHO-TEQ mono-ortho PCB	0.22	0.18	0.20	11%
Total WHO TEQ	0.43	0.36	0.40	10%
PCB #28	2797	1197	1997	40%
PCB #52	1326	821	1073	24%
PCB #101	904	649	776	16%
PCB #138	508	408	458	11%
PCB #153	442	342	392	13%
PCB #180	107	113	110	3%
total	6084	3530	4807	27%

all PCB values calculated out of 0.02% of sample

¹⁾ = all PCB#169 values calculated out of 40% of sample

²⁾ = all coplanar PCB values calculated out of 40% of sample

³⁾ Values in *italic* <nd

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Matrix	H-08-03-0415 flue gas samples 2008-02-28	H-08-03-0416 flue gas samples 2008-02-28	H-08-03-0418 flue gas samples 2008-03-03	H-08-03-0420 flue gas samples 2008-03-03				
Date	107-28412 4A, 6367	107-28412 4B, 6368	107-28412 6A, 6371	107-28412 6B, 6372				
Analysis No:								
Sampled volume, m ³ (s.d)/h	Average	SD	%RSD	Average	SD	%RSD	Average	%RSD
ng/m ³	ng/m ³	ng/m ³	ng/m ³	ng/m ³	ng/m ³	ng/m ³	ng/m ³	ng/m ³
3,3',4,4'-Tetra-CB 77	139	162	8%	150	11	8%	103	16
3,4,4',5-Tetra-CB 81	6.4	6.8	3%	6.6	0.20	3%	5	1
3,3',4,4',5-Penta-CB 126	1.8	1.8	0.4%	1.8	0.01	0.4%	2.01	0.68
3,3',4,4',5,5'-Hexa-CB 169 ¹⁾	0.023	0.027	8%	0.03	0.002	8%	0.037	0.004
Total non-ortho PCB	147	170	7%	159	12	7%	110	18
Total WHO-TEQ non-ortho PCB	0.19	0.19	0.3%	0.19	0.0005	0.3%	0.21	0.07
2,3,3',4,4'-Penta-CB 105	319	386	9%	352	33	9%	378	105
2,3,4,4',5-Penta-CB 114	31	34	4%	32	1	4%	34	9
2,3',4,4',5-Penta-CB 118	787	917	8%	852	65	8%	963	276
2',3,4,4',5-Penta-CB 123	14	17	9%	16	1	9%	17	5
2,3,3',4,4',5-Hexa-CB 156	55	64	8%	59	5	8%	85	25
2,3,3',4,4',5-Hexa-CB 157	13	16	10%	14	1	10%	20	5
2,3',4,4',5,5'-Hexa-CB 167	21	25	9%	23	2	9%	29	7
2,3,3',4,4',5,5'-Hepta-CB 189	2.2	2.9	14%	3	0	14%	3	1
Total mono-ortho PCB	1242	1461	8%	1352	109	8%	1530	434
Total WHO-TEQ mono-ortho PCB	0.16	0.19	8%	0.18	0.014	8%	0.21	0.06
Total WHO TEQ	0.35	0.38	4%	0.368	0.014	4%	0.42	0.13
PCB #28	4148	4470	4%	4309	161	4%	3524	933
PCB #52	1812	2415	14%	2114	301	14%	1719	485
PCB #101	1041	1124	4%	1083	41	4%	1093	272
PCB #138	364	411	6%	388	23	6%	427	128
PCB #153	350	401	7%	375	26	7%	437	132
PCB #180	90	101	6%	95	6	6%	114	34
total	7805	8922	7%	8364	558	7%	7314	1986
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³⁾ Values in italic <nd								

Matrix	H-08-03-0421 flue gas samples 2008-03-05	H-08-03-0422 flue gas samples 2008-03-05	H-08-03-0423 ²⁾ flue gas samples	H-08-03-0424 ²⁾ flue gas samples
Date	107-28412 7A, 6373	107-28412 7B, 6376	107-28412 Blank 1, 6374	107-28412 Blank 2, 6375
Analysis No:	4.480	4.006	8.207	8.492
Sampled volume, m ³ (s.d)/h	ng/m ³	ng/m ³	ng/m ³	ng/m ³
3,3',4,4'-Tetra-CB 77	340	369	14	0.058
3,4,4',5-Tetra-CB 81	17	17	0.004	0.0019
3,3',4,4',5-Penta-CB 126	3.6	3.7	0.07	n.d.(0.002)
3,3',4,4',5,5'-Hexa-CB 169 ¹⁾	0.047	0.046	0.001	1% n.d.(0.0002)
Total non-ortho PCB	361	389	14	0.060
Total WHO-TEQ non-ortho PCB	0.39	0.41	0.01	0.00020
2,3,3',4,4'-Penta-CB 105	592	576	8	n.d.(0.4)
2,3,4,4',5-Penta-CB 114	53	59	3	n.d.(0.4)
2,3',4,4',5-Penta-CB 118	1411	1314	49	n.d.(0.8)
2',3,4,4',5-Penta-CB 123	25	25	0	n.d.(0.4)
2,3,3',4,4',5-Hexa-CB 156	109	107	1	n.d.(0.5)
2,3,3',4,4',5-Hexa-CB 157	27	25	1	n.d.(0.6)
2,3',4,4',5,5'-Hexa-CB 167	38	37	0	n.d.(0.5)
2,3,3',4,4',5,5'-Hepta-CB 189	5.4	4.8	0	n.d.(0.8)
Total mono-ortho PCB	2261	2148	56	n.d.
Total WHO-TEQ mono-ortho PCB	0.30	0.29	0.01	0.00083
Total WHO TEQ	0.69	0.70	0.003	0.0012
PCB #28	11413	11446	16	n.d.(1)
PCB #52	4214	3716	3965	n.d.(1)
PCB #101	1495	1694	1595	n.d.(2)
PCB #138	611	620	616	n.d.(0.5)
PCB #153	570	552	561	n.d.(0.5)
PCB #180	152	146	149	n.d.(0.7)
Total	18456	18173	141	n.d.
				3.2

