



Figure 1 Supp. The air sampling device.



Figure 2 Supp. The experimental setup.

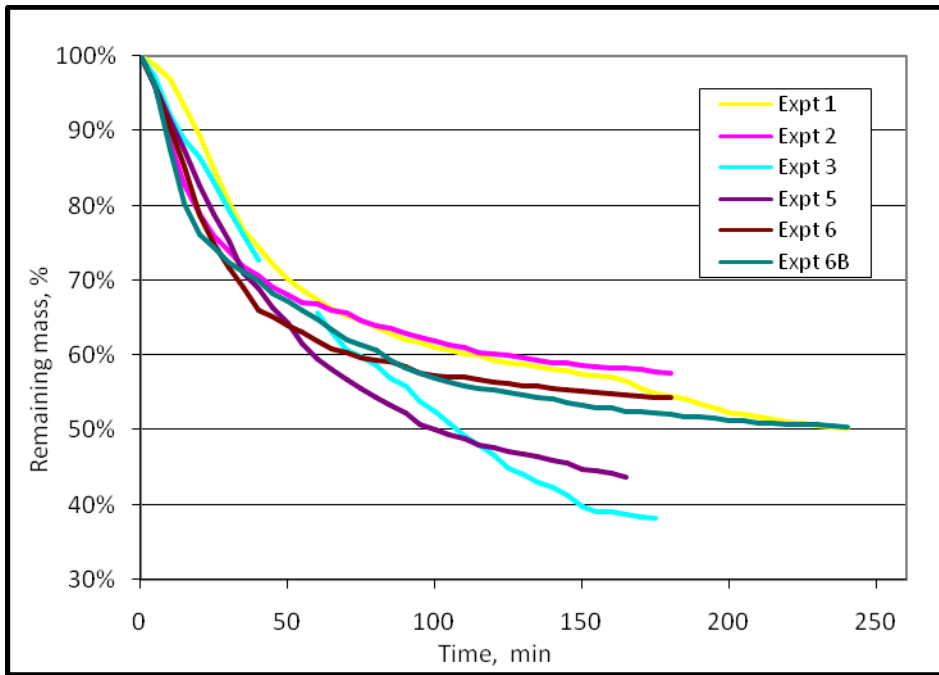


Figure 3 Supp. Change in sample mass vs. time for MEX-3 Experiments

Table 1 Supp. Composition of waste material used to assemble waste samples. Carbon, hydrogen and water content were determined by experiment for each category of waste, and these values were used to calculate carbon, hydrogen and moisture of the assembled waste sample.

material	moisture, %	dry weight, g	water, g	dry weight, % of total	carbon, %	hydrogen, %
Bones	34.8	10.1	5.4	0.4	34.5	5.4
Iron	0.0	21.5	0.0	0.8	0.0	0.0
Aluminum	5.6	30.2	1.8	1.1	0.0	0.0
Copper	0.0	1.0	0.0	0.0	0.0	0.0
Ceramic	0.0	4.5	0.0	0.2	0.0	0.0
Demolition waste	2.6	15.1	0.4	0.5	1.8	0.6
Glass	2.4	80.0	2.0	2.9	0.0	0.0
Small fraction ^b	59.6	255	376	9.1	32.6	4.3
Dust ^c	59.6	118	173	4.2	25.6	2.7
Subtotal Noncombustible	51.1	530	560	19.1	21.9	2.7
Expanded PS ^d	0.0	32.0	0.0	1.1	86.8	7.4
Textile	11.6	240	31.5	8.6	49.2	5.4
Organic matter	73.4	456	1260	16.3	38.5	4.9
Paper	7.8	500	42.3	17.8	37.2	5.5
Cardboard	13.9	141	22.8	5.0	43.2	6.2
Multilayer	3.7	36.6	1.4	1.3	48.3	7.7
Hard vegetable fiber	0.0	1.0	0.0	0.0	45.0	6.1
Synthetic fiber	89.8	4.1	35.9	0.1	52.8	6.0
Latex	0.0	3.5	0.0	0.1	34.8	2.7
Wood	38.2	10.2	6.3	0.4	47.7	6.5
Diapers/sanitary napkins	57.0	193	257	6.9	46.4	7.5
PET ^e	8.3	61.0	5.5	2.2	62.0	4.1
HDPE ^f	1.1	130	1.5	4.7	80.5	14.7

