PCBs and Related Standards

AccuStandard®

CHROMATOGRAPHIC SPECIALTIES INC.

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History of PCBs

Legacy

Polychlorinated biphenyls (PCBs) were manufactured worldwide for a large number of technical applications. The chemical stability of PCB's made them exceptionally suitable as coolants and insulating fluids for transformers and capacitors. Other applications included carbonless copy paper, paints, hydraulic fluids, plasticizers, plastic additives and flame retardants. Estimates suggest that the total global production volume of PCBs exceeded 1.5 million tons. As late as 1984, about 758 million pounds were still in use in the United States alone.

The toxicity associated with PCBs was already documented in medical cases in the 1920's and 30's. Factory workers involved in the manufacturing of PCBs exhibited detrimental health effects like severe skin conditions. In 1968, Japan reported the first of over 1200 patients, many of them children, who developed acne-type skin eruptions (chloracne) and other clinical symptoms. The contamination of rice oil (Yusho) with industrial PCBs (Kannechlor 400) was the source of this malady, later termed Yusho Disease. The average amount of actual PCBs consumed by the victims was estimated at two grams. By 1973, 22 of the 1200 victims had died, 41% from malignant tumors, suggesting a possible link to PCB ingestion.

One of the first signals of the effect of PCBs on the environment in the United States was noted in 1970, on Great Gull Island at the entrance to Long Island Sound. Scientists observed a sharp increase in the number of abnormalities found in young sea gulls such as feather loss, crossed beaks and four legs. In addition, the egg shells were extremely thin.

By 1979 the production of PCBs was banned in the United States. In 2001, PCBs were added to the list of Persistent Organic Pollutants by the Stockholm Convention of Persistent Organic Pollutants.

The high persistency and ubiquitous distribution through prior use, disposal and leakages have caused global contamination of soils, air, rivers and other waterways that will affect our food and water supplies for years to come. Although PCB concentrations in the environment are slowly decreasing, a constant, low-level human PCB exposure via dietary intake and inhalation of contaminated indoor air is still of concern. Numerous studies have linked PCBs, even at low levels, to toxic effects such as endocrine disruption, neurotoxicity, immunotoxicity and carcinogenesis.

Toxicity and molecular structure

There are 209 PCB congeners containing one to ten chlorine atoms. Technical mixtures like Aroclors may contain up to 50 of these congeners.

The toxicity and environmental impact of the congeners correlate to their substitution pattern and fall into two general categories: coplanar (or non-ortho-substituted) and noncoplanar (or ortho-substituted).

Congeners that contain no chlorine substitutions in the ortho positions are structurally more rigid because the two phenyl rings remain in the same plane (coplanar). This makes them dioxin-like not only structurally but also regarding their toxicity. They are more toxic than those having chlorine atoms in the ortho positions (noncoplanar). The most toxic PCBs are the tetra, penta and hexachlorobiphenyl congeners that are unsubstituted in the ortho position.

PCB Metabolites

PCBs are metabolized in vivo to hydroxyl and sulfur compounds. They can be formed in different organisms, including humans and birds of prey. Many studies suggest that these metabolites can be more toxic than the parent compounds.

AccuStandard offers a variety of hydroxyl-/methoxy-PCBs as well as methylsulfonyl-PCB congeners.

Analytical Methods and Reference Materials

To obtain meaningful analytical data, the PCB congeners need to be formulated into groupings of solutions that are all resolved on a gas chromatographic column. The single column on which all 209 congeners are separated has, to date, eluded all GC column manufacturers.

There are some columns that are close to achieving the status of separating all the PCB congeners. They are Agilent DB-XLB and SGE's HT 8 which resolve all but four pairs of significant congeners and five pairs of minor congeners.

Earlier work by George Frame and his co-workers at General Electric Company have coordinated a seminal study of specially formulated PCB groups - five of which are composed of the congeners contained in Aroclors, the remaining four mixtures contain those congeners generally absent in Aroclors. AccuStandard prepared and supplied the nine mixtures used in Dr. Frame's study from its inventory of the 209 pure congeners.

These nine mixtures were then tested on 17 different columns by independent laboratories and column manufacturers. The resulting chromatographic retention time and response data was compiled and published. This information has proven invaluable for identification and quantification of the different Aroclors as well as for congener specific analysis.

In the course of the investigations, it was determined that some of the 209 congeners that constitute the industrial PCB product behave differently than others. Therefore it is very helpful, even essential, to the scientific and regulatory communities, that individual congeners be available. For this reason, the EPA permits the synthesis and distribution of small quantities for research purposes.

As the leading manufacturer in synthesizing all 209 PCB congeners, AccuStandard offers ultra-pure (+99%) and high quality PCB reference standards in both neat and solutions format to help reliably identify PCBs contaminations in a wide variety of matrices. Our vast experience in synthesizing PCBs combined with our knowledgeable Technical support is available to assist you with your PCB analysis.

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Chlorobiphenyl Congeners (PCBs)

In 1993, AccuStandard completed the syntheses of all 209 congeners (with 99+% purity).

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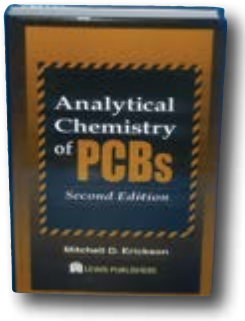
Technical Literature

Visit our website to view

PCB related papers

Physical, Spectral and Chromatographic Properties of All 209 Individual PCB Congeners
Chemosphere, Vol. 31. 2, pp. 2687-2705, 1995. Michael Bolgar, James Cunningham, Russell Cooper, Richard Kozloski and Jack Hubball

GC Elution Order Data, Design & Employment of 9 PCB Congener Mixtures for Conducting Comprehensive, Quantitative Congener-Specific (QCS) PCB Analyses
Close Elutions of PCB Congeners in 9 Mixes on 12 Phases, Capillary GC System Characteristics, Researchers and Aroclor PCB Coelutions and System Resolving Power, GC Column Injection, Column Pressure and Temp. Parameters, Distribution of PCB Congeners into 9 Mixes for Calibration on 12 GC Columns, Elution Order Tables. By Dr. George Frame

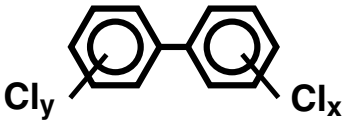


Analytical Chemistry of PCBs

The Second Edition of this book is a comprehensive review of the analytical chemistry of PCBs. The book is an invaluable resource for both chemists with no experience in PCB analysis and seasoned PCB researchers.

PCB Book
Analytical Chemistry of PCBs
BOOK-PCB-001

Chlorobiphenyl Congeners (PCBs)



EXCLUSIVES

209 Congeners One Mix
PCB-209-AG — 1 x 1 mL
1 µg/mL each in Isooctane — 209 comps.

209 Solutions Set (in Isooctane)
C-35-SET — 35 µg/mL — 209 x 1 mL
C-100-SET — 100 µg/mL — 209 x 1 mL

Purity 99+%

Chlorobiphenyl Congeners (PCBs)

No.	Compound	CAS No.	NEAT Cat. No.	NEAT Unit	SOLUTION 35 µg/mL in Isooctane Cat. No.	35 µg/mL Unit	SOLUTION 100 µg/mL in Isooctane Cat. No.	100 µg/mL Unit
1	2-Chlorobiphenyl	2051-60-7	C-001N	50 mg	C-001S	1 mL	C-001S-TP	1 mL
2	3-Chlorobiphenyl	2051-61-8	C-002N	50 mg	C-002S	1 mL	C-002S-TP	1 mL
3	4-Chlorobiphenyl	2051-62-9	C-003N	50 mg	C-003S	1 mL	C-003S-TP	1 mL
4	2,2'-Dichlorobiphenyl	13029-08-8	C-004N	25 mg	C-004S	1 mL	C-004S-TP	1 mL
5	2,3-Dichlorobiphenyl	16605-91-7	C-005N	50 mg	C-005S	1 mL	C-005S-TP	1 mL
6	2,3'-Dichlorobiphenyl	25569-80-6	C-006N	5 mg	C-006S	1 mL	C-006S-TP	1 mL
7	2,4-Dichlorobiphenyl	33284-50-3	C-007N	25 mg	C-007S	1 mL	C-007S-TP	1 mL
8	2,4'-Dichlorobiphenyl	34883-43-7	C-008N	25 mg	C-008S	1 mL	C-008S-TP	1 mL
9	2,5-Dichlorobiphenyl	34883-39-1	C-009N	50 mg	C-009S	1 mL	C-009S-TP	1 mL
10	2,6-Dichlorobiphenyl	33146-45-1	C-010N	25 mg	C-010S	1 mL	C-010S-TP	1 mL
11	3,3'-Dichlorobiphenyl	2050-67-1	C-011N	50 mg	C-011S	1 mL	C-011S-TP	1 mL
12	3,4-Dichlorobiphenyl	2974-92-7	C-012N	50 mg	C-012S	1 mL	C-012S-TP	1 mL
13	3,4'-Dichlorobiphenyl	2974-90-5	C-013N	5 mg	C-013S	1 mL	C-013S-TP	1 mL
14	3,5-Dichlorobiphenyl	34883-41-5	C-014N	50 mg	C-014S	1 mL	C-014S-TP	1 mL
15	4,4'-Dichlorobiphenyl	2050-68-2	C-015N	10 mg	C-015S	1 mL	C-015S-TP	1 mL
16	2,2',3-Trichlorobiphenyl	38444-78-9	C-016N	5 mg	C-016S	1 mL	C-016S-TP	1 mL
17	2,2',4-Trichlorobiphenyl	37680-66-3	C-017N	5 mg	C-017S	1 mL	C-017S-TP	1 mL
18	2,2',5-Trichlorobiphenyl	37680-65-2	C-018N	25 mg	C-018S	1 mL	C-018S-TP	1 mL
19	2,2',6-Trichlorobiphenyl	38444-73-4	C-019N	5 mg	C-019S	1 mL	C-019S-TP	1 mL
20	2,3,3'-Trichlorobiphenyl	38444-84-7	C-020N	5 mg	C-020S	1 mL	C-020S-TP	1 mL
21	2,3,4-Trichlorobiphenyl	55702-46-0	C-021N	25 mg	C-021S	1 mL	C-021S-TP	1 mL
22	2,3,4'-Trichlorobiphenyl	38444-85-8	C-022N	5 mg	C-022S	1 mL	C-022S-TP	1 mL
23	2,3,5-Trichlorobiphenyl	55720-44-0	C-023N	5 mg	C-023S	1 mL	C-023S-TP	1 mL
24	2,3,6-Trichlorobiphenyl	55702-45-9	C-024N	10 mg	C-024S	1 mL	C-024S-TP	1 mL
25	2,3',4-Trichlorobiphenyl	55712-37-3	C-025N	5 mg	C-025S	1 mL	C-025S-TP	1 mL
26	2,3',5-Trichlorobiphenyl	38444-81-4	C-026N	25 mg	C-026S	1 mL	C-026S-TP	1 mL
27	2,3',6-Trichlorobiphenyl	38444-76-7	C-027N	5 mg	C-027S	1 mL	C-027S-TP	1 mL
28	2,4,4'-Trichlorobiphenyl	7012-37-5	C-028N	10 mg	C-028S	1 mL	C-028S-TP	1 mL
29	2,4,5-Trichlorobiphenyl	15862-07-4	C-029N	50 mg	C-029S	1 mL	C-029S-TP	1 mL
30	2,4,6-Trichlorobiphenyl	35693-92-6	C-030N	50 mg	C-030S	1 mL	C-030S-TP	1 mL
31	2,4',5-Trichlorobiphenyl	16606-02-3	C-031N	25 mg	C-031S	1 mL	C-031S-TP	1 mL
32	2,4',6-Trichlorobiphenyl	38444-77-8	C-032N	5 mg	C-032S	1 mL	C-032S-TP	1 mL
33	2',3,4-Trichlorobiphenyl	38444-86-9	C-033N	10 mg	C-033S	1 mL	C-033S-TP	1 mL
34	2',3,5-Trichlorobiphenyl	37680-68-5	C-034N	5 mg	C-034S	1 mL	C-034S-TP	1 mL
35	3,3',4-Trichlorobiphenyl	37680-69-6	C-035N	5 mg	C-035S	1 mL	C-035S-TP	1 mL
36	3,3',5-Trichlorobiphenyl	38444-87-0	C-036N	5 mg	C-036S	1 mL	C-036S-TP	1 mL
37	3,4,4'-Trichlorobiphenyl	38444-90-5	C-037N	5 mg	C-037S	1 mL	C-037S-TP	1 mL
38	3,4,5-Trichlorobiphenyl	53555-66-1	C-038N	5 mg	C-038S	1 mL	C-038S-TP	1 mL
39	3,4',5-Trichlorobiphenyl	38444-88-1	C-039N	5 mg	C-039S	1 mL	C-039S-TP	1 mL

Technical Note

For specific applications (e.g. toxicological studies) that require absolute dioxin and furan free PCBs contact Technical Service.

NEATS and SOLUTIONS in other solvents, concentrations and quantities are available upon request.

Chlorobiphenyl Congeners (PCBs)

NEATS and SOLUTIONS in other solvents, concentrations and quantities are available upon request.

Purity 99+%

Chlorobiphenyl Congeners (PCBs) continued

No.	Compound	CAS No.	NEAT		SOLUTION			
					35 µg/mL in Isooctane		100 µg/mL in Isooctane	
			Cat. No.	Unit	Cat. No.	Unit	Cat. No.	Unit
40	2,2',3,3'-Tetrachlorobiphenyl	38444-93-8	C-040N	50 mg	C-040S	1 mL	C-040S-TP	1 mL
41	2,2',3,4-Tetrachlorobiphenyl	52663-59-9	C-041N	5 mg	C-041S	1 mL	C-041S-TP	1 mL
42	2,2',3,4'-Tetrachlorobiphenyl	36559-22-5	C-042N	5 mg	C-042S	1 mL	C-042S-TP	1 mL
43	2,2',3,5-Tetrachlorobiphenyl	70362-46-8	C-043N	5 mg	C-043S	1 mL	C-043S-TP	1 mL
44	2,2',3,5'-Tetrachlorobiphenyl	41464-39-5	C-044N	25 mg	C-044S	1 mL	C-044S-TP	1 mL
45	2,2',3,6-Tetrachlorobiphenyl	70362-45-7	C-045N	5 mg	C-045S	1 mL	C-045S-TP	1 mL
46	2,2',3,6'-Tetrachlorobiphenyl	41464-47-5	C-046N	5 mg	C-046S	1 mL	C-046S-TP	1 mL
47	2,2',4,4'-Tetrachlorobiphenyl	2437-79-8	C-047N	50 mg	C-047S	1 mL	C-047S-TP	1 mL
48	2,2',4,5-Tetrachlorobiphenyl	70362-47-9	C-048N	20 mg	C-048S	1 mL	C-048S-TP	1 mL
49	2,2',4,5'-Tetrachlorobiphenyl	41464-40-8	C-049N	20 mg	C-049S	1 mL	C-049S-TP	1 mL
50	2,2',4,6-Tetrachlorobiphenyl	62796-65-0	C-050N	5 mg	C-050S	1 mL	C-050S-TP	1 mL
51	2,2',4,6'-Tetrachlorobiphenyl	68194-04-7	C-051N	5 mg	C-051S	1 mL	C-051S-TP	1 mL
52	2,2',5,5'-Tetrachlorobiphenyl	35693-99-3	C-052N	10 mg	C-052S	1 mL	C-052S-TP	1 mL
53	2,2',5,6'-Tetrachlorobiphenyl	41464-41-9	C-053N	25 mg	C-053S	1 mL	C-053S-TP	1 mL
54	2,2',6,6'-Tetrachlorobiphenyl	15968-05-5	C-054N	50 mg	C-054S	1 mL	C-054S-TP	1 mL
55	2,3,3',4-Tetrachlorobiphenyl	74338-24-2	C-055N	5 mg	C-055S	1 mL	C-055S-TP	1 mL
56	2,3,3',4'-Tetrachlorobiphenyl	41464-43-1	C-056N	5 mg	C-056S	1 mL	C-056S-TP	1 mL
57	2,3,3',5-Tetrachlorobiphenyl	70424-67-8	C-057N	5 mg	C-057S	1 mL	C-057S-TP	1 mL
58	2,3,3',5'-Tetrachlorobiphenyl	41464-49-7	C-058N	5 mg	C-058S	1 mL	C-058S-TP	1 mL
59	2,3,3',6-Tetrachlorobiphenyl	74472-33-6	C-059N	5 mg	C-059S	1 mL	C-059S-TP	1 mL
60	2,3,4,4'-Tetrachlorobiphenyl	33025-41-1	C-060N	5 mg	C-060S	1 mL	C-060S-TP	1 mL
61	2,3,4,5-Tetrachlorobiphenyl	33284-53-6	C-061N	50 mg	C-061S	1 mL	C-061S-TP	1 mL
62	2,3,4,6-Tetrachlorobiphenyl	54230-22-7	C-062N	5 mg	C-062S	1 mL	C-062S-TP	1 mL
63	2,3,4',5-Tetrachlorobiphenyl	74472-34-7	C-063N	5 mg	C-063S	1 mL	C-063S-TP	1 mL
64	2,3,4',6-Tetrachlorobiphenyl	52663-58-8	C-064N	5 mg	C-064S	1 mL	C-064S-TP	1 mL
65	2,3,5,6-Tetrachlorobiphenyl	33284-54-7	C-065N	25 mg	C-065S	1 mL	C-065S-TP	1 mL
66	2,3',4,4'-Tetrachlorobiphenyl	32598-10-0	C-066N	20 mg	C-066S	1 mL	C-066S-TP	1 mL
67	2,3',4,5-Tetrachlorobiphenyl	73557-53-8	C-067N	5 mg	C-067S	1 mL	C-067S-TP	1 mL
68	2,3',4,5'-Tetrachlorobiphenyl	73575-52-7	C-068N	5 mg	C-068S	1 mL	C-068S-TP	1 mL
69	2,3',4,6-Tetrachlorobiphenyl	60233-24-1	C-069N	5 mg	C-069S	1 mL	C-069S-TP	1 mL
70	2,3',4',5-Tetrachlorobiphenyl	32598-11-1	C-070N	10 mg	C-070S	1 mL	C-070S-TP	1 mL
71	2,3',4',6-Tetrachlorobiphenyl	41464-46-4	C-071N	5 mg	C-071S	1 mL	C-071S-TP	1 mL
72	2,3',5,5'-Tetrachlorobiphenyl	41464-42-0	C-072N	25 mg	C-072S	1 mL	C-072S-TP	1 mL
73	2,3',5',6-Tetrachlorobiphenyl	74338-23-1	C-073N	5 mg	C-073S	1 mL	C-073S-TP	1 mL
74	2,4,4',5-Tetrachlorobiphenyl	32690-93-0	C-074N	5 mg	C-074S	1 mL	C-074S-TP	1 mL
75	2,4,4',6-Tetrachlorobiphenyl	32598-12-2	C-075N	5 mg	C-075S	1 mL	C-075S-TP	1 mL
76	2',3,4,5-Tetrachlorobiphenyl	70362-48-0	C-076N	5 mg	C-076S	1 mL	C-076S-TP	1 mL
77	3,3',4,4'-Tetrachlorobiphenyl	32598-13-3	C-077N	25 mg	C-077S	1 mL	C-077S-TP	1 mL
78	3,3',4,5-Tetrachlorobiphenyl	70362-49-1	C-078N	5 mg	C-078S	1 mL	C-078S-TP	1 mL
79	3,3',4,5'-Tetrachlorobiphenyl	41464-48-6	C-079N	5 mg	C-079S	1 mL	C-079S-TP	1 mL
80	3,3',5,5'-Tetrachlorobiphenyl	33284-52-5	C-080N	5 mg	C-080S	1 mL	C-080S-TP	1 mL
81	3,4,4',5-Tetrachlorobiphenyl	70362-50-4	C-081N	5 mg	C-081S	1 mL	C-081S-TP	1 mL
82	2,2',3,3',4-Pentachlorobiphenyl	52663-62-4	C-082N	5 mg	C-082S	1 mL	C-082S-TP	1 mL
83	2,2',3,3',5-Pentachlorobiphenyl	60145-20-2	C-083N	5 mg	C-083S	1 mL	C-083S-TP	1 mL
84	2,2',3,3',6-Pentachlorobiphenyl	52663-60-2	C-084N	5 mg	C-084S	1 mL	C-084S-TP	1 mL
85	2,2',3,4,4'-Pentachlorobiphenyl	65510-45-4	C-085N	5 mg	C-085S	1 mL	C-085S-TP	1 mL
86	2,2',3,4,5-Pentachlorobiphenyl	55312-69-1	C-086N	5 mg	C-086S	1 mL	C-086S-TP	1 mL
87	2,2',3,4,5'-Pentachlorobiphenyl	38380-02-8	C-087N	10 mg	C-087S	1 mL	C-087S-TP	1 mL
88	2,2',3,4,6-Pentachlorobiphenyl	55215-17-3	C-088N	5 mg	C-088S	1 mL	C-088S-TP	1 mL
89	2,2',3,4,6'-Pentachlorobiphenyl	73575-57-2	C-089N	5 mg	C-089S	1 mL	C-089S-TP	1 mL
90	2,2',3,4',5-Pentachlorobiphenyl	68194-07-0	C-090N	5 mg	C-090S	1 mL	C-090S-TP	1 mL
91	2,2',3,4',6-Pentachlorobiphenyl	68194-05-8	C-091N	5 mg	C-091S	1 mL	C-091S-TP	1 mL
92	2,2',3,5,5'-Pentachlorobiphenyl	52663-61-3	C-092N	5 mg	C-092S	1 mL	C-092S-TP	1 mL
93	2,2',3,5,6-Pentachlorobiphenyl	73575-56-1	C-093N	5 mg	C-093S	1 mL	C-093S-TP	1 mL
94	2,2',3,5,6'-Pentachlorobiphenyl	73575-55-0	C-094N	5 mg	C-094S	1 mL	C-094S-TP	1 mL
95	2,2',3,5',6-Pentachlorobiphenyl	38379-99-6	C-095N	5 mg	C-095S	1 mL	C-095S-TP	1 mL
96	2,2',3,6,6'-Pentachlorobiphenyl	73575-54-9	C-096N	5 mg	C-096S	1 mL	C-096S-TP	1 mL
97	2,2',3',4,5-Pentachlorobiphenyl	41464-51-1	C-097N	10 mg	C-097S	1 mL	C-097S-TP	1 mL
98	2,2',3',4,6-Pentachlorobiphenyl	60233-25-2	C-098N	5 mg	C-098S	1 mL	C-098S-TP	1 mL
99	2,2',4,4',5-Pentachlorobiphenyl	38380-01-7	C-099N	5 mg	C-099S	1 mL	C-099S-TP	1 mL
100	2,2',4,4',6-Pentachlorobiphenyl	39485-83-1	C-100N	5 mg	C-100S	1 mL	C-100S-TP	1 mL