all PCB values calculated out of 0.02% of sample

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Matrix	H-08-03-0416	H-08-03-0417 ²⁾
Date	flue gas samples 2008-02-28	back up 2008-02-28
Analysis No:	107-28412	107-28412
Sampled volume, m ³ (s,d)/h	4B, 6368	4B, F360
	7.771	7.771
	ng/m ³	ng/m ³
3,3',4,4'-Tetra-CB 77	162	0.21
3,4,4',5-Tetra-CB 81	6.8	0.015
3,3',4,4',5-Penta-CB 126	1.8	0.0036
3,3',4,4',5,5'-Hexa-CB 169 ¹⁾	0.027	0.00018
Total non-ortho PCB	170	0.23
		0.13%
Total WHO-TEQ non-ortho PCB	0.19	0.00038
		0.20%
2,3,3',4,4'-Penta-CB 105	386	0.46
2,3,4,4',5-Penta-CB 114	34	0.47
2,3',4,4',5-Penta-CB 118	917	1.04
2',3,4,4',5-Penta-CB 123	17	0.46
2,3,3',4,4',5-Hexa-CB 156	64	0.57
2,3,3',4,4',5-Hexa-CB 157	16	0.57
2,3',4,4',5,5'-Hexa-CB 167	25	0.50
2,3,3',4,4',5,5'-Hepta-CB 189	2.9	0.76
Total mono-ortho PCB	1461	n.d.
		n.a.
Total WHO-TEQ mono-ortho PCB	0.19	0.0011
		0.57%
Total WHO TEQ	0.38	0.0015
		0.38%
PCB #28	4470	175
PCB #52	2415	51
PCB #101	1124	4.9
PCB #138	411	0.54
PCB #153	401	0.49
PCB #180	101	0.65
total	8922	231
		2.59%
all PCB values calculated out of 0,02% of sample		
¹⁾ = all PCB#169 values calculated out of 40% of sample		
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Matrix	H-08-03-0418	H-08-03-0419 ²⁾
Date	flue gas samples 2008-03-03	back up 2008-03-03
Analysis No:	107-28412	107-28412
Sampled volume, m ³ (s,d)/h	6A, 6371	6A, F361
ng/m ³	8.767	8.767
% Break through		
3,3',4,4'-Tetra-CB 77	87	0.29
3,4,4',5-Tetra-CB 81	3.7	0.02
3,3',4,4',5-Penta-CB 118	1.3	0.0043
3,3',4,4',5,5'-Hexa-CB 169 ¹⁾	0.034	0.0002
Total non-ortho PCB	92	0.31
Total WHO-TEQ non-ortho PCB	0.14	0.0005
0.3%		
2,3,3',4,4'-Penta-CB 105	273	0.57
2,3,4,4',5-Penta-CB 114	25	0.42
2,3',4,4',5-Penta-CB 118	687	1.32
2',3,4,4',5-Penta-CB 123	12	0.43
2,3,3',4,4',5-Hexa-CB 156	60	0.51
2,3,3',4,4',5-Hexa-CB 157	15	0.55
2,3',4,4',5,5'-Hexa-CB 167	22	0.45
2,3,3',4,4',5,5'-Hepta-CB 189	2.0	0.75
Total mono-ortho PCB	1095	1.89
Total WHO-TEQ mono-ortho PCB	0.15	0.0010
0.71%		
Total WHO TEQ	0.29	0.0015
0.52%		
PCB #28	2591	198
PCB #52	1234	71
PCB #101	821	11
PCB #138	298	0.48
PCB #153	305	0.46
PCB #180	80	0.64
total	5329	281
all PCB values calculated out of 0,02% of sample		
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²⁾ = all coplanar PCB values calculated out of 40% of sample		
³⁾ Values in italic <nd		