LDPE ^g	0.0	317	0.0	11.3	83.2	14.5
PVC ^h	6.7	16.8	1.2	0.6	34.9	4.2
PP ⁱ	4.9	64.2	3.3	2.3	69.9	12.4
PS ^d	2.0	49.0	1.0	1.7	89.0	10.9
Other plastics	0.0	1.0	0.0	0.0	63.6	5.4
Shoes/sportshoes	2.3	12.7	0.3	0.5	43.9	6.2
Subtotal Combustible	42.3	2,270	1,670	80.9	52.5	7.7
Total	44.2	2,800	2,230	100.0	46.7	6.8

^aDry weight: Noncombustible=19.1%, Combustible=80.9%; Wet weight: Noncombustible=21.7%, Combustible=78.3%. ^bUndifferentiated material passing 2 mm square sieve. ^cClay used for landfill cover. In the experience of the experimenters, neither dust nor small fraction material is combustible.

^dPolystyrene ^ePoly(ethylene terephthalate) ^fHigh-density polyethylene ^gLow-density polyethylene ^hPoly(vinyl chloride) ⁱPolypropylene

Table 2 Supp. Carbon balance and calculation of carbon oxidation factor and plume fraction sampled.

	Expt 1	Expt 2	Expt 3	Expt 5	Expt 6	Expt 6B
Before Experiment						
Total mass at ignition, kg	94.2	88.6	94.3	89.1	91.6	93.4
Combustible C, kg ¹	21.8	21.0	21.9	21.1	21.2	21.7
Noncombustible C, kg ^a	2.1	2.1	2.1	2.1	2.1	2.1
Total C, kg	24.0	23.1	24.0	23.2	23.3	23.8
After Experiment						
Remaining mass, kg	47.3	51.0	35.9	38.9	49.7	47.1
Combustible C, kg ²	3.1	3.7	1.3	1.6	5.0	4.0
Noncombustible C, kg ³	2.1	2.1	2.1	2.1	2.1	2.1
Total C, kg	5.3	5.8	3.4	3.7	7.1	6.1
Ash C, kg	3.0	1.4	1.4	2.2	0.6	1.3
Mass loss, kg ⁴	46.9	37.6	58.4	50.2	41.9	46.3
Mass loss, %	49.8	42.4	61.9	56.3	45.7	49.6
Oxidized combustible C, kg ⁵	15.7	15.8	19.2	17.3	15.6	16.4
Carbon oxidation factor, %	72%	75%	88%	82%	74%	76%
Carbon sampled in sample train, g	35.0	15.9	15.8	23.5	10.2	24.0

¹ Calculated carbon content of the fractions of the waste sample. See Table 1 Supp.

² Calculated carbon content of the combustible fraction of the unburned remainder. Based on visual observation of unburned remainder, this material is assumed to have carbon content similar to disposable diapers and organics.

³ Assumed unchanged by burning

⁴ By difference: initial vs. final mass from load cell

⁵ By difference: Total carbon less carbon in unburned remainder and ash

^f Mass of carbon sampled divided by mass of oxidized combustible carbon

Table 3a Supp. Current campaign (MEX-3) congener-specific PCDD, PCDF data for air sampling, ng TEQ/kg C_{burned}. Multi-PUF experiments 6 and 6B are reported by each segment and in total.