Chlorobiphenyl Congeners (PCBs) continued on next page

Chlorobiphenyl Congeners (PCBs)

Purity 99+%

Chlorobiphenyl Congeners (PCBs) continued

No.	Compound	CAS No.	NEAT		SOLUTION			
					35 µg/mL in Isooctane		100 µg/mL in Isooctane	
			Cat. No.	Unit	Cat. No.	Unit	Cat. No.	Unit
101	2,2',4,5,5'-Pentachlorobiphenyl	37680-73-2	C-101N	10 mg	C-101S	1 mL	C-101S-TP	1 mL
102	2,2',4,5,6'-Pentachlorobiphenyl	68194-06-9	C-102N	5 mg	C-102S	1 mL	C-102S-TP	1 mL
103	2,2',4,5',6-Pentachlorobiphenyl	60145-21-3	C-103N	10 mg	C-103S	1 mL	C-103S-TP	1 mL
104	2,2',4,6,6'-Pentachlorobiphenyl	56558-16-8	C-104N	5 mg	C-104S	1 mL	C-104S-TP	1 mL
105	2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	C-105N	5 mg	C-105S	1 mL	C-105S-TP	1 mL
106	2,3,3',4,5-Pentachlorobiphenyl	70424-69-0	C-106N	5 mg	C-106S	1 mL	C-106S-TP	1 mL
107	2,3,3',4',5-Pentachlorobiphenyl	70424-68-9	C-107N	5 mg	C-107S	1 mL	C-107S-TP	1 mL
108	2,3,3',4,5'-Pentachlorobiphenyl	70362-41-3	C-108N	5 mg	C-108S	1 mL	C-108S-TP	1 mL
109	2,3,3',4,6-Pentachlorobiphenyl	74472-35-8	C-109N	5 mg	C-109S	1 mL	C-109S-TP	1 mL
110	2,3,3',4',6-Pentachlorobiphenyl	38380-03-9	C-110N	5 mg	C-110S	1 mL	C-110S-TP	1 mL
111	2,3,3',5,5'-Pentachlorobiphenyl	39635-32-0	C-111N	5 mg	C-111S	1 mL	C-111S-TP	1 mL
112	2,3,3',5,6-Pentachlorobiphenyl	74472-36-9	C-112N	5 mg	C-112S	1 mL	C-112S-TP	1 mL
113	2,3,3',5',6-Pentachlorobiphenyl	68194-10-5	C-113N	5 mg	C-113S	1 mL	C-113S-TP	1 mL
114	2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	C-114N	5 mg	C-114S	1 mL	C-114S-TP	1 mL
115	2,3,4,4',6-Pentachlorobiphenyl	74472-38-1	C-115N	5 mg	C-115S	1 mL	C-115S-TP	1 mL
116	2,3,4,5,6-Pentachlorobiphenyl	18259-05-7	C-116N	10 mg	C-116S	1 mL	C-116S-TP	1 mL
117	2,3,4',5,6-Pentachlorobiphenyl	68194-11-6	C-117N	5 mg	C-117S	1 mL	C-117S-TP	1 mL
118	2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	C-118N	5 mg	C-118S	1 mL	C-118S-TP	1 mL
119	2,3',4,4',6-Pentachlorobiphenyl	56558-17-9	C-119N	5 mg	C-119S	1 mL	C-119S-TP	1 mL
120	2,3',4,5,5'-Pentachlorobiphenyl	68194-12-7	C-120N	5 mg	C-120S	1 mL	C-120S-TP	1 mL
121	2,3',4,5',6-Pentachlorobiphenyl	56558-18-0	C-121N	5 mg	C-121S	1 mL	C-121S-TP	1 mL
122	2',3,3',4,5-Pentachlorobiphenyl	76842-07-4	C-122N	5 mg	C-122S	1 mL	C-122S-TP	1 mL
123	2',3,4,4',5-Pentachlorobiphenyl	65510-44-3	C-123N	5 mg	C-123S	1 mL	C-123S-TP	1 mL
124	2',3,4,5,5'-Pentachlorobiphenyl	70424-70-3	C-124N	5 mg	C-124S	1 mL	C-124S-TP	1 mL
125	2',3,4,5,6'-Pentachlorobiphenyl	74472-39-2	C-125N	5 mg	C-125S	1 mL	C-125S-TP	1 mL
126	3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	C-126N	5 mg	C-126S	1 mL	C-126S-TP	1 mL
127	3,3',4,5,5'-Pentachlorobiphenyl	39635-33-1	C-127N	5 mg	C-127S	1 mL	C-127S-TP	1 mL
128	2,2',3,3',4,4'-Hexachlorobiphenyl	38380-07-3	C-128N	20 mg	C-128S	1 mL	C-128S-TP	1 mL
129	2,2',3,3',4,5-Hexachlorobiphenyl	55215-18-4	C-129N	5 mg	C-129S	1 mL	C-129S-TP	1 mL
130	2,2',3,3',4,5'-Hexachlorobiphenyl	52663-66-8	C-130N	5 mg	C-130S	1 mL	C-130S-TP	1 mL
131	2,2',3,3',4,6-Hexachlorobiphenyl	61798-70-7	C-131N	5 mg	C-131S	1 mL	C-131S-TP	1 mL
132	2,2',3,3',4,6'-Hexachlorobiphenyl	38380-05-1	C-132N	5 mg	C-132S	1 mL	C-132S-TP	1 mL
133	2,2',3,3',5,5'-Hexachlorobiphenyl	35694-04-3	C-133N	5 mg	C-133S	1 mL	C-133S-TP	1 mL
134	2,2',3,3',5,6-Hexachlorobiphenyl	52704-70-8	C-134N	5 mg	C-134S	1 mL	C-134S-TP	1 mL
135	2,2',3,3',5,6'-Hexachlorobiphenyl	52744-13-5	C-135N	5 mg	C-135S	1 mL	C-135S-TP	1 mL
136	2,2',3,3',6,6'-Hexachlorobiphenyl	38411-22-2	C-136N	20 mg	C-136S	1 mL	C-136S-TP	1 mL
137	2,2',3,4,4',5-Hexachlorobiphenyl	35694-06-5	C-137N	5 mg	C-137S	1 mL	C-137S-TP	1 mL
138	2,2',3,4,4',5'-Hexachlorobiphenyl	35065-28-2	C-138N	5 mg	C-138S	1 mL	C-138S-TP	1 mL
139	2,2',3,4,4',6-Hexachlorobiphenyl	56030-56-9	C-139N	5 mg	C-139S	1 mL	C-139S-TP	1 mL
140	2,2',3,4,4',6'-Hexachlorobiphenyl	59291-64-4	C-140N	5 mg	C-140S	1 mL	C-140S-TP	1 mL
141	2,2',3,4,5,5'-Hexachlorobiphenyl	52712-04-6	C-141N	5 mg	C-141S	1 mL	C-141S-TP	1 mL
142	2,2',3,4,5,6-Hexachlorobiphenyl	41411-61-4	C-142N	5 mg	C-142S	1 mL	C-142S-TP	1 mL
143	2,2',3,4,5,6'-Hexachlorobiphenyl	68194-15-0	C-143N	5 mg	C-143S	1 mL	C-143S-TP	1 mL
144	2,2',3,4,5',6-Hexachlorobiphenyl	68194-14-9	C-144N	5 mg	C-144S	1 mL	C-144S-TP	1 mL
145	2,2',3,4,6,6'-Hexachlorobiphenyl	74472-40-5	C-145N	5 mg	C-145S	1 mL	C-145S-TP	1 mL
146	2,2',3,4',5,5'-Hexachlorobiphenyl	51908-16-8	C-146N	5 mg	C-146S	1 mL	C-146S-TP	1 mL
147	2,2',3,4',5,6-Hexachlorobiphenyl	68194-13-8	C-147N	5 mg	C-147S	1 mL	C-147S-TP	1 mL
148	2,2',3,4',5,6'-Hexachlorobiphenyl	74472-41-6	C-148N	5 mg	C-148S	1 mL	C-148S-TP	1 mL
149	2,2',3,4',5',6-Hexachlorobiphenyl	38380-04-0	C-149N	5 mg	C-149S	1 mL	C-149S-TP	1 mL
150	2,2',3,4',6,6'-Hexachlorobiphenyl	68194-08-1	C-150N	5 mg	C-150S	1 mL	C-150S-TP	1 mL
151	2,2',3,5,5',6-Hexachlorobiphenyl	52663-63-5	C-151N	5 mg	C-151S	1 mL	C-151S-TP	1 mL
152	2,2',3,5,6,6'-Hexachlorobiphenyl	68194-09-2	C-152N	5 mg	C-152S	1 mL	C-152S-TP	1 mL
153	2,2',4,4',5,5'-Hexachlorobiphenyl	35065-27-1	C-153N	10 mg	C-153S	1 mL	C-153S-TP	1 mL
154	2,2',4,4',5,6'-Hexachlorobiphenyl	60145-22-4	C-154N	5 mg	C-154S	1 mL	C-154S-TP	1 mL
155	2,2',4,4',6,6'-Hexachlorobiphenyl	33979-03-2	C-155N	50 mg	C-155S	1 mL	C-155S-TP	1 mL
156	2,3,3',4,4',5-Hexachlorobiphenyl	38380-08-4	C-156N	5 mg	C-156S	1 mL	C-156S-TP	1 mL
157	2,3,3',4,4',5'-Hexachlorobiphenyl	69782-90-7	C-157N	5 mg	C-157S	1 mL	C-157S-TP	1 mL
158	2,3,3',4,4',6-Hexachlorobiphenyl	74472-42-7	C-158N	5 mg	C-158S	1 mL	C-158S-TP	1 mL
159	2,3,3',4,5,5'-Hexachlorobiphenyl	39635-35-3	C-159N	5 mg	C-159S	1 mL	C-159S-TP	1 mL
160	2,3,3',4,5,6-Hexachlorobiphenyl	41411-62-5	C-160N	5 mg	C-160S	1 mL	C-160S-TP	1 mL
161	2,3,3',4,5',6-Hexachlorobiphenyl	74472-43-8	C-161N	5 mg	C-161S	1 mL	C-161S-TP	1 mL
162	2,3,3',4',5,5'-Hexachlorobiphenyl	39635-34-2	C-162N	5 mg	C-162S	1 mL	C-162S-TP	1 mL
163	2,3,3',4',5,6-Hexachlorobiphenyl	74472-44-9	C-163N	5 mg	C-163S	1 mL	C-163S-TP	1 mL
164	2,3,3',4',5',6-Hexachlorobiphenyl	74472-45-0	C-164N	5 mg	C-164S	1 mL	C-164S-TP	1 mL
165	2,3,3',5,5',6-Hexachlorobiphenyl	74472-46-1	C-165N	5 mg	C-165S	1 mL	C-165S-TP	1 mL
166	2,3,4,4',5,6-Hexachlorobiphenyl	41411-63-6	C-166N	5 mg	C-166S	1 mL	C-166S-TP	1 mL
167	2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	C-167N	5 mg	C-167S	1 mL	C-167S-TP	1 mL
168	2,3',4,4',5',6-Hexachlorobiphenyl	59291-65-5	C-168N	5 mg	C-168S	1 mL	C-168S-TP	1 mL
169	3,3',4,4',5,5'-Hexachlorobiphenyl	32774-16-6	C-169N	5 mg	C-169S	1 mL	C-169S-TP	1 mL

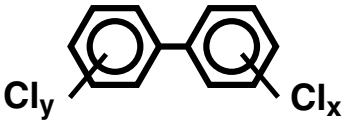
Chlorobiphenyl Congeners (PCBs)

NEATS and SOLUTIONS in other solvents, concentrations and quantities are available upon request.

Purity 99+%

Chlorobiphenyl Congeners (PCBs) continued

No.	Compound	CAS No.	NEAT Cat. No.	NEAT Unit	SOLUTION 35 µg/mL in Isooctane Cat. No.	SOLUTION 35 µg/mL in Isooctane Unit	SOLUTION 100 µg/mL in Isooctane Cat. No.	SOLUTION 100 µg/mL in Isooctane Unit
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	35065-30-6	C-170N	5 mg	C-170S	1 mL	C-170S-TP	1 mL
171	2,2',3,3',4,4',6-Heptachlorobiphenyl	52663-71-5	C-171N	5 mg	C-171S	1 mL	C-171S-TP	1 mL
172	2,2',3,3',4,5,5'-Heptachlorobiphenyl	52663-74-8	C-172N	5 mg	C-172S	1 mL	C-172S-TP	1 mL
173	2,2',3,3',4,5,6-Heptachlorobiphenyl	68194-16-1	C-173N	5 mg	C-173S	1 mL	C-173S-TP	1 mL
174	2,2',3,3',4,5,6'-Heptachlorobiphenyl	38411-25-5	C-174N	5 mg	C-174S	1 mL	C-174S-TP	1 mL
175	2,2',3,3',4,5',6-Heptachlorobiphenyl	40186-70-7	C-175N	5 mg	C-175S	1 mL	C-175S-TP	1 mL
176	2,2',3,3',4,6,6'-Heptachlorobiphenyl	52663-65-7	C-176N	5 mg	C-176S	1 mL	C-176S-TP	1 mL
177	2,2',3,3',4',5,6-Heptachlorobiphenyl	52663-70-4	C-177N	5 mg	C-177S	1 mL	C-177S-TP	1 mL
178	2,2',3,3',5,5',6-Heptachlorobiphenyl	52663-67-9	C-178N	5 mg	C-178S	1 mL	C-178S-TP	1 mL
179	2,2',3,3',5,6,6'-Heptachlorobiphenyl	52663-64-6	C-179N	5 mg	C-179S	1 mL	C-179S-TP	1 mL
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	35065-29-3	C-180N	5 mg	C-180S	1 mL	C-180S-TP	1 mL
181	2,2',3,4,4',5,6-Heptachlorobiphenyl	74472-47-2	C-181N	5 mg	C-181S	1 mL	C-181S-TP	1 mL
182	2,2',3,4,4',5,6'-Heptachlorobiphenyl	60145-23-5	C-182N	5 mg	C-182S	1 mL	C-182S-TP	1 mL
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	52663-69-1	C-183N	5 mg	C-183S	1 mL	C-183S-TP	1 mL
184	2,2',3,4,4',6,6'-Heptachlorobiphenyl	74472-48-3	C-184N	5 mg	C-184S	1 mL	C-184S-TP	1 mL
185	2,2',3,4,5,5',6-Heptachlorobiphenyl	52712-05-7	C-185N	5 mg	C-185S	1 mL	C-185S-TP	1 mL
186	2,2',3,4,5,6,6'-Heptachlorobiphenyl	74472-49-4	C-186N	5 mg	C-186S	1 mL	C-186S-TP	1 mL
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	52663-68-0	C-187N	5 mg	C-187S	1 mL	C-187S-TP	1 mL
188	2,2',3,4',5,6,6'-Heptachlorobiphenyl	74487-85-7	C-188N	5 mg	C-188S	1 mL	C-188S-TP	1 mL
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	C-189N	5 mg	C-189S	1 mL	C-189S-TP	1 mL
190	2,3,3',4,4',5,6-Heptachlorobiphenyl	41411-64-7	C-190N	5 mg	C-190S	1 mL	C-190S-TP	1 mL
191	2,3,3',4,4',5',6-Heptachlorobiphenyl	74472-50-7	C-191N	5 mg	C-191S	1 mL	C-191S-TP	1 mL
192	2,3,3',4,5,5',6-Heptachlorobiphenyl	74472-51-8	C-192N	5 mg	C-192S	1 mL	C-192S-TP	1 mL
193	2,3,3',4',5,5',6-Heptachlorobiphenyl	69782-91-8	C-193N	5 mg	C-193S	1 mL	C-193S-TP	1 mL
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	35694-08-7	C-194N	5 mg	C-194S	1 mL	C-194S-TP	1 mL
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	52663-78-2	C-195N	5 mg	C-195S	1 mL	C-195S-TP	1 mL
196	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	42740-50-1	C-196N	5 mg	C-196S	1 mL	C-196S-TP	1 mL
197	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	33091-17-7	C-197N	5 mg	C-197S	1 mL	C-197S-TP	1 mL
198	2,2',3,3',4,5,5',6-Octachlorobiphenyl	68194-17-2	C-198N	5 mg	C-198S	1 mL	C-198S-TP	1 mL
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	52663-75-9	C-199N-R1	5 mg	C-199S-R1	1 mL	C-199S-TP-R1	1 mL
200	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	52663-73-7	C-200N-R1	5 mg	C-200S-R1	1 mL	C-200S-TP-R1	1 mL
201	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	40186-71-8	C-201N-R1	5 mg	C-201S-R1	1 mL	C-201S-TP-R1	1 mL
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	2136-99-4	C-202N	5 mg	C-202S	1 mL	C-202S-TP	1 mL
203	2,2',3,4,4',5,5',6-Octachlorobiphenyl	52663-76-0	C-203N	5 mg	C-203S	1 mL	C-203S-TP	1 mL
204	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	74472-52-9	C-204N	5 mg	C-204S	1 mL	C-204S-TP	1 mL
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl	74472-53-0	C-205N	5 mg	C-205S	1 mL	C-205S-TP	1 mL
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	40186-72-9	C-206N	5 mg	C-206S	1 mL	C-206S-TP	1 mL
207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	52663-79-3	C-207N	5 mg	C-207S	1 mL	C-207S-TP	1 mL
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	52663-77-1	C-208N	5 mg	C-208S	1 mL	C-208S-TP	1 mL
209	Decachlorobiphenyl	2051-24-3	C-209N	10 mg	C-209S	1 mL	C-209S-TP	1 mL



PCB Questions?

