



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 4

Recovery of the $^{13}\text{C}_{12}$ -labelled standards at municipal waste incinerator measurements



Secretariat:

Kommission Reinhaltung der Luft im VDI und DIN – Normenausschuss KRdL
P.O. Box 10 11 39, KRdL@VDI.de
D-40002 Düsseldorf
Germany

Original sample designation Date	640276-1-1 2007-06-20	640276-1-2 2007-06-21	640276-1-3 2007-06-22	640276-1-4 2007-06-23	640276-1-5 2007-06-25	640276-1-6 2007-06-26	640276-2-1 2007-06-20	640276-2-2 2007-06-21
Recovery Sampling Standards								
13C-PCB 60 [%]	99	95	94	93	98	99	90	103
13C-PCB 127 [%]	104	101	105	92	91	107	105	91
13C-PCB 159 [%]	87	94	92	92	91	71	78	81
Recovery Extraction Standards								
13C-PCB 28 [%]	81	98	81	76	82	83	76	99
13C-PCB 52 [%]	74	72	74	67	79	78	71	75
13C-PCB 101 [%]	84	86	90	81	97	85	85	85
13C-PCB 138 [%]	80	91	94	110	87	78	84	90
13C-PCB 153 [%]	75	89	89	107	84	78	81	86
13C-PCB 180 [%]	100	67	83	103	81	87	84	68
13C-PCB 77 [%]	92	70	86	84	75	52	77	66
13C-PCB 81 [%]	95	86	95	88	97	97	91	99
13C-PCB 105 [%]	98	147	106	98	104	100	100	147
13C-PCB 114 [%]	98	136	99	102	110	97	99	145
13C-PCB 118 [%]	70	117	73	77	86	69	68	117
13C-PCB 123 [%]	91	143	97	96	108	98	96	146
13C-PCB 126 [%]	61	98	79	74	90	55	63	98
13C-PCB 156 [%]	106	101	120	128	103	114	111	108
13C-PCB 157 [%]	105	94	114	130	106	109	106	105
13C-PCB 167 [%]	106	107	119	128	101	119	115	109
13C-PCB 169 [%]	101	88	91	106	93	94	94	96
13C-PCB 189 [%]	119	96	111	121	103	104	103	95

Original sample designation Date	640276-2-3 2007-06-22	640276-2-4 2007-06-23	640276-2-5 2007-06-25	640276-2-6 2007-06-26	640276-1-B1 2007-06-19	640276-2-B2 2007-06-22	640276-1-B3 2007-06-25	640276-2-2b 2007-06-21
Recovery Sampling Standards								
13C-PCB 60 [%]	98	92	92	93	90	96	87	90
13C-PCB 127 [%]	80	99	85	103	86	101	82	87
13C-PCB 159 [%]	112	104	99	78	89	88	89	88
Recovery Extraction Standards								
13C-PCB 28 [%]	84	86	85	81	79	77	75	73
13C-PCB 52 [%]	71	79	78	77	63	75	73	73
13C-PCB 101 [%]	86	83	88	85	79	84	88	84
13C-PCB 138 [%]	136	132	110	94	85	94	96	88
13C-PCB 153 [%]	133	131	107	85	88	85	94	81
13C-PCB 180 [%]	97	122	94	94	74	81	78	83
13C-PCB 77 [%]	94	87	84	89	86	81	91	91
13C-PCB 81 [%]	91	100	95	100	87	96	96	96
13C-PCB 105 [%]	95	100	100	106	87	100	102	104
13C-PCB 114 [%]	95	98	101	97	91	94	106	103
13C-PCB 118 [%]	86	74	85	69	78	73	98	92
13C-PCB 123 [%]	95	93	100	96	93	101	97	101
13C-PCB 126 [%]	72	69	79	59	68	61	77	96
13C-PCB 156 [%]	127	144	111	116	113	116	109	105
13C-PCB 157 [%]	129	145	115	109	105	105	108	102
13C-PCB 167 [%]	149	151	116	115	110	116	95	101
13C-PCB 169 [%]	97	88	94	99	88	105	82	94
13C-PCB 189 [%]	79	107	89	88	94	87	83	83