C sampled, g	35.0	17.9	14.5	23.4	3.6	2.2	4.3	10.1	3.5	4.5	16.8	24.8
Congener	Expt 1	Expt 2	Expt 3	Expt 5	Expt 6-1	Expt 6-2	Expt 6-3	Expt 6 Tot	Expt 6B-1	Expt 6B-2	Expt 6B-3	Expt 6B Tot
2378-Cl ₄ DD	570	29	12	41	7	26	57	33	28	29	80	63
12378-Cl ₅ DD	3,500	330	62	230	19	100	280	150	37	89	340	250
123478-Cl ₆ DD	1,000	81	19	63	6 ^a	10a	110	53	6 ^a	21	95	69
123678-Cl ₆ DD	2,500	240	50	160	6 ^a	74	260	130	6 ^a	33	260	180
123789-Cl ₆ DD	1,400	120	29	32	6 ^a	45	160	78	6 ^a	22	140	100
1234678-Cl ₇ DD	9,600	760	200	556	48	320	120	590	34	120	900	630
OCDD	11,000	880	350	522	120	600	2,000	1,000	71	240	800	590
2378-Cl ₄ DF	11,000	460	300	1100	230	690	1,400	851	670	710	1800	1400
12378-Cl ₅ DF	12,000	300	270	730	130	550	1,700	895	330	580	900	760
23478-Cl ₅ DF	13,000	390	310	790	130	610	2,100	1,100	250	540	1000	840
123478-Cl ₆ DF	15,000	300	300	640	120	420	2,100	1,100	160	430	690	570
123678-Cl ₆ DF	11,000	240	230	530	100	380	1,800	880	120	340	560	460
123789-Cl ₆ DF	1,000	23	24	50	7	48 ^a	150	77	8 ^a	38	43	37
234678-Cl ₆ DF	7,300	200	170	630	59	320	1,500	730	62	140	750	540

1234678-Cl ₇ DF	31,000	500	410	1500	230	740	5,000	2,400	190	300	1800	1300
1234789-Cl ₇ DF	5600	89	95	170	67	180	700	360	58	66	190	150
OCDF	24,000	180	160	450	210	390	2500	1,200	120	59	640	460
I-TEQ _{PCDD}	2,900	240	55	190	19	94	260	140	49	83	310	230
WHO ₁₉₉₈ -TEQ _{PCDD}	4,700	410	85	310	28	140	400	210	67	130	480	360
WHO ₂₀₀₅ -TEQ _{PCDD}	4,700	410	85	310	28	140	400	210	67	130	480	360
I-TEQ _{PCDF}	12,000	340	280	740	130	530	1,900	970	250	470	970	780
WHO ₁₉₉₈ -TEQ _{PCDF}	12,000	340	280	740	130	530	1,900	970	250	470	970	780
WHO ₂₀₀₅ -TEQ _{PCDF}	9,200	260	210	570	100	400	1,400	740	190	350	740	600
I-TEQ-PCDD/PCDF	15,000	580	330	930	150	620	2,200	1,100	290	550	1,300	1,000
WHO ₁₉₉₈ - TEQ _{PCDD/PCDF}	17,000	750	360	1,000	160	680	2,300	1,200	310	600	1,400	1,100
WHO ₂₀₀₅ - TEQ _{PCDD/PCDF}	14,000	660	290	870	130	540	1,800	950	260	480	1,200	950
Total Mass PCDD/PCDF Congeners	160,000	5,100	3,000	8,100	1,510	5,500	23,000	12,000	2,100	3,800	11,000	8,500

^aND, calculated using LOD.

Table 3b Supp. Current campaign (MEX-3) congener-specific PCB data for air sampling, ng TEQ/kg C_{burned}. Multi-PUF experiments 6 and 6B are reported by each segment and in total.

Congener, ng/kg C	Expt 1	Expt 2	Expt 3	Expt 5	Expt 6-1	Expt 6-2	Expt 6-3	Expt 6 Tot	Expt 6B-1	Expt 6B-2	Expt 6B-3	Expt 6B Tot
PCB 77	30,000	2,800	1,200	2,100	1,200	2,400	3,000	2,200	1,400	2,000	4,500	3,600
PCB 81	9,800	540	320	630	310	83 ^a	880	500	380	500	1,200	960
PCB 126	9,700	470	260	460	120	450	1,200	640	360	410	1,300	1,000
PCB 169	1,800	82	35	83	16	89	310	160	25	48	280	200
PCB 105	8,700	1,500	2,500	850	3,200	7,600	3,400	4,300	1,500	930	1,200	1,200
PCB 114	5,000	160	220	220	280	560	410	400	190	220	470	380
PCB 118	14,000	3,300	6,400	2,000	8,000	18,000	7,400	10,000	3,200	2,000	1,500	1,900
PCB 123	2,500	240	160	340	190	400	350	300	160	160	300	260
PCB 156	6,700	630	940	360	820	3,000	1,700	1,600	420	380	780	650
PCB 157	2,400	190	220	99	170	670	500	420	110	100	330	260
PCB 167	3,100	280	430	170	360	1,100	760	700	220	240	390	340
PCB 189	2,800	140	120	130	47	210	600	320	37	81	420	310
Total Mass dl-PCB Congeners	97,000	10,000	13,000	7,500	15,000	35,000	20,000	22,000	8,000	7,100	13,000	11,000
WHO ₁₉₉₈ -TEQ ^a _{no-PCB}	1,000	48	27	47	12	46	120	66	37	42	140	110
WHO ₂₀₀₅ -TEQ _{no-PCB}	1,000	50	28	49	12	47	130	69	37	43	140	110
WHO ₁₉₉₈ -TEQ _{mo-PCB}	10	1	2	1	2	5	2	3	1	1	1	1