AccuStandard chemists have been involved in the synthesis of PCBs and related compounds for over 30 years. Contact Technical Service at techservice@accustandard.com

Mixtures for Congener Specific PCB Analysis

Method 1668 Congener Set of 209 Chlorinated Biphenyl Congeners by GC/MS

Set of all 209 PCB congeners for specific determination and calibration

M-1668A-0.01X-SET — **5 x 1 mL**

M-1668A-1-0.01X, M-1668A-2-0.01X, M-1668A-3-0.01X
M-1668A-4-0.01X, M-1668A-5-0.01X

PCB Congener Mix #1

M-1668A-1-0.01X — **1 x 1 mL**, 83 comps.

At stated conc. (µg/mL) in Isooctane

2	3-Chlorobiphenyl	2.5	120	2,3',4,5,5'-Pentachlorobiphenyl	5.0
10	2,6-Dichlorobiphenyl	2.5	124	2',3,4,5,5'-Pentachlorobiphenyl	5.0
9	2,5-Dichlorobiphenyl	2.5	106	2,3,3',4,5-Pentachlorobiphenyl	5.0
6	2,3'-Dichlorobiphenyl	2.5	122	2',3,3',4,5-Pentachlorobiphenyl	5.0
8	2,4'-Dichlorobiphenyl	2.5	105	2,3,3',4,4'-Pentachlorobiphenyl	5.0
14	3,5-Dichlorobiphenyl	2.5	127	3,3',4,5,5'-Pentachlorobiphenyl	5.0
11	3,3'-Dichlorobiphenyl	2.5	152	2,2',3,5,6,6'-Hexachlorobiphenyl	5.0
30	2,4,6-Trichlorobiphenyl	2.5	136	2,2',3,3',6,6'-Hexachlorobiphenyl	5.0
27	2,3',6-Trichlorobiphenyl	2.5	148	2,2',3,4',5,6'-Hexachlorobiphenyl	5.0
32	2,4',6-Trichlorobiphenyl	2.5	151	2,2',3,5,5',6-Hexachlorobiphenyl	5.0
34	2',3,5-Trichlorobiphenyl	2.5	144	2,2',3,4,5',6-Hexachlorobiphenyl	5.0
26	2,3',5-Trichlorobiphenyl	2.5	143	2,2',3,4,5,6'-Hexachlorobiphenyl	5.0
31	2,4',5-Trichlorobiphenyl	2.5	142	2,2',3,4,5,6-Hexachlorobiphenyl	5.0
33	2',3,4-Trichlorobiphenyl	2.5	133	2,2',3,3',5,5'-Hexachlorobiphenyl	5.0
36	3,3',5-Trichlorobiphenyl	2.5	161	2,3,3',4,5',6-Hexachlorobiphenyl	5.0
38	3,4,5-Trichlorobiphenyl	2.5	153	2,2',4,4',5,5'-Hexachlorobiphenyl	5.0
35	3,3',4-Trichlorobiphenyl	2.5	130	2,2',3,3',4,5'-Hexachlorobiphenyl	5.0
50	2,2',4,6-Tetrachlorobiphenyl	5.0	129	2,2',3,3',4,5-Hexachlorobiphenyl	5.0
45	2,2',3,6-Tetrachlorobiphenyl	5.0	166	2,3,4,4',5,6-Hexachlorobiphenyl	5.0
52	2,2',5,5'-Tetrachlorobiphenyl	5.0	159	2,3,3',4,5,5'-Hexachlorobiphenyl	5.0
49	2,2',4,5'-Tetrachlorobiphenyl	5.0	167	2,3',4,4',5,5'-Hexachlorobiphenyl	5.0
75	2,4,4',6-Tetrachlorobiphenyl	5.0	156	2,3,3',4,4',5-Hexachlorobiphenyl	5.0
41	2,2',3,4-Tetrachlorobiphenyl	5.0	179	2,2',3,3',5,6,6'-Heptachlorobiphenyl	5.0
72	2,3',5,5'-Tetrachlorobiphenyl	5.0	176	2,2',3,3',4,6,6'-Heptachlorobiphenyl	5.0
57	2,3,3',5-Tetrachlorobiphenyl	5.0	178	2,2',3,3',5,5',6-Heptachlorobiphenyl	5.0
63	2,3,4',5-Tetrachlorobiphenyl	5.0	175	2,2',3,3',4,5',6-Heptachlorobiphenyl	5.0
66	2,3',4,4'-Tetrachlorobiphenyl	5.0	183	2,2',3,4,4',5',6-Heptachlorobiphenyl	5.0
79	3,3',4,5'-Tetrachlorobiphenyl	5.0	177	2,2',3,3',4',5,6-Heptachlorobiphenyl	5.0
78	3,3',4,5-Tetrachlorobiphenyl	5.0	171	2,2',3,3',4,4',6-Heptachlorobiphenyl	5.0
81	3,4,4',5-Tetrachlorobiphenyl	5.0	172	2,2',3,3',4,5,5'-Heptachlorobiphenyl	5.0
96	2,2',3,6,6'-Pentachlorobiphenyl	5.0	191	2,3,3',4,4',5',6-Heptachlorobiphenyl	5.0
103	2,2',4,5',6-Pentachlorobiphenyl	5.0	170	2,2',3,3',4,4',5-Heptachlorobiphenyl	5.0
95	2,2',3,5',6-Pentachlorobiphenyl	5.0	190	2,3,3',4,4',5,6-Heptachlorobiphenyl	5.0
88	2,2',3,4,6-Pentachlorobiphenyl	5.0	201	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	7.5
89	2,2',3,4,6'-Pentachlorobiphenyl	5.0	204	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	7.5
92	2,2',3,5,5'-Pentachlorobiphenyl	5.0	200	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	7.5
113	2,3,3',5',6-Pentachlorobiphenyl	5.0	198	2,2',3,3',4,5,5',6-Octachlorobiphenyl	7.5
83	2,2',3,3',5-Pentachlorobiphenyl	5.0	196	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	7.5
119	2,3',4,4',6-Pentachlorobiphenyl	5.0	195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	7.5
87	2,2',3,4,5'-Pentachlorobiphenyl	5.0	194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	7.5
85	2,2',3,4,4'-Pentachlorobiphenyl	5.0	207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	7.5
82	2,2',3,3',4-Pentachlorobiphenyl	5.0			

PCB Congener Mix #3

M-1668A-3-0.01X — **1 x 1 mL**, 29 comps.

At stated conc. (µg/mL) in Isooctane

13	3,4'-Dichlorobiphenyl	2.5	86	2,2',3,4,5-Pentachlorobiphenyl	5.0
17	2,2',4-Trichlorobiphenyl	2.5	116	2,3,4,5,6-Pentachlorobiphenyl	5.0
29	2,4,5-Trichlorobiphenyl	2.5	107	2,3,3',4',5-Pentachlorobiphenyl	5.0
20	2,3,3'-Trichlorobiphenyl	2.5	154	2,2',4,4',5,6'-Hexachlorobiphenyl	5.0
46	2,2',3,6'-Tetrachlorobiphenyl	5.0	147	2,2',3,4',5,6-Hexachlorobiphenyl	5.0
65	2,3,5,6-Tetrachlorobiphenyl	5.0	140	2,2',3,4,4',6'-Hexachlorobiphenyl	5.0
59	2,3,3',6-Tetrachlorobiphenyl	5.0	146	2,2',3,4',5,5'-Hexachlorobiphenyl	5.0
40	2,2',3,3'-Tetrachlorobiphenyl	5.0	141	2,2',3,4,5,5'-Hexachlorobiphenyl	5.0
67	2,3',4,5-Tetrachlorobiphenyl	5.0	164	2,3,3',4',5,6-Hexachlorobiphenyl	5.0
76	2',3,4,5-Tetrachlorobiphenyl	5.0	158	2,3,3',4,4',6-Hexachlorobiphenyl	5.0
80	3,3',5,5'-Tetrachlorobiphenyl	5.0	182	2,2',3,4,4',5,6'-Heptachlorobiphenyl	5.0
93	2,2',3,5,6-Pentachlorobiphenyl	5.0	174	2,2',3,3',4,5,6'-Heptachlorobiphenyl	5.0
84	2,2',3,3',6-Pentachlorobiphenyl	5.0	173	2,2',3,3',4,5,6-Heptachlorobiphenyl	5.0
101	2,2',4,5,5'-Pentachlorobiphenyl	5.0	193	2,3,3',4',5,5',6-Heptachlorobiphenyl	5.0
112	2,3,3',5,6-Pentachlorobiphenyl	5.0			

PCB Congener Mix #2

M-1668A-2-0.01X — **1 x 1 mL**, 54 comps.

At stated conc. (µg/mL) in Isooctane

7	2,4-Dichlorobiphenyl	2.5
5	2,3-Dichlorobiphenyl	2.5
12	3,4-Dichlorobiphenyl	2.5
18	2,2',5-Trichlorobiphenyl	2.5
24	2,3,6-Trichlorobiphenyl	2.5
23	2,3,5-Trichlorobiphenyl	2.5
28	2,4,4'-Trichlorobiphenyl	2.5
22	2,3,4'-Trichlorobiphenyl	2.5
39	3,4',5-Trichlorobiphenyl	2.5
53	2,2',5,6'-Tetrachlorobiphenyl	5.0
51	2,2',4,6'-Tetrachlorobiphenyl	5.0
73	2,3',5',6-Tetrachlorobiphenyl	5.0
48	2,2',4,5-Tetrachlorobiphenyl	5.0
62	2,3,4,6-Tetrachlorobiphenyl	5.0
71	2,3',4',6-Tetrachlorobiphenyl	5.0
68	2,3',4,5'-Tetrachlorobiphenyl	5.0
58	2,3,3',5'-Tetrachlorobiphenyl	5.0
61	2,3,4,5-Tetrachlorobiphenyl	5.0
55	2,3,3',4-Tetrachlorobiphenyl	5.0
60	2,3,4,4'-Tetrachlorobiphenyl	5.0
94	2,2',3,5,6'-Pentachlorobiphenyl	5.0
100	2,2',4,4',6-Pentachlorobiphenyl	5.0
91	2,2',3,4',6-Pentachlorobiphenyl	5.0
121	2,3',4,5',6-Pentachlorobiphenyl	5.0
90	2,2',3,4',5-Pentachlorobiphenyl	5.0
99	2,2',4,4',5-Pentachlorobiphenyl	5.0
109	2,3,3',4,6-Pentachlorobiphenyl	5.0
117	2,3,4',5,6-Pentachlorobiphenyl	5.0
111	2,3,3',5,5'-Pentachlorobiphenyl	5.0
108	2,3,3',4,5'-Pentachlorobiphenyl	5.0
118	2,3',4,4',5-Pentachlorobiphenyl	5.0
114	2,3,4,4',5-Pentachlorobiphenyl	5.0
150	2,2',3,4',6,6'-Hexachlorobiphenyl	5.0
145	2,2',3,4,6,6'-Hexachlorobiphenyl	5.0
135	2,2',3,3',5,6'-Hexachlorobiphenyl	5.0
149	2,2',3,4',5',6-Hexachlorobiphenyl	5.0
139	2,2',3,4,4',6-Hexachlorobiphenyl	5.0
132	2,2',3,3',4,6'-Hexachlorobiphenyl	5.0
165	2,3,3',5,5',6-Hexachlorobiphenyl	5.0
168	2,3',4,4',5',6-Hexachlorobiphenyl	5.0
137	2,2',3,4,4',5-Hexachlorobiphenyl	5.0
160	2,3,3',4,5,6-Hexachlorobiphenyl	5.0
128	2,2',3,3',4,4'-Hexachlorobiphenyl	5.0
162	2,3,3',4',5,5'-Hexachlorobiphenyl	5.0
157	2,3,3',4,4',5'-Hexachlorobiphenyl	5.0
184	2,2',3,4,4',6,6'-Heptachlorobiphenyl	5.0
186	2,2',3,4,5,6,6'-Heptachlorobiphenyl	5.0
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	5.0
185	2,2',3,4,5,5',6-Heptachlorobiphenyl	5.0
181	2,2',3,4,4',5,6-Heptachlorobiphenyl	5.0
192	2,3,3',4,5,5',6-Heptachlorobiphenyl	5.0
197	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	7.5
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	7.5
203	2,2',3,4,4',5,5',6-Octachlorobiphenyl	7.5

Method 1668 PCB Congener Set continued on next page

Mixtures for Congener Specific PCB Analysis

Method 1668 Congener Set of 209 Chlorinated Biphenyl Congeners by GC/MS (continued)

PCB Congener Mix #4

M-1668A-4-0.01X — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 15 comps.

25	2,3',4-Trichlorobiphenyl	2.5
21	2,3,4-Trichlorobiphenyl	2.5
69	2,3',4,6-Tetrachlorobiphenyl	5.0
47	2,2',4,4'-Tetrachlorobiphenyl	5.0
42	2,2',3,4'-Tetrachlorobiphenyl	5.0
64	2,3,4',6-Tetrachlorobiphenyl	5.0
70	2,3',4',5-Tetrachlorobiphenyl	5.0
102	2,2',4,5,6'-Pentachlorobiphenyl	5.0
97	2,2',3',4,5-Pentachlorobiphenyl	5.0
115	2,3,4,4',6-Pentachlorobiphenyl	5.0
123	2',3,4,4',5-Pentachlorobiphenyl	5.0
134	2,2',3,3',5,6-Hexachlorobiphenyl	5.0
131	2,2',3,3',4,6-Hexachlorobiphenyl	5.0
163	2,3,3',4',5,6-Hexachlorobiphenyl	5.0
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	5.0

PCB Congener Mix #5

M-1668A-5-0.01X — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 28 comps.

1	2-Chlorobiphenyl	2.5	98	2,2',3',4,6-Pentachlorobiphenyl	5.0
3	4-Chlorobiphenyl	2.5	125	2',3,4,5,6'-Pentachlorobiphenyl	5.0
4	2,2'-Dichlorobiphenyl	2.5	110	2,3,3',4',6-Pentachlorobiphenyl	5.0
15	4,4'-Dichlorobiphenyl	2.5	126	3,3',4,4',5-Pentachlorobiphenyl	5.0
19	2,2',6-Trichlorobiphenyl	2.5	155	2,2',4,4',6,6'-Hexachlorobiphenyl	5.0
16	2,2',3-Trichlorobiphenyl	2.5	138	2,2',3,4,4',5'-Hexachlorobiphenyl	5.0
37	3,4,4'-Trichlorobiphenyl	2.5	169	3,3',4,4',5,5'-Hexachlorobiphenyl	5.0
54	2,2',6,6'-Tetrachlorobiphenyl	5.0	188	2,2',3,4',5,6,6'-Heptachlorobiphenyl	5.0
43	2,2',3,5-Tetrachlorobiphenyl	5.0	189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	5.0
44	2,2',3,5'-Tetrachlorobiphenyl	5.0	202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	7.5
74	2,4,4',5-Tetrachlorobiphenyl	5.0	205	2,3,3',4,4',5,5',6-Octachlorobiphenyl	7.5
56	2,3,3',4'-Tetrachlorobiphenyl	5.0	208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	7.5
77	3,3',4,4'-Tetrachlorobiphenyl	5.0	206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	7.5
104	2,2',4,6,6'-Pentachlorobiphenyl	5.0	209	Decachlorobiphenyl	7.5

Method 1668A/1668 Combined Congener Standards

M-1668A-C-NT-LOC-WD — **1 x 1 mL**

M-1668A-C-NT-LOC-WD-PAK — ***SAVE*** **5 x 1 mL**

20 µg/mL each in Isooctane — 33 comps.

1	2-Chlorobiphenyl	155	2,2',4,4',6,6'-Hexachlorobiphenyl
3	4-Chlorobiphenyl	156	2,3,3',4,4',5-Hexachlorobiphenyl
4	2,2'-Dichlorobiphenyl	157	2,3,3',4,4',5'-Hexachlorobiphenyl
15	4,4'-Dichlorobiphenyl	167	2,3',4,4',5,5'-Hexachlorobiphenyl
19	2,2',6-Trichlorobiphenyl	169	3,3',4,4',5,5'-Hexachlorobiphenyl
23	2,3,5-Trichlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
34	2',3,5-Trichlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
37	3,4,4'-Trichlorobiphenyl	182	2,2',3,4,4',5,6'-Heptachlorobiphenyl
54	2,2',6,6'-Tetrachlorobiphenyl	187	2,2',3,4',5,5',6-Heptachlorobiphenyl
77	3,3',4,4'-Tetrachlorobiphenyl	188	2,2',3,4',5,6,6'-Heptachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl	189	2,3,3',4,4',5,5'-Heptachlorobiphenyl
104	2,2',4,6,6'-Pentachlorobiphenyl	202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl	205	2,3,3',4,4',5,5',6-Octachlorobiphenyl
114	2,3,4,4',5-Pentachlorobiphenyl	206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl	208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl
123	2',3,4,4',5-Pentachlorobiphenyl	209	Decachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl		

GPC Calibration Solution

CLP-027-R2-WL-10ML — **1 x 10 mL**

At stated conc. (mg/mL) in CH_2Cl_2 — 5 comps.

Corn Oil	25
bis(2-Ethylhexyl)phthalate	0.5
Methoxychlor	0.1
Perylene	0.02
Sulfur	0.08

Method 1668A Level of Chlorination Calibration/Spike Set

Calibration/Spike Set

M-1668A-LOC-SET — **2 x 1 mL**

M-1668A-NAT, M-1668A-PAR

Native PCB Calibration Mix

M-1668A-NAT — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 19 comps.

3	4-Chlorobiphenyl	5.0
15	4,4'-Dichlorobiphenyl	5.0
28	2,4,4'-Trichlorobiphenyl	5.0
77	3,3',4,4'-Tetrachlorobiphenyl	1.0
105	2,3,3',4,4'-Pentachlorobiphenyl	5.0
114	2,3,4,4',5-Pentachlorobiphenyl	5.0
118	2,3',4,4',5-Pentachlorobiphenyl	5.0
123	2',3,4,4',5-Pentachlorobiphenyl	5.0
126	3,3',4,4',5-Pentachlorobiphenyl	5.0
156	2,3,3',4,4',5-Hexachlorobiphenyl	10
157	2,3,3',4,4',5'-Hexachlorobiphenyl	10
167	2,3',4,4',5,5'-Hexachlorobiphenyl	10
169	3,3',4,4',5,5'-Hexachlorobiphenyl	10
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	10
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	10
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	10
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	10
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	10
209	Decachlorobiphenyl	20

PAR PCB Spike Mix

M-1668A-PAR — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 19 comps.