Original sample designation Date	640276-2-4b 640276-2-6b 640276-1-B1 640276-2-B2 640276-1-B3 2007-06-23 2007-06-26 2007-06-19 2007-06-22 2007-06-25										
	Recovery Sampling Standards										
	13C-PCB 60 [%]	99	100	90	96	87	87	min	max	mean	n
	13C-PCB 127 [%]	85	66	86	101	82	66	66	107	92	24
	13C-PCB 159 [%]	97	88	89	88	89	71	71	112	90	24
Recovery Extraction Standards											
	13C-PCB 28 [%]	80	83	79	77	75	73	73	99	81	24
	13C-PCB 52 [%]	79	81	63	75	73	63	63	81	74	24
	13C-PCB 101 [%]	90	82	79	84	88	79	79	97	85	24
	13C-PCB 138 [%]	88	92	85	94	96	78	78	136	95	24
	13C-PCB 153 [%]	82	90	88	85	94	75	75	133	92	24
	13C-PCB 180 [%]	82	87	74	81	78	67	67	122	86	24
	13C-PCB 77 [%]	94	81	86	81	91	52	52	94	83	24
	13C-PCB 81 [%]	109	95	87	96	96	86	86	109	95	24
	13C-PCB 105 [%]	110	93	87	100	102	87	87	147	104	24
	13C-PCB 114 [%]	103	96	91	94	106	91	91	145	103	24
	13C-PCB 118 [%]	95	90	78	73	98	68	68	117	84	24
	13C-PCB 123 [%]	102	93	93	101	97	91	91	146	102	24
	13C-PCB 126 [%]	102	94	68	61	77	55	55	102	76	24
	13C-PCB 156 [%]	97	106	113	116	109	97	97	144	113	24
	13C-PCB 157 [%]	109	108	105	105	108	94	94	145	111	24
13C-PCB 167 [%]	107	114	110	116	95	95	95	151	114	24	
13C-PCB 169 [%]	94	88	88	105	82	82	82	106	94	24	
13C-PCB 189 [%]	93	99	94	87	83	79	79	121	96	24	

Original sample designation	H-07-07-0067	H-07-07-0068	H-07-07-0069	H-07-07-0070	H-07-07-0071	H-07-07-0072	H-07-07-0073
Recovery Sampling Standards							
13C-PCB 60 [%]	121	121	126	23	134	120	127
13C-PCB 127 [%]	85	93	97	76	98	99	97
13C-PCB 159 [%]	86	81	106	43	95	103	98
Recovery Extraction Standards							
13C-PCB 28 [%]	64	59	63	53	61	69	61
13C-PCB 52 [%]	50	51	52	63	49	60	61
13C-PCB 101 [%]	57	59	57	69	58	68	75
13C-PCB 138 [%]	60	57	45	67	55	62	63
13C-PCB 153 [%]	50	52	47	66	53	60	62
13C-PCB 180 [%]	66	62	56	69	72	68	73
13C-PCB 77 [%]	50	63	63	26	61	60	63
13C-PCB 81 [%]	50	66	66	25	62	65	65
13C-PCB 105 [%]	48	63	62	27	59	61	60
13C-PCB 114 [%]	50	61	60	26	58	60	58
13C-PCB 118 [%]	39	40	31	22	40	42	43
13C-PCB 123 [%]	49	43	36	24	48	47	49
13C-PCB 126 [%]	46	42	31	23	45	42	50
13C-PCB 156 [%]	46	43	36	25	42	45	47
13C-PCB 157 [%]	40	34	31	19	39	37	41
13C-PCB 167 [%]	34	33	31	21	37	36	38
13C-PCB 169 [%]	40	35	30	22	38	42	42
13C-PCB 189 [%]	37	35	31	20	36	36	38
13C-HCB [%}	66	61	62	38	65	58	65