WHO ₂₀₀₅ -TEQ _{mo} -PCB	1	0	0	0	0	1	0	1	0	0	0	0
WHO ₁₉₉₈ -TEQ _{dl} -PCB	1,000	49	28	47	14	50	120	69	37	42	140	110
WHO ₂₀₀₅ -TEQ _{dl} -PCB	1,000	50	28	49	13	48	130	70	37	43	140	110
WHO ₁₉₉₈ - TEQ _{PCDD/PCDF/PCB}	18,000	800	390	1,100	170	720	2,400	1,300	350	640	1,600	1,200
WHO ₂₀₀₅ - TEQ _{PCDD/PCDF/PCB}	15,000	710	320	920	140	590	2,000	1,000	290	520	1,400	1,100
% PCB to Total TEQ ₁₉₉₈	5.6	6.2	7.3	4.3	8.0	7.0	5.1	5.5	11	6.6	8.7	8.6
% PCB to Total TEQ ₂₀₀₅	6.9	7.0	8.7	5.3	9.0	8.2	6.5	6.8	13	8.2	10	10

^ano = non-*ortho*; mo = mono-*ortho*; dl = dioxin-like

Table 5a Supp. Congener specific data for ash samples, PCDD/PCDF, ng/kg.

Congener	Expt 1	Expt 2	Expt 3	Expt 5	Expt 6	Expt 6B
2378-Cl ₄ DD	2.0	1.9	0.74 ^a	1.1 ^a	2.9	1.1 ^a
12378-Cl ₅ DD	12	12	1.0 ^a	19	19	1.3 ^a
123478-Cl ₆ DD	6.1	1.3 ^a	1.6 ^a	4.5	8.8	2.2 ^a
123678-Cl ₆ DD	12	8.2	5.0	13	25	2.1 ^a
123789-Cl ₆ DD	9.1	5.8	2.9	6	12	2.1 ^a
1234678-Cl ₇ DD	53	31	64	48	150	17
Cl ₈ DD	58	43	178	91	210	22
2378-Cl ₄ DF	43	25	7.6	25	64	10
12378-Cl ₅ DF	35	20	7.9	15	84	6.4
23478-Cl ₅ DF	39	28	9.0	24	110	10
123478-Cl ₆ DF	49	25	13	16	170	8.0
123678-Cl ₆ DF	39	20	9.3	13	130	6.8
123789-Cl ₆ DF	1.2 ^a	1.5 ^a	1.5 ^a	1.6	11	2.4 ^a
234678-Cl ₆ DF	25	20	10	22	140	13
1234678-Cl ₇ DF	100	57	43	46	640	21
1234789-Cl ₇ DF	15	12	4.3	4.7	75	2.3 ^a
Cl ₈ DF	42	38	27	14	400	8.8 ^a
I-TEQ _{PCDD}	11	10	3.0	14	19	2.6
WHO ₁₉₉₈ TEQ _{PCDD}	18	16	3.4	23	28	3.2
WHO ₂₀₀₅ TEQ _{PCDD}	18	16	3.4	23	28	3.2
I-TEQ _{PCDF}	38	25	10	21	118	10
WHO ₁₉₉₈ TEQ _{PCDF}	38	25	10	21	117	10
WHO ₂₀₀₅ TEQ _{PCDF}	30	19	7.6	16	94	7.6
I-TEQ _{PCDD/PCDF}	50	35	13	35	137	12
WHO ₁₉₉₈ TEQ _{PCDD/PCDF}	56	41	13	44	146	13
WHO ₂₀₀₅ TEQ _{PCDD/PCDF}	47	35	11	39	122	11
Total Mass of 17 Congeners	540	350	380	360	2,200	137

^aND, calculated using LOD.