3	4-Chlorobiphenyl	10
15	4,4'-Dichlorobiphenyl	10
28	2,4,4'-Trichlorobiphenyl	10
77	3,3',4,4'-Tetrachlorobiphenyl	0.2
105	2,3,3',4,4'-Pentachlorobiphenyl	10
114	2,3,4,4',5-Pentachlorobiphenyl	10
118	2,3',4,4',5-Pentachlorobiphenyl	10
123	2',3,4,4',5-Pentachlorobiphenyl	10
126	3,3',4,4',5-Pentachlorobiphenyl	1.0
156	2,3,3',4,4',5-Hexachlorobiphenyl	10
157	2,3,3',4,4',5'-Hexachlorobiphenyl	10
167	2,3',4,4',5,5'-Hexachlorobiphenyl	10
169	3,3',4,4',5,5'-Hexachlorobiphenyl	2.0
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	2.0
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	10
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	2.0
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	10
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	10
209	Decachlorobiphenyl	20

Congener Specific PCB Analysis

Canadian Methods

A second set of four formulations has been selected by the Institute for Biological Sciences of Canada and can be purchased individually or as a complete set (C-CAN-SET). The concentration levels for these formulations are selected so that 1 mL of standard diluted into 100 mL will show equal response by ECD.

PCB Congener (Canadian RM) Set

C-CAN-SET — **4 x 1 mL**

C-CAN-01, C-CAN-02, C-CAN-03, C-CAN-04

PCB Congeners Mix #1

C-CAN-01 — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 14 comps.

18	2,2',5-Trichlorobiphenyl	11.8
31	2,4',5-Trichlorobiphenyl	6.6
40	2,2',3,3'-Tetrachlorobiphenyl	4.9
44	2,2',3,5'-Tetrachlorobiphenyl	5.9
49	2,2',4,5'-Tetrachlorobiphenyl	7.6
54	2,2',6,6'-Tetrachlorobiphenyl	16.6
77	3,3',4,4'-Tetrachlorobiphenyl	5.5
86	2,2',3,4,5-Pentachlorobiphenyl	2.9
87	2,2',3,4,5'-Pentachlorobiphenyl	4.2
121	2,3',4,5',6-Pentachlorobiphenyl	3.1
153	2,2',4,4',5,5'-Hexachlorobiphenyl	2.1
156	2,3,3',4,4',5-Hexachlorobiphenyl	1.5
159	2,3,3',4,5,5'-Hexachlorobiphenyl	1.2
209	Decachlorobiphenyl	1.7

PCB Congeners Mix #2

C-CAN-02 — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 15 comps.

15	4,4'-Dichlorobiphenyl	91.9
52	2,2',5,5'-Tetrachlorobiphenyl	15.2
60	2,3,4,4'-Tetrachlorobiphenyl	3.9
103	2,2',4,5',6-Pentachlorobiphenyl	10.8
105	2,3,3',4,4'-Pentachlorobiphenyl	4.0
128	2,2',3,3',4,4'-Hexachlorobiphenyl	4.9
143	2,2',3,4,5,6'-Hexachlorobiphenyl	5.7
154	2,2',4,4',5,6'-Hexachlorobiphenyl	6.2
173	2,2',3,3',4,5,6-Heptachlorobiphenyl	2.3
182	2,2',3,4,4',5,6'-Heptachlorobiphenyl	3.8
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	3.6
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl	3.2
207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	3.8
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	2.4
209	Decachlorobiphenyl	2.8

PCB Congeners Mix #3

C-CAN-03 — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 15 comps.

15	4,4'-Dichlorobiphenyl	138.1
114	2,3,4,4',5-Pentachlorobiphenyl	6.3
129	2,2',3,3',4,5-Hexachlorobiphenyl	8.3
137	2,2',3,4,4',5-Hexachlorobiphenyl	7.4
153	2,2',4,4',5,5'-Hexachlorobiphenyl	7.3
171	2,2',3,3',4,4',6-Heptachlorobiphenyl	5.2
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	6.6
185	2,2',3,4,5,5',6-Heptachlorobiphenyl	3.5
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	4.7
191	2,3,3',4,4',5',6-Heptachlorobiphenyl	5.0
201	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	4.8
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	7.0
203	2,2',3,4,4',5,5',6-Octachlorobiphenyl	5.1
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	6.7
209	Decachlorobiphenyl	6.5

PCB Congeners Mix #4

C-CAN-04 — **1 x 1 mL**

At stated conc. (µg/mL) in Isooctane — 15 comps.

14	4,4'-Dichlorobiphenyl	76.7
101	2,2',4,5,5'-Pentachlorobiphenyl	8.9
118	2,3',4,4',5-Pentachlorobiphenyl	3.9
138	2,2',3,4,4',5'-Hexachlorobiphenyl	4.2
141	2,2',3,4,5,5'-Hexachlorobiphenyl	2.8
151	2,2',3,5,5',6-Hexachlorobiphenyl	5.0
153	2,2',4,4',5,5'-Hexachlorobiphenyl	3.3
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	3.0
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	2.8
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	3.2
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	2.4
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	2.6
196	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	3.3
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	3.6
209	Decachlorobiphenyl	2.7

Quebec Ministry of Environment Congener Mix

C-QME-01 — **1 x 1 mL**

At stated conc. (ng/mL) in Isooctane — 41 comps.

17	2,2',4-Trichlorobiphenyl	500
18	2,2',5-Trichlorobiphenyl	2000
28	2,4,4'-Trichlorobiphenyl	2000
31	2,4',5-Trichlorobiphenyl	1500
33	2',3,4-Trichlorobiphenyl	2000
44	2,2',3,5'-Tetrachlorobiphenyl	2000
49	2,2',4,5'-Tetrachlorobiphenyl	2000
52	2,2',5,5'-Tetrachlorobiphenyl	2000
70	2,3',4',5-Tetrachlorobiphenyl	2000
74	2,4,4',5-Tetrachlorobiphenyl	2000
82	2,2',3,3',4-Pentachlorobiphenyl	500
87	2,2',3,4,5'-Pentachlorobiphenyl	2000
95	2,2',3,5',6-Pentachlorobiphenyl	1000
99	2,2',4,4',5-Pentachlorobiphenyl	2000
101	2,2',4,5,5'-Pentachlorobiphenyl	2000
105	2,3,3',4,4'-Pentachlorobiphenyl	500
110	2,3,3',4',6-Pentachlorobiphenyl	2000
118	2,3',4,4',5-Pentachlorobiphenyl	2000
128	2,2',3,3',4,4'-Hexachlorobiphenyl	2000
132	2,2',3,3',4,6'-Hexachlorobiphenyl	1000
138	2,2',3,4,4',5'-Hexachlorobiphenyl	2000
149	2,2',3,4',5',6-Hexachlorobiphenyl	2000
151	2,2',3,5,5',6-Hexachlorobiphenyl	2000
153	2,2',4,4',5,5'-Hexachlorobiphenyl	2000
156	2,3,3',4,4',5-Hexachlorobiphenyl	2000
158	2,3,3',4,4',6-Hexachlorobiphenyl	500
169	3,3',4,4',5,5'-Hexachlorobiphenyl	2000
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	2000
171	2,2',3,3',4,4',6-Heptachlorobiphenyl	2000
177	2,2',3,3',4',5,6-Heptachlorobiphenyl	2000
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	2000
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	2000
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	2000
191	2,3,3',4,4',5',6-Heptachlorobiphenyl	2000
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	2000
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	2000
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	1500
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl	2000
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	2000
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	2000
209	Decachlorobiphenyl	2000

Congener Specific PCB Analysis

Integrated Atmospheric Deposition Network (IADN)

The Integrated Atmospheric Deposition Network is composed of five agencies: the US EPA, Environment Canada's (EC) Metrological Service of Canada, EC's National Water Research Institute (NWRI), EC's Ecosystem Health Division of Ontario Region (EHD), and the Ontario Ministry of Environment (OME) whose goal it is to cooperatively implement the Great Lakes Water Quality Agreement.

This agreement requires certain chemicals to be monitored. The Tier 1 group specifically called for the measurement of PCB congeners. AccuStandard was requested to develop a set of IADN PCB congener standards to meet this specific chemical list.

IADN Congener Set

C-IADN-SET — **3 x 1 mL**

C-IADN-01, C-IADN-02, C-IADN-03

IADN Congener Standard #1

C-IADN-01 — **1 x 1 mL**

30 µg/mL each in Isooctane — 28 comps.

4	2,2'-Dichlorobiphenyl
7	2,4-Dichlorobiphenyl
10	2,6-Dichlorobiphenyl
15	4,4'-Dichlorobiphenyl
18	2,2',5-Trichlorobiphenyl
28	2,4,4'-Trichlorobiphenyl
32	2,4',6-Trichlorobiphenyl
41	2,2',3,4-Tetrachlorobiphenyl
45	2,2',3,6-Tetrachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl
56	2,3,3',4'-Tetrachlorobiphenyl
66	2,3',4,4'-Tetrachlorobiphenyl
74	2,4,4',5-Tetrachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl
85	2,2',3,4,4'-Pentachlorobiphenyl
91	2,2',3,4',6-Pentachlorobiphenyl
97	2,2',3',4,5-Pentachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl
114	2,3,4,4',5-Pentachlorobiphenyl
123	2',3,4,4',5-Pentachlorobiphenyl
131	2,2',3,3',4,6-Hexachlorobiphenyl
138	2,2',3,4,4',5'-Hexachlorobiphenyl
153	2,2',4,4',5,5'-Hexachlorobiphenyl
167	2,3',4,4',5,5'-Hexachlorobiphenyl
171	2,2',3,3',4,4',6-Heptachlorobiphenyl
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
200	2,2',3,3',4,5,6,6'-Octachlorobiphenyl
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl

IADN Congener Standard #2

C-IADN-02 — **1 x 1 mL**

30 µg/mL each in Isooctane — 28 comps.

5	2,3-Dichlorobiphenyl
8	2,4'-Dichlorobiphenyl
12	3,4-Dichlorobiphenyl
16	2,2',3-Trichlorobiphenyl
19	2,2',6-Trichlorobiphenyl
26	2,3',5-Trichlorobiphenyl
33	2',3,4-Trichlorobiphenyl
42	2,2',3,4'-Tetrachlorobiphenyl
47	2,2',4,4'-Tetrachlorobiphenyl
49	2,2',4,5'-Tetrachlorobiphenyl
60	2,3,4,4'-Tetrachlorobiphenyl
70	2,3',4',5-Tetrachlorobiphenyl
76	2',3,4,5-Tetrachlorobiphenyl
83	2,2',3,3',5-Pentachlorobiphenyl
87	2,2',3,4,5'-Pentachlorobiphenyl
92	2,2',3,5,5'-Pentachlorobiphenyl
99	2,2',4,4',5-Pentachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl
132	2,2',3,3',4,6'-Hexachlorobiphenyl
144	2,2',3,4,5',6-Hexachlorobiphenyl
156	2,3,3',4,4',5-Hexachlorobiphenyl
169	3,3',4,4',5,5'-Hexachlorobiphenyl
172	2,2',3,3',4,5,5'-Heptachlorobiphenyl
190	2,3,3',4,4',5,6-Heptachlorobiphenyl
198	2,2',3,3',4,5,5',6'-Octachlorobiphenyl
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl

IADN Congener Standard #3

C-IADN-03 — **1 x 1 mL**

30 µg/mL each in Isooctane — 28 comps.

6	2,3'-Dichlorobiphenyl	89	2,2',3,4,6'-Pentachlorobiphenyl
9	2,5-Dichlorobiphenyl	95	2,2',3,5',6-Pentachlorobiphenyl
13	3,4'-Dichlorobiphenyl	100	2,2',4,4',6-Pentachlorobiphenyl
17	2,2',4-Trichlorobiphenyl	110	2,3,3',4',6-Pentachlorobiphenyl
22	2,3,4'-Trichlorobiphenyl	119	2,3',4,4',6-Pentachlorobiphenyl
31	2,4',5-Trichlorobiphenyl	128	2,2',3,3',4,4'-Hexachlorobiphenyl
37	3,4,4'-Trichlorobiphenyl	135	2,2',3,3',5,6'-Hexachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	149	2,2',3,4',5',6-Hexachlorobiphenyl
48	2,2',4,5-Tetrachlorobiphenyl	163	2,3,3',4',5,6-Hexachlorobiphenyl
53	2,2',5,6'-Tetrachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
64	2,3,4',6-Tetrachlorobiphenyl	174	2,2',3,3',4,5,6'-Heptachlorobiphenyl
71	2,3',4',6-Tetrachlorobiphenyl	194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl
77	3,3',4,4'-Tetrachlorobiphenyl	202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl
84	2,2',3,3',6-Pentachlorobiphenyl	207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl

PCB Congener Content Evaluation

These Congener Calibration mixes have been formulated to meet the proposed International standard titled "Insulating Liquids - Contamination by PCBs - Method of Determination by Capillary Column Gas Chromatography".

Mix #1

AE-00059 — **1 x 1 mL**

AE-00059-10ML — **1 x 10 mL**

10 µg/mL each in Isooctane — 6 comps.

28	2,4,4'-Trichlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl
138	2,2',3,4,4',5'-Hexachlorobiphenyl
153	2,2',4,4',5,5'-Hexachlorobiphenyl
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl

Mix #2

AE-00060 — **1 x 1 mL**

AE-00060-10ML — **1 x 10 mL**

10 µg/mL each in Isooctane — 3 comps.

77	3,3',4,4'-Tetrachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl
169	3,3',4,4',5,5'-Hexachlorobiphenyl

Congener Calibration Mix

AE-00061 — **1 x 1 mL**

AE-00061-10ML — **1 x 10 mL**

10 µg/mL each in Isooctane — 14 comps.

18	2,2',5-Trichlorobiphenyl
28	2,4,4'-Trichlorobiphenyl
31	2,4',5-Trichlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl
138	2,2',3,4,4',5'-Hexachlorobiphenyl
149	2,2',3,4',5,6-Hexachlorobiphenyl
153	2,2',4,4',5,5'-Hexachlorobiphenyl
170	2,2',3,3',4,4',5-Heptachlorobiphenyl
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl
209	Decachlorobiphenyl

Internal Standards

Each at 100 µg/mL in Isooctane

C-030S-TP — **1 x 1 mL**

2,4,6-Trichlorobiphenyl

C-209S-TP — **1 x 1 mL**

Decachlorobiphenyl

Technical Note

These congener content evaluation mixtures have proven useful for European laboratories estimating the PCB content of a sample when following EU guideline 96/59/EU for cleanup of PCBs.

Congener Specific PCB Analysis

Formulations for Toxicity and Abundance Studies

Toxicity and Abundance Based PCB Congener Formulations
A study was conducted in 1989 by McFarland and J. Clarke [1], Environmental Occurrence, Abundance, and Potential Toxicity of Polychlorinated Biphenyl Congeners: Consideration for a Congener - Specific Analysis. The data that formed the basis for conclusions in the study have been referenced by the National Oceanic & Atmospheric Administration (NOAA) which developed a method in the same year.

Abundance Analysis
Five of the solutions AccuStandard offers are formulated to assist the investigator or analytical chemist in their own studies and can be purchased individually or as a complete set (C-SCA-SET). According to the study the 36 congeners contained in these five groups are considered environmentally threatening due to their frequency of occurrence in environmental samples, abundance in the Aroclors and potential toxicity.

Group 1a: comprises the three congeners present to a small extent in the Aroclors that are the most toxic and have been characterized as pure 3-Methyl cholanthrene - type (3-MC) inducers.

Group 1b: congeners are mixed-type inducers but are of somewhat lesser toxicity and are very abundant in the Aroclors as well as in the environment. It includes Congener #105 which, while not as prevalent, is potentially almost as toxic as the Group 1a congeners.

Group 2: includes the congeners which are Phenobarbital - type (PB) inducers for Mixed-Function Oxidase enzymes. These are less toxic but more abundant in the environment. They represent 25-41% of total PCB content found in animal tissue.

Group 3: congeners are weak- or non-inducers representing about 10% of the PCB content of tissues.

Group 4: congeners have some potential for toxicity but have very low presence in tissue.

Toxicity Analysis
A sixth solution is prepared for the analyst who is investigating the presence of PCB congeners in food and human tissues. Specific congeners are selected by K.C. Jones [2] as outlined in his article referenced below which is titled, "Determination of polychlorinated biphenyls in human food stuffs and tissues: Suggestions for a selective congener analytical approach".

Complete Set of PCB Congeners

C-SCA-SET — **5 x 1 mL**
C-SCA-01, C-SCA-02, C-SCA-03, C-SCA-04, C-SCA-05

Mix #1 Group 1a (3 MC Type Inducers)

C-SCA-01 — **1 x 1 mL**
10 µg/mL each in Isooctane — 3 comps.

77	3,3',4,4'-Tetrachlorobiphenyl	169	3,3',4,4',5,5'-Hexachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl		

Mix #2 Group 1b (Mixed Type Inducers)

C-SCA-02 — **1 x 1 mL**
10 µg/mL each in Isooctane — 6 comps.

105	2,3,3',4,4'-Pentachlorobiphenyl	138	2,2',3,4,4',5'-Hexachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl	156	2,3,3',4,4',5-Hexachlorobiphenyl
128	2,2',3,3',4,4'-Hexachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl

Mix #3 Group 2 (PB Type Inducers)

C-SCA-03 — **1 x 1 mL**
10 µg/mL each in Isooctane — 7 comps.

87	2,2',3,4,5'-Pentachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
99	2,2',4,4',5-Pentachlorobiphenyl	183	2,2',3,4,4',5',6-Heptachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl	194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl
153	2,2',4,4',5,5'-Hexachlorobiphenyl		

Mix #4 Group 3 (Non-Inducer Type)

C-SCA-04 — **1 x 1 mL**
10 µg/mL each in Isooctane — 10 comps.

18	2,2',5-Trichlorobiphenyl	74	2,4,4',5-Tetrachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	151	2,2',3,5,5',6-Hexachlorobiphenyl
49	2,2',4,5'-Tetrachlorobiphenyl	177	2,2',3,3',4',5,6-Heptachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl	187	2,2',3,4',5,5',6-Heptachlorobiphenyl
70	2,3',4',5-Tetrachlorobiphenyl	199	2,2',3,3',4,4,5,5',6'-Octachlorobiphenyl

Mix #5 Group 4 (Mixed Type Inducers present at very low levels)

C-SCA-05 — **1 x 1 mL**
10 µg/mL each in Isooctane — 10 comps.

37	3,4,4'-Trichlorobiphenyl	157	2,3,3',4,4',5-Hexachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl	158	2,3,3',4,4',6-Hexachlorobiphenyl
114	2,3,4,4',5-Pentachlorobiphenyl	167	2,3',4,4',5,5'-Hexachlorobiphenyl
119	2,3',4,4',6-Pentachlorobiphenyl	168	2,3',4,4',5',6-Hexachlorobiphenyl
123	2',3,4,4',5-Pentachlorobiphenyl	189	2,3,3',4,4',5,5'-Heptachlorobiphenyl

Mix #6 (Food & Human Tissue analysis)

C-SCA-06 — **1 x 1 mL**
10 µg/mL each in Isooctane — 32 comps.

8	2,4'-Dichlorobiphenyl	114	2,3,4,4',5-Pentachlorobiphenyl
28	2,4,4'-Trichlorobiphenyl	118	2,3',4,4',5-Pentachlorobiphenyl
37	3,4,4'-Trichlorobiphenyl	126	3,3',4,4',5-Pentachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	128	2,2',3,3',4,4'-Hexachlorobiphenyl
49	2,2',4,5'-Tetrachlorobiphenyl	138	2,2',3,4,4',5'-Hexachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl	153	2,2',4,4',5,5'-Hexachlorobiphenyl
60	2,3,4,4'-Tetrachlorobiphenyl	156	2,3,3',4,4',5-Hexachlorobiphenyl
66	2,3',4,4'-Tetrachlorobiphenyl	158	2,3,3',4,4',6-Hexachlorobiphenyl
70	2,3',4',5-Tetrachlorobiphenyl	166	2,3,4,4',5,6-Hexachlorobiphenyl
74	2,4,4',5-Tetrachlorobiphenyl	169	3,3',4,4',5,5'-Hexachlorobiphenyl
77	3,3',4,4'-Tetrachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
82	2,2',3,3',4-Pentachlorobiphenyl	179	2,2',3,3',5,6,6'-Heptachlorobiphenyl
87	2,2',3,4,5'-Pentachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
99	2,2',4,4',5-Pentachlorobiphenyl	183	2,2',3,4,4',5',6-Heptachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl	187	2,2',3,4',5,5',6-Heptachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl	189	2,3,3',4,4',5,5'-Heptachlorobiphenyl

Non-Ortho Substituted PCBs

C-SCA-DIOXLIK — **1 x 1 mL**
10 µg/mL each in Isooctane — 4 comps.

