

Analysis Report

Client	TWO Teknik ApS Korngården 6 4660 St. Heddinge Att: Tim Warner
Case number/ref.	TWO, tests of sealers
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Assignment

Dansk MiljøAnalyse has been given the assignment to test two different PCB sealers.

Chemicals

Aroclor 1248 solution (certified reference material, 1000 µg/mL in isooctane 44807, Supelco, Sigma Aldrich), Dutch Seven PCB Mixture (NEN 5734/VPR C85-16, LGC Standards), PCB mix (certified reference material bcr – 365, LGC Standards), DBOB 4,4'-Dibromooctafluorobiphenyl (Sigma Aldrich), PCB202 2,2',3,3',5,5',6,6'-Octachlorobiphenyl (13C12,99%, LGC Standards) SPS Sealers (delivered by TWO Teknik ApS), cyclohexane and acetone.

Sources of error

A main source of error during the test is the use of "free" PCB (PCB in solution not bounded). When adding a PCB in a solution to the concrete and afterward sealing the concrete, some of the PCB may be dissolved in the sealing layer which might explain the background level of PCB in the air sample. Another consequence hereby is the possible pollution of sealing on the brush which can contaminate the sealing in the sealing bucket.

Method

Air




The method is a modification of the DMA accredited analysis for PCB in air DMA103, Acc. No. 549

The sample is transferred to a glass vial and 5 ml cyclohexane/acetone (1/1) containing extraction standard DBOB is added. The PCB content is extracted by sonication for 2 hours. 900 µL of the extract is mixed with 100 µL injection standard PCB 202 C13 and analyzed on a GC-MS in SIM mode

The concentrations of 7 different PCB congeners are calculated from their peak areas. The concentrations are added together and multiplied by a factor of 5 to find the total PCB concentration. The concentration of SPS Trace is determined by its peak area.

Experimental Setup

The setup consists of three concrete tiles. Each concrete tile is treated with the same amount of PCB. Two of the concrete tiles are then sealed with and the last concrete tile is used as a control. One of the sealed concrete tiles is used as a reference, and the sealant on the other sealed concrete tile is gradually removed. See the table below for an overview of the experiment.

	Concrete tile 1	Concrete tile 2	Concrete tile 3
			
During the experiment the follow steps are made			
Steps	Concrete tile 1	Concrete tile 2	Concrete tile 3
1	Applied 1mL, 1000 ppm Aroclor 1248	Applied 1mL, 1000 ppm Aroclor 1248	Applied 1mL, 1000 ppm Aroclor 1248
2	Not sealed	Sealed with SPS Primær V2, 1 time	Sealed with SPS Primær Vinter, 1 time
3	First air sample 2 days after sealing of concrete tile 1 and 2	First air sample 2 days after sealing	First air sample 2 days after sealing
4	Second air sample, 2 days after first sample	Second air sample, 2 days after first sample	Second air sample, 2 days after first sample
5	Second air sample, 7 days after first sample	Second air sample, 7 days after first sample	Second air sample, 7 days after first sample

Results

Results – PCB in air										
Lab no.	Sample name	PCB concentration in ng/m3						Air volume, m3	Average temp. °C	
1.1	Concrete tile 1, air sample 1	28000						0,060	21,8	
1.2	Concrete tile 1, air sample 2	18000						0,060	21,8	
1.3	Concrete tile 1, air sample 3	7300						0,060	21,8	
2.2	Concrete tile 2, air sample 1	110						0,060	22,3	
2.2	Concrete tile 2, air sample 2	120						0,060	22,3	
2.2	Concrete tile 2, air sample 3	150						0,060	22,3	
3.3	Concrete tile 3, air sample 1	120						0,060	21,5	
3.3	Concrete tile 3, air sample 2	100						0,060	21,5	
3.3	Concrete tile 3, air sample 3	51						0,060	21,5	
Method	DMA103 (Acc. no. 549)									
Notes The concentration is calculated and the result is expressed in ng/m3 based on the air amount. The air amount and the average temperature are not a part of the accreditation.										
The Danish Board of Health has the following action values for PCB in indoor air:										
<ul style="list-style-type: none"> <300 ng/m3 is not considered to cause increased health risk 300-3000 ng/m3 demands a plan to lower the level to a concentration below 300 ng/m3 >3000 ng/m3 estimated to cause a significant health risk. A lasting solution must promptly be sought which can reduce the level. 										
n.d.: Not detected above the detection limit for the single congener										
Detailed PCB results										
Lab no.	PCB Congeners (ng/m3)							Σ7PCB	Factor	Total PCB content
	28	52	101	118	138	153	180			
1.1	1900	2500	380	65	320	410	66	5700	5	28000
1.2	1300	1800	160	38	130	160	27	3600	5	18000
1.3	660	730	32	7,7	14	16	I.D.	1500	5	7300
2.1	9,2	13	I.D.	I.D.	I.D.	I.D.	I.D.	22	5	110
2.2	10	15	I.D.	I.D.	I.D.	I.D.	I.D.	24	5	120
2.3	13	17	I.D.	I.D.	I.D.	I.D.	I.D.	30	5	150
3.1	11	13	I.D.	I.D.	I.D.	I.D.	I.D.	24	5	120
3.2	9	12	I.D.	I.D.	I.D.	I.D.	I.D.	21	5	100
3.3	6,8	3,3	I.D.	I.D.	I.D.	I.D.	I.D.	10	5	51
Notes:										
The sum of detected concentrations (areas under curve) of the seven congeners is multiplied by a factor of 5 in order to calculate the total PCB concentration (in accordance with the Danish guideline "Energistyrelsen 2010: vejledning for måling af PCB i indeklimaet"). Detection limits for the single congener: 10 ng/m3										
The expanded uncertainty for the single congener is 20 %										
For concentrations, close to the detection limit the expanded uncertainty may be up to 30 %										

2017-07-10



Anders Jensen

Responsibility: For samples submitted for analysis DMA is only responsible for the laboratory analysis of the sample. This means that DMA is not responsible for the sampling, i.e. whether the sample represents the specific material that has been sampled or whether the number of samples is sufficient to draw any conclusions about the type of material in the sample area.

DMA is not responsible for any practical actions performed on the site by the recipient of the analytical results as a consequence of the results reported herein.