Table 5b Supp. Congener specific data for ash samples, PCB, ng/kg.

Congener, ng	Expt 1	Expt 2	Expt 3	Expt 5	Expt 6	Expt 6B
PCB 77	77	130	130	80	490	70
PCB 81	13	14	8.8	20	53	7.4
PCB 126	21	20	17	29	99	10
PCB 169	4.4	3.9	4.2	6.5	25	2.6
PCB 105	54	340	540	58	2600	93
PCB 114	10	24	34	7.6	180	7.9
PCB 118	110	720	1100	99	5400	180
PCB 123	5.5	16	23	6.7	110	5.5
PCB 156	28	130	230	21	1000	35
PCB 157	7.2	26	52	9.4	230	7.6
PCB 167	14	49	86	9.5	360	16
PCB 189	9.0	15	25	7.7	100	7.1
WHO ₁₉₉₈ -TEQ _{no-PCB} ^a	2.2	2.1	1.8	3.0	10	1.1
WHO ₂₀₀₅ -TEQ _{no-PCB}	2.2	2.2	1.9	3.1	11	1.1
WHO ₁₉₉₈ -TEQ _{mo-PCB}	0.04	0.20	0.33	0.04	1.6	0.05
WHO ₂₀₀₅ -TEQ _{mo-PCB}	0.01	0.04	0.06	0.01	0.30	0.01
WHO ₁₉₉₈ -TEQ _{dl-PCB}	2.2	2.3	2.1	3.0	12	1.1
WHO ₂₀₀₅ -TEQ _{dl-PCB}	2.3	2.2	2.0	3.1	11	1.1
WHO ₁₉₉₈ -TEQ _{PCDD/PCDF/PCB}	58	43	15	47	160	14
WHO ₂₀₀₅ -TEQ _{PCDD/PCDF/PCB}	50	37	13	42	130	12
% PCB to Total TEQ ₁₉₉₈	3.8	5.3	14	6.4	7.5	7.8
% PCB to Total TEQ ₂₀₀₅	4.5	6.0	15	7.4	8.3	9.3

^ano = non-*ortho* substituted; mo = mono-*ortho* substituted

Table 6 Supp. Homolog-specific data for PCDD, PCDF for ash samples, ng/kg.

	Expt 1	Expt 2	Expt 3	Expt 5	Expt 6	Expt 6B
Cl ₄ DD	210	310	99	900	240	340
Cl ₅ DD	130	160	22	440	220	150
Cl ₆ DD	130	130	48	280	320	88
Cl ₇ DD	100	78	130	120	340	42
Cl ₈ DD	58	43	180	91	210	22
Cl ₄ DF	930	700	220	910	2200	320
Cl ₅ DF	540	360	140	420	1800	160
Cl ₆ DF	300	180	90	170	1300	76
Cl ₇ DF	150	90	62	65	920	29
Cl ₈ DF	42	38	27	14	400	8.8 ^a
Total Cl ₄ -Cl ₈ Homologs	2600	2100	1000	3400	7900	1200

^aND, calculated using LOD.

Table 7 Supp. Results of multi-sample experiments by sample.

Campaign	Sample	Carbon, g ^a	ng TEQ/ kg C burned ^a	CO/CO ₂ ^a	Burn Progress
MEX-3	Exp 6-1	3.56	128	6.1%	35%
MEX-3	Exp 6-2	2.21	541	11.9%	57%
MEX-3	Exp 6-3	4.29	1845	18.9%	100%
MEX-3	Exp 6B-1	3.55	256	7.3%	14%
MEX-3	Exp 6B-2	4.46	476	16.8%	32%
MEX-3	Exp 6B-3	16.8	1225	22.6%	100%
MEX-1	Soy-1a	8.83	226	8.0%	56%
MEX-1	Soy-2a	6.02	584	13.4%	100%
MEX-1	Soy-3a	7.76	202	12.2%	59%
MEX-1	Soy-4a	5.38	826	13.4%	100%
MEX-1	San-1a	7.14	432	8.8%	54%
MEX-1	San-2a	6.11	1210	16.6%	100%
MEX-1	San-3a	5.78	1400	13.6%	55%
MEX-1	San-4a	4.67	1700	12.9%	100%

^asampled during that increment