77	3,3',4,4'-Tetrachlorobiphenyl	169	3,3',4,4',5,5'-Hexachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl	81	3,4,4',5-Tetrachlorobiphenyl

Internal Standard

C-EU-IS-10ML — **1 x 10 mL**
At stated conc.(µg/mL) in Isooctane — *2 comps.*

30	2,4,6-Trichlorobiphenyl (300)	209	Decachlorobiphenyl (100)

Dutch Seven PCBs Standard

PCB-DUTCH7-SET — **7 x 1 mL**
Each at 100 µg/mL in Isooctane

PCB-DUTCH7 — **1 x 1 mL**
10 µg/mL each in Isooctane — 7 comps.

28	2,4,4'-Trichlorobiphenyl	138	2,2',3,4,4',5'-Hexachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl	153	2,2',4,4',5,5'-Hexachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl		

Literature Reference
1. V.A. McFarland and J.U. Clarke, Environmental Health Perspectives, vol. 81, pp 225-239 (1989).
2. K.C. Jones, Sci. Total Environment, vol. 68, pp 141-159 (1988).

AccuStandard is accredited to ISO 17034, 17025, and certified to ISO 9001

Congener Specific PCB Analysis

PCB Congener Mix for West Coast Fish Studies

C-WCFS **1 x 1 mL**

25 µg/mL each in Isooctane 24 comps.

31	2,4',5-Trichlorobiphenyl	132	2,2',3,3',4,6'-Hexachlorobiphenyl
33	2',3,4-Trichlorobiphenyl	141	2,2',3,4,5,5'-Hexachlorobiphenyl
49	2,2',4,5'-Tetrachlorobiphenyl	149	2,2',3,4',5,6-Hexachlorobiphenyl
56	2,3,3',4'-Tetrachlorobiphenyl	151	2,2',3,5,5',6-Hexachlorobiphenyl
60	2,3,4,4'-Tetrachlorobiphenyl	156	2,3,3',4,4',5-Hexachlorobiphenyl
70	2,3',4',5-Tetrachlorobiphenyl	158	2,3,3',4,4',6-Hexachlorobiphenyl
74	2,4,4',5-Tetrachlorobiphenyl	174	2,2',3,3',4,5,6'-Heptachlorobiphenyl
87	2,2',3,4,5'-Pentachlorobiphenyl	177	2,2',3,3',4',5,6-Heptachlorobiphenyl
95	2,2',3,5',6-Pentachlorobiphenyl	183	2,2',3,4,4',5,6-Heptachlorobiphenyl
97	2,2',3',4,5-Pentachlorobiphenyl	194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl
99	2,2',4,4',5-Pentachlorobiphenyl	198	2,2',3,3',4,5,5',6-Octachlorobiphenyl
110	2,3,3',4',6-Pentachlorobiphenyl	203	2,2',3,4,4',5,5',6-Octachlorobiphenyl

WHO/NIST/NOAA Congener List

C-WNN **1 x 1 mL**

C-WNN-PAK ***SAVE*** **5 x 1 mL**

10 µg/mL each in Isooctane 28 comps.

8	2,4'-Dichlorobiphenyl	128	2,2',3,3',4,4'-Hexachlorobiphenyl
18	2,2',5-Trichlorobiphenyl	138	2,2',3,4,4',5'-Hexachlorobiphenyl
28	2,4,4'-Trichlorobiphenyl	153	2,2',4,4',5,5'-Hexachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	156	2,3,3',4,4',5-Hexachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl	157	2,3,3',4,4',5'-Hexachlorobiphenyl
66	2,3',4,4'-Tetrachlorobiphenyl	167	2,3',4,4',5,5'-Hexachlorobiphenyl
77	3,3',4,4'-Tetrachlorobiphenyl	169	3,3',4,4',5,5'-Hexachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl	187	2,2',3,4',5,5',6-Heptachlorobiphenyl
114	2,3,4,4',5-Pentachlorobiphenyl	189	2,3,3',4,4',5,5'-Heptachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl	195	2,2',3,3',4,4',5,6-Octachlorobiphenyl
123	2',3,4,4',5-Pentachlorobiphenyl	206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl	209	Decachlorobiphenyl

World Health Organization Congener Mix

C-WHO-01 **1 x 1 mL**

2.0 µg/mL each in Isooctane 12 comps.

77	3,3',4,4'-Tetrachlorobiphenyl	118	2,3',4,4',5-Pentachlorobiphenyl	157	2,3,3',4,4',5'-Hexachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl	123	2',3,4,4',5-Pentachlorobiphenyl	167	2,3',4,4',5,5'-Hexachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl	126	3,3',4,4',5-Pentachlorobiphenyl	169	3,3',4,4',5,5'-Hexachlorobiphenyl
114	2,3,4,4',5-Pentachlorobiphenyl	156	2,3,3',4,4',5-Hexachlorobiphenyl	189	2,3,3',4,4',5,5'-Heptachlorobiphenyl

DCMA-PCB Isomer Mixture

M-002 **1 x 1 mL**

M-002-PAK ***SAVE*** **5 x 1 mL**

At stated conc. (µg/mL) in Hexane 10 comps.

1	2-Chlorobiphenyl	100	136	2,2',3,3',6,6'-Hexachlorobiphenyl	10
11	3,3'-Dichlorobiphenyl	100	185	2,2',3,4,5,5',6-Heptachlorobiphenyl	5
29	2,4,5-Trichlorobiphenyl	10	194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	5
47	2,2',4,4'-Tetrachlorobiphenyl	10	206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	5
121	2,3',4,5',6-Pentachlorobiphenyl	10	209	Decachlorobiphenyl	5

Technical Note

The Dry Color Manufacturer's Association (DCMA) recommends this type of mixture to monitor their process streams for PCBs.

CEN's Workgroup #22 for PCBs in Waste Oil

PCB-W22 **1 x 1 mL**

10 µg/mL each in Isooctane 15 comps.

PCB-W22-PAK ***SAVE*** **5 x 1 mL**

PCB-W22-SET **15 x 1 mL**

Each at 100 µg/mL in Isooctane

18	2,2',5-Trichlorobiphenyl	52	2,2',5,5'-Tetrachlorobiphenyl	149	2,2',3,4',5,6-Hexachlorobiphenyl
20	2,3,3'-Trichlorobiphenyl	101	2,2',4,5,5'-Pentachlorobiphenyl	153	2,2',4,4',5,5'-Hexachlorobiphenyl
28	2,4,4'-Trichlorobiphenyl	105	2,3,3',4,4'-Pentachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
31	2,4',5-Trichlorobiphenyl	118	2,3',4,4',5-Pentachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	138	2,2',3,4,4',5'-Hexachlorobiphenyl	194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl

Technical Note

The Comité Europeen de Normalisation (CEN) has assigned Workgroup Number 22 in Hamburg, Germany to develop a method for "PCBs" in waste oil.

Dioxin-Like Congeners

C-DIOXLIK		**(-01)**	**(-02)**	**(-03)**	**(-04)**	**(-05)**	**(-06)**	**(-07)**	**(-08)**	**(-09)**	**(-10)**	**(-11)**	**(-12)**
At stated conc. (ng/mL) in Nonane		Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12
77	3,3',4,4'-Tetrachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
81	3,4,4',5-Tetrachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
105	2,3,3',4,4'-Pentachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
114	2,3,4,4',5-Pentachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
118	2,3',4,4',5-Pentachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
123	2',3,4,4',5-Pentachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
126	3,3',4,4',5-Pentachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
156	2,3,3',4,4',5-Hexachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
157	2,3,3',4,4',5'-Hexachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
167	2,3',4,4',5,5'-Hexachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
169	3,3',4,4',5,5'-Hexachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	0.05	0.1	0.2	0.5	1	2	5	10	20	50	100	250

C-DIOXLIK1-SET **5 x 1 mL**

C-DIOXLIK-02, C-DIOXLIK-04, C-DIOXLIK-06, C-DIOXLIK-08, C-DIOXLIK-10

C-DIOXLIK2-SET **5 x 1 mL**

C-DIOXLIK-03, C-DIOXLIK-05, C-DIOXLIK-07, C-DIOXLIK-09, C-DIOXLIK-11

C-DIOXLIK3-SET **5 x 1 mL**

C-DIOXLIK-04, C-DIOXLIK-06, C-DIOXLIK-08, C-DIOXLIK-10, C-DIOXLIK-12

Levels can be individually purchased.

C-DIOXLIK-01 **1 x 1 mL**

PCB Congener Calibration Mixtures

9 Mixtures provide All 209 Congeners - Present in Aroclors

PCB Congener Mix #1

C-CS-01 — **1 x 1 mL**

10 µg/mL each in Isooctane — 39 comps.

1	2-Chlorobiphenyl
2	3-Chlorobiphenyl ¤
3	4-Chlorobiphenyl
4	**2,2'-Dichlorobiphenyl**
6	**2,3'-Dichlorobiphenyl**
8	**2,4'-Dichlorobiphenyl**
9	2,5-Dichlorobiphenyl
16	**2,2',3-Trichlorobiphenyl**
18	**2,2',5-Trichlorobiphenyl**
19	2,2',6-Trichlorobiphenyl
22	**2,3,4'-Trichlorobiphenyl**
25	2,3',4-Trichlorobiphenyl
28	**2,4,4'-Trichlorobiphenyl**
44	**2,2',3,5'-Tetrachlorobiphenyl**
52	**2,2',5,5'-Tetrachlorobiphenyl**
56	**2,3,3',4'-Tetrachlorobiphenyl**
66	**2,3',4,4'-Tetrachlorobiphenyl**
67	2,3',4,5-Tetrachlorobiphenyl
71	2,3',4',6-Tetrachlorobiphenyl
74	**2,4,4',5-Tetrachlorobiphenyl**
82	**2,2',3,3',4-Pentachlorobiphenyl**
87	**2,2',3,4,5'-Pentachlorobiphenyl**
99	**2,2',4,4',5-Pentachlorobiphenyl**
110	**2,3,3',4',6-Pentachlorobiphenyl**
138	**2,2',3,4,4',5'-Hexachlorobiphenyl**
146	**2,2',3,4',5,5'-Hexachlorobiphenyl**
147	2,2',3,4',5,6-Hexachlorobiphenyl ¤
153	**2,2',4,4',5,5'-Hexachlorobiphenyl**
173	2,2',3,3',4,5,6-Heptachlorobiphenyl
174	**2,2',3,3',4,5,6'-Heptachlorobiphenyl**
177	**2,2',3,3',4',5,6-Heptachlorobiphenyl**
179	**2,2',3,3',5,6,6'-Heptachlorobiphenyl**
180	**2,2',3,4,4',5,5'-Heptachlorobiphenyl**
187	**2,2',3,4',5,5',6-Heptachlorobiphenyl**
194	**2,2',3,3',4,4',5,5'-Octachlorobiphenyl**
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl
203	**2,2',3,4,4',5,5',6-Octachlorobiphenyl**
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl

PCB Congener Mix #4

C-CS-04 — **1 x 1 mL**

10 µg/mL each in Isooctane — 22 comps.

13	3,4'-Dichlorobiphenyl
14	3,5-Dichlorobiphenyl ¤
35	3,3',4-Trichlorobiphenyl
51	2,2',4,6'-Tetrachlorobiphenyl
53	2,2',5,6'-Tetrachlorobiphenyl
54	2,2',6,6'-Tetrachlorobiphenyl ¤
73	2,3',5',6-Tetrachlorobiphenyl ¤
75	2,4,4',6-Tetrachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl ¤
90	2,2',3,4',5-Pentachlorobiphenyl ¤
100	2,2',4,4',6-Pentachlorobiphenyl ¤
117	2,3,4',5,6-Pentachlorobiphenyl
122	2',3,3',4,5-Pentachlorobiphenyl
124	2',3,4,5,5'-Pentachlorobiphenyl
130	2,2',3,3',4,5'-Hexachlorobiphenyl
154	2,2',4,4',5,6'-Hexachlorobiphenyl ¤
163	**2,3,3',4',5,6-Hexachlorobiphenyl**
165	2,3,3',5,5',6-Hexachlorobiphenyl ¤
175	2,2',3,3',4,5',6-Heptachlorobiphenyl
200	2,2',3,3',4,5,6,6'-Octachlorobiphenyl
201	2,2',3,3',4,5',6,6'-Octachlorobiphenyl
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl

PCB Congener Mix #2

C-CS-02 — **1 x 1 mL**

10 µg/mL each in Isooctane — 36 comps.

5	2,3-Dichlorobiphenyl
7	2,4-Dichlorobiphenyl
10	2,6-Dichlorobiphenyl
17	**2,2',4-Trichlorobiphenyl**
24	2,3,6-Trichlorobiphenyl
26	**2,3',5-Trichlorobiphenyl**
31	**2,4',5-Trichlorobiphenyl**
32	**2,4',6-Trichlorobiphenyl**
37	**3,4,4'-Trichlorobiphenyl**
41	2,2',3,4-Tetrachlorobiphenyl
45	**2,2',3,6-Tetrachlorobiphenyl**
46	2,2',3,6'-Tetrachlorobiphenyl
48	**2,2',4,5-Tetrachlorobiphenyl**
60	**2,3,4,4'-Tetrachlorobiphenyl**
70	**2,3',4',5-Tetrachlorobiphenyl**
83	2,2',3,3',5-Pentachlorobiphenyl
84	**2,2',3,3',6-Pentachlorobiphenyl**
95	**2,2',3,5',6-Pentachlorobiphenyl**
103	2,2',4,5',6-Pentachlorobiphenyl ¤
107	2,3,3',4',5-Pentachlorobiphenyl
115	2,3,4,4',6-Pentachlorobiphenyl
131	2,2',3,3',4,6-Hexachlorobiphenyl
132	**2,2',3,3',4,6'-Hexachlorobiphenyl**
135	**2,2',3,3',5,6'-Hexachlorobiphenyl**
141	**2,2',3,4,5,5'-Hexachlorobiphenyl**
149	**2,2',3,4',5,6-Hexachlorobiphenyl**
164	2,3,3',4',5,6-Hexachlorobiphenyl
170	**2,2',3,3',4,4',5-Heptachlorobiphenyl**
171	**2,2',3,3',4,4',6-Heptachlorobiphenyl**
172	2,2',3,3',4,5,5'-Heptachlorobiphenyl
178	2,2',3,3',5,5',6-Heptachlorobiphenyl
183	**2,2',3,4,4',5,6-Heptachlorobiphenyl**
193	2,3,3',4',5,5',6-Heptachlorobiphenyl
196	2,2',3,3',4,4',5,6-Octachlorobiphenyl
197	2,2',3,3',4,4',6,6'-Octachlorobiphenyl
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl

PCB Congener Mix #5

C-CS-05 — **1 x 1 mL**

10 µg/mL each in Isooctane — 20 comps.

12	3,4-Dichlorobiphenyl
33	**2',3,4-Trichlorobiphenyl**
49	**2,2',4,5'-Tetrachlorobiphenyl**
59	2,3,3',6-Tetrachlorobiphenyl
63	2,3,4',5-Tetrachlorobiphenyl
64	**2,3,4',6-Tetrachlorobiphenyl**
77	3,3',4,4'-Tetrachlorobiphenyl
85	**2,2',3,4,4'-Pentachlorobiphenyl**
91	2,2',3,4',6-Pentachlorobiphenyl
97	**2,2',3',4,5-Pentachlorobiphenyl**
104	2,2',4,6,6'-Pentachlorobiphenyl ¤
114	2,3,4,4',5-Pentachlorobiphenyl
123	2',3,4,4',5-Pentachlorobiphenyl
129	2,2',3,3',4,5-Hexachlorobiphenyl
137	2,2',3,4,4',5-Hexachlorobiphenyl
156	**2,3,3',4,4',5-Hexachlorobiphenyl**
167	2,3',4,4',5,5'-Hexachlorobiphenyl
176	2,2',3,3',4,6,6'-Heptachlorobiphenyl
185	2,2',3,4,5,5',6-Heptachlorobiphenyl
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl

PCB Congener Mix #3

C-CS-03 — **1 x 1 mL**

10 µg/mL each in Isooctane — 27 comps.

15	**4,4'-Dichlorobiphenyl**
20	2,3,3'-Trichlorobiphenyl
27	2,3',6-Trichlorobiphenyl
29	2,4,5-Trichlorobiphenyl
34	2',3,5-Trichlorobiphenyl
40	2,2',3,3'-Tetrachlorobiphenyl
42	**2,2',3,4'-Tetrachlorobiphenyl**
47	**2,2',4,4'-Tetrachlorobiphenyl**
69	2,3',4,6-Tetrachlorobiphenyl ¤
92	2,2',3,5,5'-Pentachlorobiphenyl
93	2,2',3,5,6-Pentachlorobiphenyl ¤
101	**2,2',4,5,5'-Pentachlorobiphenyl**
105	**2,3,3',4,4'-Pentachlorobiphenyl**
118	**2,3',4,4',5-Pentachlorobiphenyl**
119	2,3',4,4',6-Pentachlorobiphenyl
128	**2,2',3,3',4,4'-Hexachlorobiphenyl**
134	2,2',3,3',5,6-Hexachlorobiphenyl
136	**2,2',3,3',6,6'-Hexachlorobiphenyl**
144	2,2',3,4,5',6-Hexachlorobiphenyl
151	**2,2',3,5,5',6-Hexachlorobiphenyl**
157	2,3,3',4,4',5'-Hexachlorobiphenyl
158	2,3,3',4,4',6-Hexachlorobiphenyl
190	2,3,3',4,4',5,6-Heptachlorobiphenyl
191	**2,3,3',4,4',5',6-Heptachlorobiphenyl**
207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl ¤
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl
209	Decachlorobiphenyl ¤

Congener Calibration Solution Sets

Containing all 209 PCB congeners

C-CSQ-SET — **9 x 1 mL**

C-CS-01	C-CS-04	C-CS-07
C-CS-02	C-CS-05	C-CS-08
C-CS-03	C-CS-06	C-CS-09

Congeners found in Aroclor® 1242, 1254 and 1260

C-CSA-SET — **5 x 1 mL**

C-CS-01	C-CS-03	C-CS-05
C-CS-02	C-CS-04	

Reference Key

non-Bold = Congener in any of Aroclors 1242, 1254 or 1260 @ < 1.0 Wt.%

Bold = Congener in any of Aroclors 1242, 1254 or 1260 @ > 1.0 Wt.%

¤ = Congener not in any of the 3 Aroclors @ > 0.05 Wt.%

Bold congeners related to mixes #6, 7 & 8 marginally above 0.05 Wt.%, except #43 @ 0.24 Wt.% in Aroclor 1242.

Some “non-Aroclor” congeners assigned to Mixes 1-5 to reduce coelutions and number of mixes needed.

PCB Congener Calibration Mixtures

9 Mixtures provide All 209 Congeners - NOT Present in Aroclors

PCB Congener Mix #6

C-CS-06 — **1 x 1 mL**

10 µg/mL each in Isooctane — 18 comps.

