

PBDE flame retardant levels in indoor environments in Australia

Toms L, Mueller J, Bartkow M and Symons R 2006, *Assessment of concentrations of polybrominated diphenyl ether flame retardants in indoor environments in Australia*, Australian Government Department of Environment and Heritage, Canberra

The report is available at the Department of Environment and Water Resources website:
<http://www.environment.gov.au/settlements/publications/chemicals/bfr/indoor.html>

The study involved the testing of nine indoor air samples, two outdoor air samples, nine dust samples and ten surface wipes from South East Queensland. PBDEs were detected in all air and dust samples and nine of the ten surface wipe samples, reflecting the ubiquity of PBDEs in the Australian indoor environment.

Air

Concentrations of PBDEs were greater for indoor air than outdoor air.

	Low (pg/m ³)	High (pg/m ³)
Indoor air – offices	15	487
Indoor air – homes	0.5	179
Outdoor air	1.7	6.8

The outdoor air samples were taken outside of one of the homes and one of the offices.

The lowest air concentration was in an old house with no carpet and no air conditioning. The highest concentration was found in an office with carpet and air conditioning that had been refurbished in the last two years.

In both homes and offices BDE-2091 dominated, along with BDE-472 and BDE-183.3

The home indoor air results were lower than two Canadian studies and a UK study but were higher than another Canadian study. The office indoor air results were lower than found in studies of offices in Canada and the UK. The outdoor air results were similar or lower to those observed in North America and the UK.

Dust

Dust was collected using a vacuum cleaner.

	Low (ng/g)	High (ng/g)
Dust – offices	583	3070
Dust – homes	87	733

The lowest and highest PBDE concentrations in dust were found in the same locations as the lowest and highest concentrations of PBDEs in air. However, this correlation did not hold for all sites.

The dust congener profile was dominated by BDE-209, with (to a much lesser degree) BDE-99,4

-
- 1 Decabromodiphenyl ether
 - 2 2,2',4,4'-Tetrabrominated diphenyl ether
 - 3 2,2',3,4,4',5',6-Hexabrominated diphenyl ether
 - 4 2,2',4,4',5-Pentabrominated diphenyl ether

BDE-47, BDE-183, BDE-2065 and BDE-207.6

The concentrations found in dust were lower than another Australian study, although there were differences in dust collection methodology that may explain this. The levels of household dust were lower than that found in North America but higher than Germany. For office dust, the levels were higher than that for Europe.

Surface Wipes

The surfaces sampled were televisions, refrigerators, stereos and DVD players.

The only surface wipe that did not return a detect was the metal surface of a stereo in a closed glass cabinet. The highest concentration was a television with 23,500 pg Σ PBDE/cm². The respective contributions of PBDEs to these measurements by the dust and the product itself cannot be determined.

The dominant congener found from the surface wipes was BDE-209.

The surface wipe results results were lower than one other international study on surfaces, with the exception of the highest reading obtained from the television.

5 2,2,3,3',4,4',5,5',6-Nonabrominated diphenyl ether
6 2,2,3,3',4,4',5,6,6-Nonabrominated diphenyl ether