Original sample designation					
Recovery Sampling Standards		min	max	mean	n
13C-PCB 60 [%]		23	134	111	14
13C-PCB 127 [%]		72	105	92	15
13C-PCB 159 [%]		43	106	85	15
Recovery Extraction Standards					
13C-PCB 28 [%]		52	69	61	15
13C-PCB 52 [%]		48	68	56	15
13C-PCB 101 [%]		57	75	64	15
13C-PCB 138 [%]		45	67	60	15
13C-PCB 153 [%]		36	66	54	15
13C-PCB 180 [%]		53	76	66	15
13C-PCB 77 [%]		26	64	50	15
13C-PCB 81 [%]		25	66	51	15
13C-PCB 105 [%]		27	63	49	15
13C-PCB 114 [%]		25	61	48	15
13C-PCB 118 [%]		20	47	36	15
13C-PCB 123 [%]		24	49	41	15
13C-PCB 126 [%]		22	50	39	15
13C-PCB 156 [%]		23	53	40	15
13C-PCB 157 [%]		18	42	34	15
13C-PCB 167 [%]		20	38	31	15
13C-PCB 169 [%]		20	43	34	15
13C-PCB 189 [%]		20	39	33	15
13C-HCB [%]		37	67	54	15

Original sample designation	2	4	5	6	7	8	9	11	13	14	15	16	17	18
Recovery Sampling Standards														
13C-PCB 60 [%]	65	63	75	77	75	80	74	67	69	75	80	64	72	92
13C-PCB 127 [%]	51	102	53	55	56	56	56	55	59	51	85	96	87	64
13C-PCB 159 [%]	53	69	63	59	57	58	58	54	55	64	88	86	72	82
Recovery Extraction Standards														
13C-PCB 28 [%]	91	68	94	111	157	144	148	60	69	50	35	59	49	66
13C-PCB 52 [%]	150	39	50	146	82	80	80	59	55	54	14	19	23	66
13C-PCB 101 [%]	128	20	43	136	56	67	58	49	29	39	24	30	28	54
13C-PCB 138 [%]	62	27	21	51	33	23	32	72	91	51	32	37	45	61
13C-PCB 153 [%]	93	69	103	128	92	142	108	83	45	121	74	99	62	63
13C-PCB 180 [%]	53	46	59	77	68	97	73	57	38	69	49	61	53	36
13C-PCB 77 [%]	74	79	76	91	143	128	134	90	35	59	59	103	91	86
13C-PCB 81 [%]	70	87	74	93	149	146	131	89	51	55	69	117	106	112
13C-PCB 105 [%]	26	27	29	30	47	33	49	66	114	59	65	83	77	82
13C-PCB 114 [%]	30	21	28	28	49	35	49	65	101	60	60	72	68	88
13C-PCB 118 [%]	30	22	33	29	51	38	48	63	95	58	62	79	77	87
13C-PCB 123 [%]	28	23	30	31	51	34	49	67	91	62	63	80	74	83
13C-PCB 126 [%]	30	42	27	27	50	45	50	67	113	57	86	133	147	82
13C-PCB 156 [%]	34	29	29	35	51	38	39	66	107	57	63	83	86	64
13C-PCB 157 [%]	31	31	29	29	52	35	53	72	98	61	74	97	81	68
13C-PCB 167 [%]	30	27	31	33	48	36	41	59	61	59	73	87	89	85
13C-PCB 169 [%]	32	47	33	36	56	37	56	92	117	54	94	154	159	80
13C-PCB 189 [%]	74	105	96	116	145	137	125	81	57	49	89	118	92	37

Original sample designation		min	max	mean	n
Recovery Sampling Standards					
13C-PCB 60 [%]		63	92	73	14
13C-PCB 127 [%]		51	102	66	14
13C-PCB 159 [%]		53	88	66	14
Recovery Extraction Standards					
13C-PCB 28 [%]		35	157	86	14
13C-PCB 52 [%]		14	150	66	14
13C-PCB 101 [%]		20	136	54	14
13C-PCB 138 [%]		21	91	45	14
13C-PCB 153 [%]		45	142	91	14
13C-PCB 180 [%]		36	97	60	14
13C-PCB 77 [%]		35	143	89	14
13C-PCB 81 [%]		51	149	96	14
13C-PCB 105 [%]		26	114	56	14
13C-PCB 114 [%]		21	101	54	14
13C-PCB 118 [%]		22	95	55	14
13C-PCB 123 [%]		23	91	55	14
13C-PCB 126 [%]		27	147	68	14
13C-PCB 156 [%]		29	107	56	14
13C-PCB 157 [%]		29	98	58	14
13C-PCB 167 [%]		27	89	54	14
13C-PCB 169 [%]		32	159	75	14
13C-PCB 189 [%]		37	145	94	14