11	3,3'-Dichlorobiphenyl ¤
21	2,3,4-Trichlorobiphenyl ¤
38	3,4,5-Trichlorobiphenyl ¤
50	2,2',4,6-Tetrachlorobiphenyl ¤
57	2,3,3',5-Tetrachlorobiphenyl ¤
61	2,3,4,5-Tetrachlorobiphenyl ¤
65	2,3,5,6-Tetrachlorobiphenyl ¤
86	2,2',3,4,5-Pentachlorobiphenyl ¤
102	2,2',4,5,6'-Pentachlorobiphenyl ¤
113	2,3,3',5',6-Pentachlorobiphenyl ¤
126	3,3',4,4',5-Pentachlorobiphenyl ¤
127	3,3',4,5,5'-Pentachlorobiphenyl ¤
133	2,2',3,3',5,5'-Hexachlorobiphenyl ¤
139	2,2',3,4,4',6-Hexachlorobiphenyl ¤
145	2,2',3,4,6,6'-Hexachlorobiphenyl ¤
161	2,3,3',4,5',6-Hexachlorobiphenyl ¤
169	3,3',4,4',5,5'-Hexachlorobiphenyl ¤
181	2,2',3,4,4',5,6-Heptachlorobiphenyl

PCB Congener Mix #7

C-CS-07 — **1 x 1 mL**

10 µg/mL each in Isooctane — 14 comps.

36	3,3',5-Trichlorobiphenyl ¤
72	2,3',5,5'-Tetrachlorobiphenyl ¤
78	3,3',4,5-Tetrachlorobiphenyl ¤
79	3,3',4,5'-Tetrachlorobiphenyl ¤
89	2,2',3,4,6'-Pentachlorobiphenyl ¤
96	2,2',3,6,6'-Pentachlorobiphenyl ¤
98	2,2',3',4,6-Pentachlorobiphenyl ¤
106	2,3,3',4,5-Pentachlorobiphenyl ¤
108	2,3,3',4,5'-Pentachlorobiphenyl ¤
152	2,2',3,5,6,6'-Hexachlorobiphenyl ¤
166	2,3,4,4',5,6-Hexachlorobiphenyl ¤
182	2,2',3,4,4',5,6'-Heptachlorobiphenyl ¤
184	2,2',3,4,4',6,6'-Heptachlorobiphenyl ¤
204	2,2',3,4,4',5,6,6'-Octachlorobiphenyl ¤

PCB Congener Mix #8

C-CS-08 — **1 x 1 mL**

10 µg/mL each in Isooctane — 12 comps.

30	2,4,6-Trichlorobiphenyl ¤
43	2,2',3,5-Tetrachlorobiphenyl ¤
55	2,3,3',4-Tetrachlorobiphenyl ¤
58	2,3,3',5'-Tetrachlorobiphenyl ¤
76	2',3,4,5-Tetrachlorobiphenyl ¤
109	2,3,3',4,6-Pentachlorobiphenyl ¤
112	2,3,3',5,6-Pentachlorobiphenyl ¤
120	2,3',4,5,5'-Pentachlorobiphenyl ¤
159	2,3,3',4,5,5'-Hexachlorobiphenyl ¤
186	2,2',3,4,5,6,6'-Heptachlorobiphenyl ¤
192	2,3,3',4,5,5',6-Heptachlorobiphenyl ¤
198	2,2',3,3',4,5,5',6-Octachlorobiphenyl ¤

PCB Congener Mix #9

C-CS-09 — **1 x 1 mL**

10 µg/mL each in Isooctane — 21 comps.

23	2,3,5-Trichlorobiphenyl ¤
39	3,4',5-Trichlorobiphenyl ¤
62	2,3,4,6-Tetrachlorobiphenyl ¤
68	2,3',4,5'-Tetrachlorobiphenyl ¤
80	3,3',5,5'-Tetrachlorobiphenyl ¤
88	2,2',3,4,6-Pentachlorobiphenyl ¤
94	2,2',3,5,6'-Pentachlorobiphenyl ¤
111	2,3,3',5,5'-Pentachlorobiphenyl ¤
116	2,3,4,5,6-Pentachlorobiphenyl ¤
121	2,3',4,5',6-Pentachlorobiphenyl ¤
125	2',3,4,5,6'-Pentachlorobiphenyl ¤
140	2,2',3,4,4',6'-Hexachlorobiphenyl ¤
142	2,2',3,4,5,6-Hexachlorobiphenyl ¤
143	2,2',3,4,5,6'-Hexachlorobiphenyl ¤
148	2,2',3,4',5,6'-Hexachlorobiphenyl ¤
150	2,2',3,4',6,6'-Hexachlorobiphenyl ¤
155	2,2',4,4',6,6'-Hexachlorobiphenyl ¤
160	2,3,3',4,5,6-Hexachlorobiphenyl ¤
162	2,3,3',4',5,5'-Hexachlorobiphenyl ¤
168	2,3',4,4',5',6-Hexachlorobiphenyl ¤
188	2,2',3,4',5,6,6'-Heptachlorobiphenyl ¤

Congener Calibration Solution Sets

Containing all 209 PCB congeners

C-CSQ-SET — **9 x 1 mL**

C-CS-01	C-CS-04	C-CS-07
C-CS-02	C-CS-05	C-CS-08
C-CS-03	C-CS-06	C-CS-09

Non-Aroclor congeners

C-CSN-SET — **4 x 1 mL**

C-CS-06	C-CS-08	C-CS-09
C-CS-07		

Reference Key

non-Bold = Congener in any of Aroclors 1242, 1254 or 1260 @ < 1.0 Wt.%

Bold = Congener in any of Aroclors 1242, 1254 or 1260 @ > 1.0 Wt.%

¤ = Congener not in any of the 3 Aroclors @ > 0.05 Wt.%

Bold congeners related to mixes #6, 7 & 8 marginally above 0.05 Wt.%, except #43 @ 0.24 Wt.% in Aroclor 1242.

Some “non-Aroclor” congeners assigned to Mixes 1-5 to reduce coelutions and number of mixes needed.

PCB Congener Calibration Mixtures

Method 525.3 PCB and PAHs

Method 525.3 PCB and PAH Standard

M-525.3-01 **1 x 1 mL**
500 µg/mL each in Acetone 30 comps.

2-Chlorobiphenyl
4-Chlorobiphenyl
2,4'-Dichlorobiphenyl
2,2',5-Trichlorobiphenyl
2,4,4'-Trichlorobiphenyl
2,2',3,5'-Tetrachlorobiphenyl
2,2',5,5'-Tetrachlorobiphenyl
2,3',4',5-Tetrachlorobiphenyl
2,3,3',4',6-Pentachlorobiphenyl
2,3',4,4',5-Pentachlorobiphenyl
2,2',3,4,4',5'-Hexachlorobiphenyl
2,2',3,4',5',6-Hexachlorobiphenyl
2,2',4,4',5,5'-Hexachlorobiphenyl
2,2',3,4,4',5,5'-Heptachlorobiphenyl
Acenaphthylene
Anthracene
Benz(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Benz[a]pyrene
Chrysene
Dibenz(a,h)anthracene
Fluorene
Hexachlorobenzene
Indeno(1,2,3-cd)pyrene
Isophorone
Pentachlorophenol
Phenanthrene
Pyrene

Method 680 PCB Analytes

Internal Standards

M-680-IS **1 x 1 mL**
M-680-IS-PAK ***SAVE*** **5 x 1 mL**
75 µg/mL each in Hexane:Toluene (50:50) 2 comps.

M-680-IS-10X **1 x 1 mL**
M-680-IS-10X-PAK ***SAVE*** **5 x 1 mL**
750 µg/mL each in Hexane:Toluene (50:50) 2 comps.

Chrysene-d_{12} Phenanthrene-d_{10}

PCB Locator Mixture

M-PCBL **1 x 1 mL**
M-PCBL-PAK ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in Isooctane 5 comps.

Aroclor 1242	0.5	3-Chlorobiphenyl	0.1
Aroclor 1260	0.5	Decachlorobiphenyl	0.1
2-Chlorobiphenyl	0.1		

Retention Time Calibration Standard

M-680-RT **1 x 1 mL**
M-680-RT-PAK ***SAVE*** **5 x 1 mL**
At stated conc. (µg/mL) in Hexane 3 comps.

77	3,3',4,4'-Tetrachlorobiphenyl	100
104	2,2',4,6,6'-Pentachlorobiphenyl	100
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	200

Tuning Standard

M-680-TS **1 x 1 mL**
M-680-TS-PAK ***SAVE*** **5 x 1 mL**
10 µg/mL in CH_2Cl_2

Decafluorotriphenylphosphine (DFTPP)

The EPA has designated the following isomers for use in quantifying PCBs by GC/MS. The PCBs are identified and measured as isomer groups (i.e., by level of chlorination). Concentration is measured for each PCB isomer group; total PCB concentration in each sample extract is obtained by summing isomer group concentrations.

Level of Chlorination	Isomer Selected	Congener Number	RF Value vs. Chrysene-d_{12}	Mean RF Value vs. Chrysene-d_{12}
1	2-mono	1	0.899	0.925
2	2,3-di	5	0.651	0.642
3	2,4,5-tri	29	0.411	0.411
4	2,2'4,6-tetra	50	0.305	0.431
5	2,2',3,4,5'-penta	87	0.299	0.287
6	2,2',4,4',5,6'-hexa	154	0.254	0.254
7	2,2',3,4',5,6,6'-hepta	188	0.164	0.160
8	2,2',3,3',4,5',6,6'-octa	201	0.207	0.191
9,10	deca	209	0.144	0.150

PCB Isomer Calibration Mix

M-680A **1 x 1 mL**
At stated conc. (µg/mL) in Hexane 9 comps.

1	2-Chlorobiphenyl	50
5	2,3-Dichlorobiphenyl	50
29	2,4,5-Trichlorobiphenyl	50
50	2,2',4,6-Tetrachlorobiphenyl	100
87	2,2',3,4,5'-Pentachlorobiphenyl	100
154	2,2',4,4',5,6'-Hexachlorobiphenyl	100
188	2,2',3,4',5,6,6'-Heptachlorobiphenyl	150
201	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	150
209	Decachlorobiphenyl	250

Internal Standard

M-680B **1 x 1 mL**
250 µg/mL in Toluene

Chrysene-d_{12}

PCB Isomer Calibration Set

M-680-SET **2 x 1 mL**
M-680A, M-680B

Instrument Test Solutions

PCB Window Defining Mixture

C-WDM **1 x 1 mL**
C-WDM-PAK ***SAVE*** **5 x 1 mL**
2.5 µg/mL each in Isooctane 20 comps.

	Biphenyl
1	2-Chlorobiphenyl
3	4-Chlorobiphenyl
10	2,6-Dichlorobiphenyl
15	4,4'-Dichlorobiphenyl
19	2,2',6-Trichlorobiphenyl
37	3,4,4'-Trichlorobiphenyl
54	2,2',6,6'-Tetrachlorobiphenyl
77	3,3',4,4'-Tetrachlorobiphenyl
104	2,2',4,6,6'-Pentachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl
155	2,2',4,4',6,6'-Hexachlorobiphenyl
169	3,3',4,4',5,5'-Hexachlorobiphenyl
188	2,2',3,4',5,6,6'-Heptachlorobiphenyl
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
209	Decachlorobiphenyl

DIN 38407-3 PCB PWDM Mix

C-WDM-H-R1 **1 x 1 mL**
C-WDM-H-R1-10ML **1 x 10 mL**
2.5 µg/mL each in n-Hexane 21 comps.

same as C-WDM, except
2,2',6-Tri, replaced with 2,4,6-Trichlorobiphenyl, plus 2,2',3,3',4,4',5,5'-Octachlorobiphenyl

PCB Calibration Check Solution

C-CCSEC **1 x 1 mL**
C-CCSEC-PAK ***SAVE*** **5 x 1 mL**
100 µg/mL each in Acetone 20 comps.

C-CCSEC-R **1 x 1 mL**
C-CCSEC-R-PAK ***SAVE*** **5 x 1 mL**
C-CCSEC plus 2,2',3,3',4,5',6,6'-Octachlorobiphenyl 21 comps.

8	2,4'-Dichlorobiphenyl
18	2,2',5-Trichlorobiphenyl
28	2,4,4'-Trichlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl
66	2,3',4,4'-Tetrachlorobiphenyl
77	3,3',4,4'-Tetrachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl
128	2,2',3,3',4,4'-Hexachlorobiphenyl
138	2,2',3,4,4',5'-Hexachlorobiphenyl
153	2,2',4,4',5,5'-Hexachlorobiphenyl
170	2,2',3,3',4,4',5-Heptachlorobiphenyl
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
187	2,2',3,4',5,5',6-Heptachlorobiphenyl
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
209	Decachlorobiphenyl

PCB/Selective Ion Monitoring Solution

PCB-SIM **1 x 1 mL**
PCB-SIM-PAK ***SAVE*** **5 x 1 mL**
At stated conc.(µg/mL) in Hexane 12 comps.

1	2-Chlorobiphenyl	10
5	2,3-Dichlorobiphenyl	10
29	2,4,5-Trichlorobiphenyl	10
104	2,2',4,6,6'-Pentachlorobiphenyl	20
87	2,2',3,4,5'-Pentachlorobiphenyl	20
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	40
50	2,2',4,6-Tetrachlorobiphenyl	20
209	Decachlorobiphenyl	50
77	3,3',4,4'-Tetrachlorobiphenyl	20
200	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	30
186	2,2',3,4',5,6,6'-Heptachlorobiphenyl	30
154	2,2',4,4',5,6'-Hexachlorobiphenyl	20

Technical Note

For use with 5% phenyl methyl silicone type columns.

EPA Method 8082

Method 8082/8082A PCBs by Capillary Column GC by ECD or ELCD

PCB Congeners Mix

M-8082 — **1 x 1 mL**
M-8082-PAK — *SAVE* **5 x 1 mL**
100 µg/mL each in Hexane — 19 comps.

1	2-Chlorobiphenyl	137	2,2',3,4,4',5-Hexachlorobiphenyl
5	2,3-Dichlorobiphenyl	141	2,2',3,4,5,5'-Hexachlorobiphenyl
18	2,2',5-Trichlorobiphenyl	151	2,2',3,5,5',6-Hexachlorobiphenyl
31	2,4',5-Trichlorobiphenyl	153	2,2',4,4',5,5'-Hexachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
66	2,3',4,4'-Tetrachlorobiphenyl	183	2,2',3,4,4',5',6-Heptachlorobiphenyl
87	2,2',3,4,5'-Pentachlorobiphenyl	187	2,2',3,4',5,5',6-Heptachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl	206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
110	2,3,3',4',6-Pentachlorobiphenyl		

Reformulated PCB Congeners Mix

M-8082A — **1 x 1 mL**
M-8082A-PAK — *SAVE* **5 x 1 mL**
100 µg/mL each in Hexane — 19 comps.

1	2-Chlorobiphenyl	138	2,2',3,4,4',5'-Hexachlorobiphenyl
5	2,3-Dichlorobiphenyl	141	2,2',3,4,5,5'-Hexachlorobiphenyl
18	2,2',5-Trichlorobiphenyl	151	2,2',3,5,5',6-Hexachlorobiphenyl
31	2,4',5-Trichlorobiphenyl	153	2,2',4,4',5,5'-Hexachlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl	170	2,2',3,3',4,4',5-Heptachlorobiphenyl
52	2,2',5,5'-Tetrachlorobiphenyl	180	2,2',3,4,4',5,5'-Heptachlorobiphenyl
66	2,3',4,4'-Tetrachlorobiphenyl	183	2,2',3,4,4',5',6-Heptachlorobiphenyl
87	2,2',3,4,5'-Pentachlorobiphenyl	187	2,2',3,4',5,5',6-Heptachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl	206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
110	2,3,3',4',6-Pentachlorobiphenyl		

Internal Standards

M-8082-ISC-WL-10ML — **1 x 10 mL**
M-8082-ISC-WL-10ML-PAK — *SAVE* **5 x 10 mL**
5 µg/mL in Hexane

Decachlorobiphenyl

M-8082-SSC-WL-10ML — **1 x 10 mL**
M-8082-SSC-WL-10ML-PAK — *SAVE* **5 x 10 mL**
5 µg/mL in Acetone

Tetrachloro-*m*-xylene (TCMX)

Internal Standards

C-209S-H — **1 x 1 mL**
100 µg/mL in Hexane

C-209S-H-10X — **1 x 1 mL**
1.0 mg/mL in Hexane

Decachlorobiphenyl

Internal and Surrogate Standard

CLP-032-H-5X — **1 x 1 mL**
1.0 mg/mL each in Hexane — 2 comps.

Decachlorobiphenyl — Tetrachloro-*m*-xylene (TCMS)

Surrogate Standards

M-8082-SSA-WL-10ML — **1 x 10 mL**
M-8082-SSA-WL-10ML-PAK — *SAVE* **5 x 10 mL**
5 µg/mL in Acetone

Decachlorobiphenyl

M-8082-SS — **1 x 1 mL**
100 µg/mL in Hexane

M-8082-SS-10X — **1 x 1 mL**
1.0 mg/mL in Hexane

Tetrachloro-*m*-xylene (TCMX)

Method 8082 Aroclor 1016/1260 Calibration Check

Aroclor 1016/1260 Calibration Check Set

C-216-260-CAL-SET — **6 x 1 mL**
At stated conc. (ng/mL) in Isooctane — 4 comps.

Components	Level 1	Level 2 (2X)	Level 3 (5X)	Level 4 (10X)	Level 5 (15X)	Level 6 (20X)
Aroclor 1016	50	100	250	500	750	1000
Aroclor 1260	50	100	250	500	750	1000
Decachlorobiphenyl	10	20	50	100	150	200
Tetrachloro-*m*-xylene	10	20	50	100	150	200

Level 3 Daily Working Level

Low level check

C-216-260-WL-5X-5ML — **1 x 5 mL**
C-216-260-WL-5X-10ML — **1 x 10 mL**
At stated conc. (ng/mL) in Isooctane

Level 4 Daily Working Level

Higher level check

C-216-260-WL-10X-5ML — **1 x 5 mL**
C-216-260-WL-10X-10ML — **1 x 10 mL**
At stated conc. (ng/mL) in Isooctane

Method 8082A Polychlorinated Biphenyl (PCBs) by GC/ECD

Individual PCB Congener Solutions

Congener	35 µg/mL in Isooctane	100 µg/mL in Isooctane	Unit
2-Chlorobiphenyl	C-001S	C-001S-TP	1 mL
2,3-Dichlorobiphenyl	C-005S	C-005S-TP	1 mL
2,2',5-Trichlorobiphenyl	C-018S	C-018S-TP	1 mL
2,4',5-Trichlorobiphenyl	C-031S	C-031S-TP	1 mL
2,2',3,5'-Tetrachlorobiphenyl	C-044S	C-044S-TP	1 mL
2,2',5,5'-Tetrachlorobiphenyl	C-052S	C-052S-TP	1 mL
2,3',4,4'-Tetrachlorobiphenyl	C-066S	C-066S-TP	1 mL
2,2',3,4,5'-Pentachlorobiphenyl	C-087S	C-087S-TP	1 mL
2,2',4,5,5'-Pentachlorobiphenyl	C-101S	C-101S-TP	1 mL
2,3,3',4',6-Pentachlorobiphenyl	C-110S	C-110S-TP	1 mL
2,2',3,4,4',5-Hexachlorobiphenyl	C-137S	C-137S-TP	1 mL
2,2',3,4,4',5'-Hexachlorobiphenyl	C-138S	C-138S-TP	1 mL
2,2',3,4,5,5'-Hexachlorobiphenyl	C-141S	C-141S-TP	1 mL
2,2',3,5,5',6-Hexachlorobiphenyl	C-151S	C-151S-TP	1 mL
2,2',4,4',5,5'-Hexachlorobiphenyl	C-153S	C-153S-TP	1 mL
2,2',3,3',4,4',5-Heptachlorobiphenyl	C-170S	C-170S-TP	1 mL
2,2',3,4,4',5,5'-Heptachlorobiphenyl	C-180S	C-180S-TP	1 mL
2,2',3,4,4',5',6-Heptachlorobiphenyl	C-183S	C-183S-TP	1 mL
2,2',3,4',5,5',6-Heptachlorobiphenyl	C-187S	C-187S-TP	1 mL
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	C-206S	C-206S-TP	1 mL

Aroclors® (Industrial PCBs)

Aroclors

Aroclor Neat and Solutions in Isooctane, at Listed Concentration (Individuals, PAKs, Sets)

Neats & Solutions	N Neat	TP Isooctane	M Methanol Matrix		Isooctane 35 µg/mL	Unit	SAVE 5 x 1 mL	Isooctane 100 µg/mL	Unit
Aroclor 1016	C-216N		NEAT	100 mg	C-216S	1 mL	C-216S-PAK	C-216S-TP	1 mL
	C-216S-TP-10X		1000 µg/mL	1 mL					
Aroclor 1221	C-221N-50MG		NEAT	50 mg	C-221S	1 mL	C-221S-PAK	C-221S-TP	1 mL
Aroclor 1232	----		----		C-232S	1 mL	C-232S-PAK	C-232S-TP	1 mL
Aroclor 1242	C-242N-50MG		NEAT	50 mg	C-242S	1 mL	C-242S-PAK	C-242S-TP	1 mL
Aroclor 1248	C-248N-50MG		NEAT	50 mg	C-248S	1 mL	C-248S-PAK	C-248S-TP	1 mL
Aroclor 1254	C-254N-50MG		NEAT	50 mg	C-254S	1 mL	C-254S-PAK	C-254S-TP	1 mL
Aroclor 1260	C-260S-TP-10X		100 µg/mL	1 mL	C-260S	1 mL	C-260S-PAK	C-260S-TP	1 mL
	C-260S-M-143X		5000 µg/mL	1 mL					
Aroclor 1262	C-262N-50MG		NEAT	50 mg	C-262S	1 mL	C-262S-PAK	C-262S-TP	1 mL
Aroclor 1268	----		----	----	C-268S	1 mL	C-268S-PAK	C-268S-TP	1 mL
				SET	**Z-008S-SET**	**9 x 1 mL**			

Aroclor Solutions in Methanol, 3 Concentrations (Individuals, PAKs, Sets)

Aroclor #	MeOH 35 µg/mL	Unit	SAVE 5 x 1 mL	MeOH 100 µg/mL	Unit	MeOH 1000 µg/mL	Unit
Aroclor 1016	C-216S-M	1 mL	C-216S-M-PAK	C-216S-M-2.85X	1 mL	C-216S-M-28.5X	1 mL
Aroclor 1221	C-221S-M	1 mL	C-221S-M-PAK	C-221S-M-2.85X	1 mL	----	-----
Aroclor 1232	C-232S-M	1 mL	C-232S-M-PAK	C-232S-M-2.85X	1 mL	----	-----
Aroclor 1242	C-242S-M	1 mL	C-242S-M-PAK	C-242S-M-2.85X	1 mL	----	-----
Aroclor 1248	C-248S-M	1 mL	C-248S-M-PAK	C-248S-M-2.85X	1 mL	----	-----
Aroclor 1254	C-254S-M	1 mL	C-254S-M-PAK	C-254S-M-2.85X	1 mL	C-254S-M-28.5X	1 mL
Aroclor 1260	C-260S-M	1 mL	C-260S-M-PAK	C-260S-M-2.85X	1 mL	C-260S-M-28.5X	1 mL
Aroclor 1262	C-262S-M	1 mL	C-262S-M-PAK	C-262S-M-2.85X	1 mL	----	-----
Aroclor 1268	C-268S-M	1 mL	C-268S-M-PAK	C-268S-M-2.85X	1 mL	----	-----
SET	**Z-008S-M-SET**	**9 x 1 mL**					

Aroclor Solutions in Hexane, 2 Concentrations (Indiv., PAKs, Sets)

Aroclor #	Hexane 100 µg/mL	Unit	Hexane 1000 µg/mL	Unit	SAVE 5 x 1 mL
Aroclor 1016	C-216S-H	1 mL	C-216S-H-10X	1 mL	C-216S-H-10X-PAK
Aroclor 1221	C-221S-H	1 mL	C-221S-H-10X	1 mL	C-221S-H-10X-PAK
Aroclor 1232	C-232S-H	1 mL	C-232S-H-10X	1 mL	C-232S-H-10X-PAK
Aroclor 1242	C-242S-H	1 mL	C-242S-H-10X	1 mL	C-242S-H-10X-PAK
Aroclor 1248	C-248S-H	1 mL	C-248S-H-10X	1 mL	C-248S-H-10X-PAK
Aroclor 1254	C-254S-H	1 mL	C-254S-H-10X	1 mL	C-254S-H-10X-PAK
Aroclor 1260	C-260S-H	1 mL	C-260S-H-10X	1 mL	C-260S-H-10X-PAK
Aroclor 1262	C-262S-H	1 mL	C-262S-H-10X	1 mL	C-262S-H-10X-PAK
Aroclor 1268	C-268S-H	1 mL	C-268S-H-10X	1 mL	C-268S-H-10X-PAK
SETS	**Z-008S-H-SET**	**9 x 1 mL**	**Z-008S-H-10X-SET**	**9 x 1 mL**	

Solutions in PCB-Free Transformer Oil (Individuals and PAKs 2 Concentrations)

Aroclor # CAS No.	Conc. ppm w/w	Individual Cat. No.	Unit	SAVE 5 x 1 mL
Aroclor 1016	50	C-216-ST-1	1 mL	C-216-ST-1-PAK
12674-11-2	500	C-216-ST-2	1 mL	C-216-ST-2-PAK
Aroclor 1221	50	C-221-ST-1	1 mL	C-221-ST-1-PAK
11104-28-2	500	C-221-ST-2	1 mL	C-221-ST-2-PAK
Aroclor 1232	50	C-232-ST-1	1 mL	C-232-ST-1-PAK
11141-16-5	500	C-232-ST-2	1 mL	C-232-ST-2-PAK
Aroclor 1242	50	C-242-ST-1	1 mL	C-242-ST-1-PAK
53469-21-9	500	C-242-ST-2	1 mL	C-242-ST-2-PAK
Aroclor 1248	50	C-248-ST-1	1 mL	C-248-ST-1-PAK
12672-29-6	500	C-248-ST-2	1 mL	C-248-ST-2-PAK
Aroclor 1254	50	C-254-ST-1	1 mL	C-254-ST-1-PAK
11097-69-1	500	C-254-ST-2	1 mL	C-254-ST-2-PAK
Aroclor 1260	50	C-260-ST-1	1 mL	C-260-ST-1-PAK
11096-82-5	500	C-260-ST-2	1 mL	C-260-ST-2-PAK
Aroclor 1262	50	C-262-ST-1	1 mL	C-262-ST-1-PAK
37324-23-5	500	C-262-ST-2	1 mL	C-262-ST-2-PAK
Aroclor 1268	50	C-268-ST-1	1 mL	C-268-ST-1-PAK
11100-14-4	500	C-268-ST-2	1 mL	C-268-ST-2-PAK

Aroclor-free Transformer Oil

T-W130 1 x 1 mL

Aroclors 1221 & 1254 Similar but Different

C-221S-SET 2 x 1 mL
C-221S-TYPE1* and **C-221S-TYPE2***
C-254S-SET 2 x 1 mL
C-254S-TYPE1* and **C-254S-TYPE2***
Solutions in these sets are 35 µg/mL in Isooctane

All Standards cited in this monograph are bonafide and unadulterated Monsanto product.

Reference Standards of Aroclor Mixtures (for GC analysis)

Technical mixtures of PCBs (Aroclors) were manufactured by Monsanto from the 1930s through 1977. In some instances there was an alteration in the manufacturing process which resulted in a more radical components change than the usual variations.

This was the case for a particular batch of Aroclor 1254 (54% Chlorine by weight) that was chlorinated in two stages rather than the usual one. The product of the two stage manufacturing process was a material containing higher concentrations of the more toxic non-ortho substituted congeners.

Consequently, the analyst may have to identify and quantify two distinct types of Aroclor 1254. For different reasons there also exist two distinct types of Aroclor 1221. To eliminate any confusion when encountering these Aroclors, AccuStandard offers all four variations.

Technical Note

AccuStandard has formulated these standards for use in determining the concentrations of Aroclors (Industrial PCBs), specific PCB congeners, or "total PCBs". Additional Aroclor stock solutions are available at higher concentrations and in other solvents.

Aroclors® (Industrial PCBs)

Technical Note

Major Isomer Components of Aroclor 1254

Aroclor 1254 was the most commonly used of the industrial PCB fluids. This list contains congeners which constitute the majority of the components in this material.

In Aroclor 1254 only the following congeners may be found at > 0.5% by weight include: 44, 49, 52, 56, 64, 66, 70, 74, 82, 84, 85, 87, 91, 92, 95, 97, 99, 101, 105, 110, 118, 128, 130, 132, 135, 136, 138, 141, 146, 149, 151, 153, 156, 158, 163, 170, 180.

- The coplanar polychlorinated biphenyl (PCB) congeners 77, 126, and 169 are recognized as the most toxic components of Aroclors.
- The major problem in isolation of these PCB congeners is the separation of 110 from 77.
- A simple cleanup procedure using alumina is proposed for the fractionation of the Aroclors on alumina which allows the isolation and analysis of the coplanar PCB congeners (1).
- The proposed internal standard 3,3',4,4'-Tetrabromobiphenyl (B-077S) enhances the accuracy of the procedure.

3,3',4,4'-Tetrabromobiphenyl is used as an Internal Standard to identify and quantify the coplanar components of Aroclors

(1) Analysis of coplanar PCB congeners in Aroclors using alumina column cleanup. Jerry W. Anderson, ManTech Environmental Technology, Inc., R.S. Kerr Environmental Research Laboratory, U.S. Environmental Protection Agency, P.O. Box 1198, Ada, OK 74820 - Pittsburgh Conference, March 1992, New Orleans

Custom Formulations

Custom Standards offer an efficient and economical option when our listed catalog products do not match your exact testing requirements. With decades of experience in manufacturing Certified Reference Material (CRMs), AccuStandard can formulate quality custom standards that are uniquely made to meet your exact specifications. Our Custom CRMs follow our ISO17034 quality guidelines offering convenience, but most importantly reliability and confidence. Our commitment to quality goes above and beyond by offering shelf life extension testing to all our organic custom CRMs included in our custom standard service.

Why buy AccuStandard's Custom Standards?

- Fast and knowledgeable quotations
- Experienced technical support to answer your questions
- Formulation is carefully evaluated for stability and compatibility
- Concentrations are certified gravimetrically and verified analytically
- Balances used are calibrated daily against NIST traceable weights
- Certificate of Analysis (COA) provided as well as chromatograms (when requested)

To request a custom formulation visit our website at:

https://www.accustandard.com/custom-quote-request or call to talk with a quotation specialist.

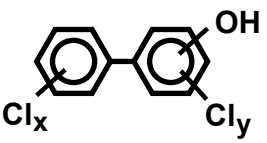
Custom Synthesis

AccuStandard specializes in synthesizing chemicals of high purity to be used as reference standards. Custom synthesis capabilities range from milligram to kilogram scale. Our Synthesis Department employs several PhD Organic Chemists with many years of pertinent academic and industrial experience. We have developed hundreds of pure chemical compounds for companies, research, academic institutions and governmental agencies around the world.

Featured in AccuStandard's history of firsts are all of the 209 congeners of polychlorinated biphenyls (PCBs) and all of the 209 congeners of polybrominated diphenyl ethers (PBDEs).

The synthesis of many organic pollutants and their metabolites are an integral part of the department's efforts to provide the community with previously unavailable standards.

PCB Metabolites



Hydroxy PCBs

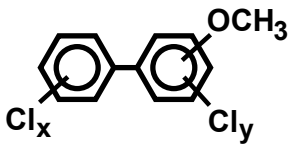
Compound	CAS No.	NEAT Cat. No.	Unit	100 µg/mL in Isooctane Cat. No.	Unit
2-Hydroxy-5-chlorobiphenyl	607-12-5	HPCB-1001N	5 mg	HPCB-1001S	1 mL
4-Hydroxy-2-chlorobiphenyl	23719-22-4	HPCB-1002N	5 mg	HPCB-1002S	1 mL
4-Hydroxy-3-chlorobiphenyl	92-04-6	HPCB-1003N	5 mg	HPCB-1003S	1 mL
4-Hydroxy-4'-chlorobiphenyl	28034-99-3	HPCB-1004N	10 mg	HPCB-1004S	1 mL
2-Hydroxy-2',5'-dichlorobiphenyl	53905-30-9	HPCB-2001N	10 mg	HPCB-2001S	1 mL
3-Hydroxy-2',5'-dichlorobiphenyl	53905-29-6	HPCB-2002N	10 mg	HPCB-2002S	1 mL
4-Hydroxy-2',5'-dichlorobiphenyl	53905-28-5	HPCB-2003N	10 mg	HPCB-2003S	1 mL
4-Hydroxy-3,5-dichlorobiphenyl	1137-59-3	HPCB-2004N	10 mg	HPCB-2004S	1 mL
2-Hydroxy-2',3'-dichlorobiphenyl		HPCB-2005N	10 mg	HPCB-2005S	1 mL
2-Hydroxy-3',4'-dichlorobiphenyl		HPCB-2006N	10 mg	HPCB-2006S	1 mL
2-Hydroxy-2',4',6'-trichlorobiphenyl		HPCB-3001N	10 mg	HPCB-3001S	1 mL
2-Hydroxy-2',5,5'-trichlorobiphenyl		HPCB-3002N	10 mg	HPCB-3002S	1 mL
3-Hydroxy-2',4',6'-trichlorobiphenyl		HPCB-3003N	10 mg	HPCB-3003S	1 mL
4-Hydroxy-2,2',5'-trichlorobiphenyl	53905-33-2	HPCB-3004N	5 mg	HPCB-3004S	1 mL
4-Hydroxy-2',3,5'-trichlorobiphenyl		HPCB-3005N	5 mg	HPCB-3005S	1 mL
4-Hydroxy-2',4',6'-trichlorobiphenyl	14962-28-8	HPCB-3006N	10 mg	HPCB-3006S	1 mL
2-Hydroxy-2',3',4',5'-tetrachlorobiphenyl		HPCB-4001N	10 mg	HPCB-4001S	1 mL
2-Hydroxy-2',3',5',6'-tetrachlorobiphenyl		HPCB-4002N	10 mg	HPCB-4002S	1 mL
2-Hydroxy-2',4',5,6'-tetrachlorobiphenyl		HPCB-4003N	10 mg	HPCB-4003S	1 mL
3-Hydroxy-2',3',4',5'-tetrachlorobiphenyl	67651-37-0	HPCB-4004N	10 mg	HPCB-4004S	1 mL
3-Hydroxy-2',3',5',6'-tetrachlorobiphenyl		HPCB-4005N	10 mg	HPCB-4005S	1 mL
4-Hydroxy-2,2',4',6'-tetrachlorobiphenyl	150304-08-8	HPCB-4006N	5 mg	HPCB-4006S	1 mL
4-Hydroxy-2',3',4',5'-tetrachlorobiphenyl	67651-34-7	HPCB-4007N	10 mg	HPCB-4007S	1 mL
4-Hydroxy-2',3,4',6'-tetrachlorobiphenyl		HPCB-4008N	5 mg	HPCB-4008S	1 mL
4-Hydroxy-2',3,5,5'-tetrachlorobiphenyl	245084-57-5	HPCB-4009N	10 mg	HPCB-4009S	1 mL
4-Hydroxy-2',3',5',6'-tetrachlorobiphenyl	14962-32-4	HPCB-4010N	10 mg	HPCB-4010S	1 mL
4'-Hydroxy-3,3',4,5'-tetrachlorobiphenyl	111810-41-4	----------	----------	HPCB-4011S	1 mL
3-Hydroxy-2,2',6,6'-tetrachlorobiphenyl		----------	----------	HPCB-4012S	1 mL
2-Hydroxy-2',3,5,6'-tetrachlorobipheny		----------	----------	HPCB-4013S	1 mL
5-Hydroxy-2,2',4,6'-tetrachlorobiphenyl		----------	----------	HPCB-4014S	1 mL
4,4'-Dihydroxy-2,2',6,6'-tetrachlorobiphenyl		----------	----------	HPCB-4015S	1 mL
4,6'-Dihydroxy-2,2',4',6-tetrachlorobiphenyl		----------	----------	HPCB-4016S	1 mL
2-Hydroxy-2',3',4',5,5'-pentachlorobiphenyl	67651-36-9	HPCB-5001N	10 mg	HPCB-5001S	1 mL
2-Hydroxy-2',3',5,5',6'-pentachlorobiphenyl		HPCB-5002N	10 mg	HPCB-5002S	1 mL
4-Hydroxy-2,2',3',4',5'-pentachlorobiphenyl		HPCB-5003N	5 mg	HPCB-5003S	1 mL
4-Hydroxy-2,2',3',5',6'-pentachlorobiphenyl		HPCB-5004N	5 mg	HPCB-5004S	1 mL
4-Hydroxy-2',3,3',4',5'-pentachlorobiphenyl	192190-09-3	HPCB-5005N	5 mg	HPCB-5005S	1 mL
4-Hydroxy-2',3,3',5',6'-pentachlorobiphenyl		HPCB-5006N	5 mg	HPCB-5006S	1 mL
4-Hydroxy-2',3,4',5,6'-pentachlorobiphenyl		HPCB-5007N	10 mg	HPCB-5007S	1 mL
3-Hydroxy-2,2',4',5,5'-pentachlorobiphenyl	69278-58-6	----------	----------	HPCB-5008S	1 mL
4-Hydroxy-2,2',4',5,5'-pentachlorobiphenyl		----------	----------	HPCB-5009S	1 mL
2-Hydroxy-2',3,4',5',6-pentachlorobiphenyl		----------	----------	HPCB-5010S	1 mL
4-Hydroxy-2',3,3',4',5,5'-hexachlorobiphenyl	158076-63-2	HPCB-6001N	10 mg	HPCB-6001S	1 mL
4-Hydroxy-2',3,3',5,5',6'-hexachlorobiphenyl		HPCB-6002N	10 mg	HPCB-6002S	1 mL
5-Hydroxy-2,2',3,4,4',5'-hexachlorobiphenyl		----------	----------	HPCB-6003S	1 mL
4'-Hydroxy-2,2',3,3',4,5,5'-heptachlorobiphenyl		----------	----------	HPCB-7001S	1 mL
3'-Hydroxy-2,2',3,4,4',5,6'-heptachlorobiphenyl		----------	----------	HPCB-7002S	1 mL
3'-Hydroxy-2,2',3,4,4',5,5'-heptachlorobiphenyl		----------	----------	HPCB-7003S	1 mL
5-Hydroxy-2,2',3,4,4',5',6-heptachlorobiphenyl		----------	----------	HPCB-7004S	1 mL

Metabolite and Degradation Reference Material Importance to the Environment

As environmental testing progresses researchers realize that often the original compounds are not the ones found in the ecosystem. In real-world samples, metabolites and degradation products of well-known common chemical pollutants, such as PCBs and BDEs, are becoming much more prevalent. These compounds are found in soil, water, and wildlife samples. This occurs as the parent compounds are leached out of waste and are exposed to rainwater, sunlight, and other environmental factors. The original materials form new compounds, most often the methoxy or the hydroxy derivatives of the original molecule. Sometimes substitutions of the halogens occur and chlorinated moieties are found.

The problem with these newly found pollutants is that they are not commercial chemicals. This means they are not readily available as reference materials. Not having a reference material makes the identification and quantification of these materials extremely difficult. In order to support the research into these degradates, AccuStandard has worked with many different researchers to synthesize the novel compounds that they require for their work. By having these materials available, scientists can learn more about the environmental fate and true impact of pollutants.

PCB Metabolites



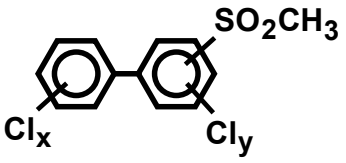
Methoxy PCBs

Compound	100 µg/mL in Isooctane Cat. No.	Unit	Compound	100 µg/mL in Isooctane Cat. No.	Unit
2-Methoxy-5-chlorobiphenyl	MOPCB-1001S	1 mL	2-Methoxy-2',3',4',5'-tetrachlorobiphenyl	MOPCB-4001S	1 mL
4-Methoxy-2-chlorobiphenyl	MOPCB-1002S	1 mL	2-Methoxy-2',3',5',6'-tetrachlorobiphenyl	MOPCB-4002S	1 mL
4-Methoxy-3-chlorobiphenyl	MOPCB-1003S	1 mL	2-Methoxy-2',4',5,6'-tetrachlorobiphenyl	MOPCB-4003S	1 mL
4-Methoxy-4'-chlorobiphenyl	MOPCB-1004S	1 mL	3-Methoxy-2',3',4',5'-tetrachlorobiphenyl	MOPCB-4004S	1 mL
2-Methoxy-3-chlorobiphenyl	MOPCB-1005S	1 mL	3-Methoxy-2',3',5',6'-tetrachlorobiphenyl	MOPCB-4005S	1 mL
3-Methoxy-5-chlorobiphenyl	MOPCB-1006S	1 mL	4-Methoxy-2',3',4',5'-tetrachlorobiphenyl	MOPCB-4007S	1 mL
2-Methoxy-3'-chlorobiphenyl	MOPCB-1007S	1 mL	4-Methoxy-2',3,4',6'-tetrachlorobiphenyl	MOPCB-4008S	1 mL
3-Methoxy-3'-chlorobiphenyl	MOPCB-1008S	1 mL	4-Methoxy-2',3,5,5'-tetrachlorobiphenyl	MOPCB-4009S	1 mL
4-Methoxy-3'-chlorobiphenyl	MOPCB-1009S	1 mL	4-Methoxy-2',3',5',6'-tetrachlorobiphenyl	MOPCB-4010S	1 mL
2-Methoxy-2',5'-dichlorobiphenyl	MOPCB-2001S	1 mL	3-Methoxy-2,2',6,6'-tetrachlorobiphenyl	MOPCB-4012S-0.5X *	1 mL
3-Methoxy-2',5'-dichlorobiphenyl	MOPCB-2002S	1 mL	2-Methoxy-2',3',4',5,5'-pentachlorobiphenyl	MOPCB-5001S	1 mL
4-Methoxy-2',5'-dichlorobiphenyl	MOPCB-2003S	1 mL	2-Methoxy-2',3',5,5',6'-pentachlorobiphenyl	MOPCB-5002S	1 mL
4-Methoxy-3,5-dichlorobiphenyl	MOPCB-2004S	1 mL	4-Methoxy-2,2',3',4',5'-pentachlorobiphenyl	MOPCB-5003S	1 mL
2-Methoxy-2',3'-dichlorobiphenyl	MOPCB-2005S	1 mL	4-Methoxy-2,2',3',5',6'-pentachlorobiphenyl	MOPCB-5004S	1 mL
2-Methoxy-3',4'-dichlorobiphenyl	MOPCB-2006S	1 mL	4-Methoxy-2',3,4',5,6'-pentachlorobiphenyl	MOPCP-5007S	1 mL
2-Methoxy-2',4',6'-trichlorobiphenyl	MOPCB-3001S	1 mL	4-Methoxy-2,2',4',5,5'-pentachlorobiphenyl	MOPCB-5009S	1 mL
2-Methoxy-2',5,5'-trichlorobiphenyl	MOPCB-3002S	1 mL	2-Methoxy-2',3,4',5',6-pentachlorobiphenyl	MOPCB-5010S	1 mL
3-Methoxy-2',4',6'-trichlorobiphenyl	MOPCB-3003S	1 mL	4-Methoxy-2',3,3',4',5,5'-hexachlorobiphenyl	MOPCB-6001S	1 mL
4-Methoxy-2,2',5'-trichlorobiphenyl	MOPCB-3004S	1 mL	5-Methoxy-2,2',3,4,4',5'-hexachlorobiphenyl	MOPCB-6003S	1 mL
4-Methoxy-2',3,5'-trichlorobiphenyl	MOPCB-3005S	1 mL	4'-Methoxy-2,2',3,3',4,5,5'-heptachlorobiphenyl	MOPCB-7001S-0.5X *	1 mL
4-Methoxy-2',4',6'-trichlorobiphenyl	MOPCB-3006S	1 mL	5-Methoxy-2,2',3,4,4',5',6-heptachlorobiphenyl	MOPCB-7004S-0.5X *	1 mL

*** at 50 µg/mL in Isooctane**

Methylsulfonyl PCB Congeners

Compound	CAS No.	50 µg/mL in Isooctane Cat. No.	Unit
3-Methylsulfonyl-2,2',4',5-tetrachlorobiphenyl	116807-52-4	MSCB-3049	1 mL
3-Methylsulfonyl-2,2',5,5'-tetrachlorobiphenyl	60640-54-2	MSCB-3052	1 mL
3-Methylsulfonyl-2,3',4',5-tetrachlorobiphenyl	116807-53-5	MSCB-3070	1 mL
3-Methylsulfonyl-2,2',3',4',5-pentachlorobiphenyl	66640-58-2	MSCB-3087	1 mL
3-Methylsulfonyl-2,2',4',5,6-pentachlorobiphenyl	149949-86-0	MSCB-3091	1 mL
3-Methylsulfonyl-2,2',3',5,6'-pentachlorobiphenyl		MSCB-3095	1 mL
3-Methylsulfonyl-2,2',4',5,5'-pentachlorobiphenyl	66640-60-6	MSCB-3101	1 mL
3-Methylsulfonyl-2,3',4',5,6-pentachlorobiphenyl	116807-23-9	MSCB-3110	1 mL
3-Methylsulfonyl-2,2',3',4',5,6-hexachlorobiphenyl	149949-90-6	MSCB-3132	1 mL
3-Methylsulfonyl-2,2',3',4',5,5'-hexachlorobiphenyl	104086-18-2	MSCB-3141	1 mL
3-Methylsulfonyl-2,2',4',5,5',6-hexachlorobiphenyl	149949-88-2	MSCB-3149	1 mL
3-Methylsulfonyl-2,2',3',4',5,5',6-heptachlorobiphenyl		MSCB-3174	1 mL
4-Methylsulfonyl-2,2',4',5-tetrachlorobiphenyl	69797-52-0	MSCB-4049	1 mL
4-Methylsulfonyl-2,2',5,5'-tetrachlorobiphenyl	60640-55-3	MSCB-4052	1 mL
4-Methylsulfonyl-2,3,4',6-tetrachlorobiphenyl	108736-08-9	MSCB-4064	1 mL
4-Methylsulfonyl-2,3',4',5-tetrachlorobiphenyl	69797-51-9	MSCB-4070	1 mL
4-Methylsulfonyl-2,2',3',4',5-pentachlorobiphenyl	66640-59-3	MSCB-4087	1 mL
4-Methylsulfonyl-2,2',4',5,6-pentachlorobiphenyl	149949-87-1	MSCB-4091	1 mL
4-Methylsulfonyl-2,2',3',5,6'-pentachlorobiphenyl		MSCB-4095	1 mL
4-Methylsulfonyl-2,2',4',5,5'-pentachlorobiphenyl	66640-61-7	MSCB-4101	1 mL
4-Methylsulfonyl-2,2',4',5,6'-pentachlorobiphenyl		MSCB-4103	1 mL
4-Methylsulfonyl-2,3,3',4',6-pentachlorobiphenyl	149949-89-3	MSCB-4110	1 mL
4-Methylsulfonyl-2,2',3,3',4',6-hexachlorobiphenyl	104086-16-0	MSCB-4132	1 mL
4-Methylsulfonyl-2,2',3',4',5,5'-hexachlorobiphenyl	104086-19-3	MSCB-4141	1 mL
4-Methylsulfonyl-2,2',3,4',5',6-hexachlorobiphenyl	116806-76-9	MSCB-4149	1 mL
4-Methylsulfonyl-2,2',3',4',5,5',6-heptachlorobiphenyl	153310-30-6	MSCB-4174	1 mL
3-Methylsulfonyl-4-methyl-2',3',4',5,5'-pentachlorobiphenyl (ISTD)		MSCB-IS	1 mL

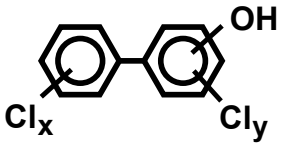


Technical Note

Only the 3- and 4-MeSO$_2$-PCBs with chlorine atoms in the 2,5- or 2,3,6-position have been found in environmental samples, and therefore only those are offered by AccuStandard.

Hydroxybiphenyls

Compound	CAS No.	NEAT Cat. No.	Unit	100 µg/mL in MeOH Cat. No.	Unit
2-Hydroxybiphenyl	90-43-7	HBP-001N	100 mg	HBP-001S	1 mL
3-Hydroxybiphenyl	580-51-8	HBP-002N	100 mg	HBP-002S	1 mL
4-Hydroxybiphenyl	92-69-3	HBP-003N	100 mg	HBP-003S	1 mL
2,2'-Dihydroxybiphenyl	1806-29-7	HBP-004N	100 mg	HBP-004S	1 mL
4,4'-Dihydroxybiphenyl	92-88-6	HBP-006N	100 mg	HBP-006S	1 mL
2,5-Dihydroxybiphenyl	1079-21-6	HBP-009N	100 mg	HBP-009S	1 mL



Halogenated Aromatics (other than PCBs)

Polychlorinated Terphenyls (PCTs) have physical and chemical properties similar to PCBs, and may contain up to 10% of PCBs within the product matrix. They have been used as plasticizers, fire retardants, and in various types of coatings. AccuStandard offers 20 PCT congeners to aid in the monitoring and enviromental impact of these pollutants.

Polychlorinated Terphenyls (PCTs)

Compound	CAS No.	Conc.	Matrix	Cat. No.	Unit
o-Terphenyl	84-15-1		NEAT	T-001N	100 mg
m-Terphenyl	92-06-8		NEAT	T-002N	100 mg
p-Terphenyl	92-94-4		NEAT	T-003N	100 mg
Tetradecachloro-o-terphenyl		35 µg/mL	Toluene	T-004S	1 mL
Tetradecachloro-m-terphenyl	42429-88-9	35 µg/mL	Toluene	T-005S	1 mL
Tetradecachloro-p-terphenyl		35 µg/mL	Toluene	T-006S	1 mL
4-Chloro-o-terphenyl		50 µg/mL	Toluene	T-007S	1 mL
4-Chloro-p-terphenyl	1762-83-0	50 µg/mL	Toluene	T-008S	1 mL
2,4-Dichloro-p-terphenyl	61576-83-8	50 µg/mL	Toluene	T-009S	1 mL
2,5-Dichloro-o-terphenyl	61577-02-4	50 µg/mL	Toluene	T-010S	1 mL
2,5-Dichloro-m-terphenyl		50 µg/mL	Toluene	T-011S	1 mL
2,5-Dichloro-p-terphenyl	61576-86-1	50 µg/mL	Toluene	T-012S	1 mL
2,4,6-Trichloro-p-terphenyl	57346-61-9	50 µg/mL	Toluene	T-013S	1 mL
2,3,5,6-Tetrachloro-p-terphenyl	61576-99-6	50 µg/mL	Toluene	T-014S	1 mL
2,4,4",6-Tetrachloro-p-terphenyl	61576-97-4	50 µg/mL	Toluene	T-015S	1 mL
2,3,4,5,6-Pentachloro-p-terphenyl	61577-01-3	50 µg/mL	Toluene	T-016S	1 mL
Aroclor 5432	63496-31-1	35 µg/mL	Toluene	T-432S	1 mL
Aroclor 5442	12642-23-8	35 µg/mL	Toluene	T-442S	1 mL
Aroclor 5460	11126-42-4	35 µg/mL	Toluene	T-460S	1 mL
Aroclor 6050		35 µg/mL	Toluene	T-6050S	1 mL

Perchlorinated Aromatics

Compound	CAS No.	Conc.	Matrix	Cat. No.	Unit
Decachlorobiphenyl	2051-24-3			C-209S	1 mL
Hexachlorobenzene	118-74-1		NEAT	A-012	100 mg
Octachlorodibenzofuran	39001-02-0		NEAT	F-801N	50 mg
		50 µg/mL	Toluene	F-801S	1 mL
Octachlorodibenzo-p-dioxin	3268-87-9		NEAT	D-801N	50 mg
		50 µg/mL	Toluene	D-801S	1 mL
Octachloronaphthalene	2234-13-1	100 µg/mL	MeOH	N-003S	1 mL
Octachlorostyrene	29082-74-4	35 µg/mL	Toluene	PC-001S	1 mL
Perchlorinated p,p'-DDE		35 µg/mL	Toluene	PC-002S	1 mL
Tetradecachloro-o-terphenyl	42429-88-9	35 µg/mL	Toluene	T-004S	1 mL
Tetradecachloro-m-terphenyl	42429-89-0	35 µg/mL	Toluene	T-005S	1 mL
Tetradecachloro-p-terphenyl		35 µg/mL	Toluene	T-006S	1 mL

Halogenated Aromatics (other than PCBs)

Compound	CAS No.	Conc.	Matrix	Cat. No.	Unit
Decafluorobiphenyl	434-90-2	10 µg/mL	Acetone	M-551.1-SS	1 mL
		0.1 mg/mL	ACN	M-8310-SS	1 mL
		0.2 mg/mL	CH_2Cl_2	M-625-04	1 mL
		1 mg/mL	Acetone	M-551.1-SS-100X	1 mL
		2 mg/mL	CH_2Cl_2	M-625-04-10X	1 mL
4,4'-Dibromobiphenyl	92-86-4	0.1 mg/mL	Ethyl acetate	M-508.1-SS	1 mL
		0.2 mg/mL	CH_2Cl_2	M-625-05	1 mL
		1 mg/mL	Acetone	M-8111-IS-20X	1 mL
		2 mg/mL	CH_2Cl_2	M-625-05-10X	1 mL
4,4'-Dibromooctafluorobiphenyl	10386-84-2	0.2 mg/mL	CH_2Cl_2	M-625-06	1 mL
		2 mg/mL	CH_2Cl_2	M-625-06-10X	1 mL
2,2'-Difluorobiphenyl	388-82-9	0.2 mg/mL	CH_2Cl_2	M-625-07	1 mL
		1 mg/mL	MeOH	M-1653-IIS	1 mL
		2 mg/mL	CH_2Cl_2	M-625-07-10X	1 mL
		5 mg/mL	Acetone	M-1653-IIS-R	1 mL
4,4'-Difluorobiphenyl	398-23-2	0.1 mg/mL	ACN	M-550-IS	1 mL
2-Fluorobiphenyl	321-60-8	0.2 mg/mL	CH_2Cl_2	M-625-09	1 mL
		2 mg/mL	CH_2Cl_2	M-625-09-10X	1 mL
Halowax 1000	58718-66-4		NEAT	N-1000N	10 mg
Halowax 1001	58718-67-5		NEAT	N-1001N	10 mg
Halowax 1013	1321-64-8	0.1 mg/mL	MeOH	N-1013S	1 mL
Halowax 1014	1335-87-1	0.1 mg/mL	MeOH	N-1014S	1 mL
Halowax 1051		0.1 mg/mL	MeOH	N-1051S	1 mL
Halowax 1099	39450-05-0	0.1 mg/mL	MeOH	N-1099S	1 mL
		5 mg/mL	MeOH	AS-E0470	1 mL
Octachloronaphthalene	2234-13-1	100 µg/mL	MeOH	N-003S	1 mL

Halogenated Aromatics (other than PCBs)

Polychlorinated Naphthalenes (PCNs) were produced in high volumes from the 1920s through the 1950s. They were used primarily as wood preservatives, engine oil additives, and raw materials for dye production. Primary exposure sources are from waste incineration emissions, landfill disposal of items containing PCNs, treatment of municipal drinking water with chlorine, and food contamination. Recent data indicates that PCNs are widespread in foods throughout the world.

Polychlorinated Naphthalenes

Halowaxes (Koppers PCNs)

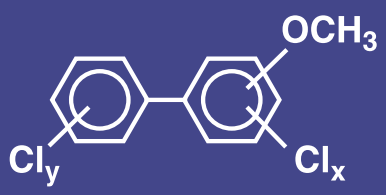
Compound	CAS No.	Conc	Matrix	Cat. No.	Unit
Halowax 1000	58718-66-4		NEAT	N-1000N	10 mg
Halowax 1001	58718-67-5		NEAT	N-1001N	10 mg
Halowax 1013 (56 %Cl)	1321-64-8	100 µg/mL	MeOH	N-1013S	1 mL
Halowax 1014 (62 %Cl)	1335-87-1	100 µg/mL	MeOH	N-1014S	1 mL
Halowax 1051 (70 %Cl)		100 µg/mL	MeOH	N-1051S	1 mL
Halowax 1099 (52 %Cl)	39450-05-0		NEAT	N-1099N	10 mg
		100 µg/mL	MeOH	N-1099S	1 mL

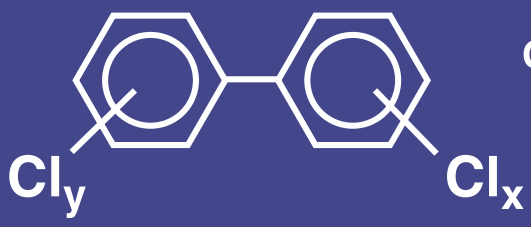
Polychlorinated Naphthalene Congeners

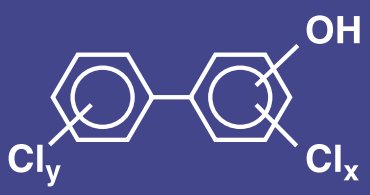
Naphthalene	91-20-3		NEAT	H-152N	100 mg
		50 µg/mL	Toluene	H-152S	1 mL
1-Chloronaphthalene	90-13-1		NEAT	N-001N	100 mg
2-Chloronaphthalene	91-58-7		NEAT	N-002N	100 mg
1,4-Dichloronaphthalene	1825-31-6		NEAT	N-004N	10 mg
Octachloronaphthalene	2234-13-1	100 µg/mL	MeOH	N-003S	1 mL
1,2,3,4-Tetrachloronaphthalene	20020-02-4		NEAT	N-005N	10 mg

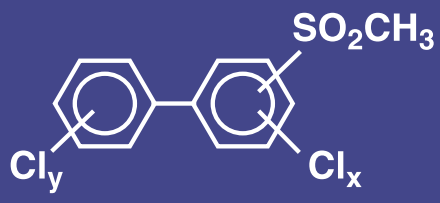
Chlorinated Diphenyl Ethers

Compound	CAS No.	Conc	Matrix	Cat. No.	Unit
4-Chlorodiphenyl ether	7005-72-3		NEAT	CDE-003N	10 mg
		50 µg/mL	Isooctane	CDE-003S	1 mL
2,4-Dichorodiphenyl ether			NEAT	CDE-007N	10 mg
		50 µg/mL	Isooctane	CDE-007S	1 mL
4,4'-Dichlorodiphenyl ether	2444-89-5		NEAT	CDE-015N	10 mg
		50 µg/mL	Isooctane	CDE-015S	1 mL
2,2',4,4'-Tetrachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-047S	1 mL
3,3',4,4'-Tetrachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-077S	1 mL
3,3',5,5'-Tetrachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-080S	1 mL
2,2',4,4',5-Pentachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-099S	1 mL
2,2,4,4',6-Pentachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-100S	1 mL
2,3,3',4,4'-Pentachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-105S	1 mL
2,3',4,4',5-Pentachlorodiphenyl ether	60123-65-1		NEAT	CDE-118N	1 mL
		50 µg/mL	Isooctane	CDE-118S	1 mL
2,2',4,4',5,5'-Hexachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-153S	1 mL
2,2',4,4',5,6'-Hexachlorodiphenyl ether		50 µg/mL	Isooctane	CDE-154S	1 mL
Decachlorodiphenyl ether	31710-30-2	10 mg	NEAT	CDE-209N	10 mg
		50 µg/mL	Isooctane	CDE-209S	1 mL









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