

# PCB Congeners

## EU Formulations

### PCB Congener Content Evaluation Mix 1

Scope: Determination of water, waste water and sludge for polychlorinated biphenyls.  
**AE-00059-H-2X** 1 x 1 mL  
**AE-00059-H-2X-10ML** 1 x 10 mL  
 20 µg/mL each in n-Hexane 6 comps.

BZ#	
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

### DIN 38407-3 PCB Mix

Scope: Determination of water, waste water and sludge for polychlorinated biphenyls.  
**DIN38407-3-01** 1 x 1 mL  
**DIN38407-3-01-10ML** 1 x 10 mL  
 20 µg/mL each in n-Hexane 17 comps.

BZ#	
77	3,3',4,4'-Tetrachlorobiphenyl
81	3,4,4',5-Tetrachlorobiphenyl
126	3,3',4,4',5-Pentachlorobiphenyl
169	3,3',4,4',5,5'-Hexachlorobiphenyl
33	2',3,4-Trichlorobiphenyl
53	2,2',5,6'-Tetrachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl
110	2,3,3',4',6-Pentachlorobiphenyl
114	2,3,4,4',5-Pentachlorobiphenyl
118	2',3,4,4',5-Pentachlorobiphenyl
123	2',3,4,4',5-Pentachlorobiphenyl
149	2,2',3,4',5',6-Hexachlorobiphenyl
156	2,3,3',4,4',5-Hexachlorobiphenyl
157	2,3,3',4,4',5'-Hexachlorobiphenyl
167	2,3',4,4',5,5'-Hexachlorobiphenyl
170	2,2',3,3',4,4',5-Heptachlorobiphenyl
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl

### DIN 38407-3 PCB PWDM Mix

Scope: Determination of water, waste water and sludge for polychlorinated biphenyls.  
**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.

BZ#	
1	2-Chlorobiphenyl
3	4-Chlorobiphenyl
10	2,6-Dichlorobiphenyl
15	4,4'-Dichlorobiphenyl
30	2,4,6-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
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
208	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
209	Decachlorobiphenyl
133	Biphenyl

### DIN 38414-20 Internal Standard

Scope: Determination of 6 PCBs in water, waste water and sludge by GC/ECD  
**DIN38414-20-IS** 1 x 1 mL  
**DIN38414-20-IS-10ML** 1 x 10 mL  
 10 µg/mL in Hexane

BZ#	
209	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl

### DIN 38414-20 PCBs

Scope: Determination of 6 PCBs in water, waste water and sludge by GC/ECD.

Internal standard: PCB 209 is an internal standard at 10 µg/mL for this method.  
**DIN38414-20** 1 x 1 mL  
**DIN38414-20-10ML** 1 x 10 mL  
 10 µg/mL each in Hexane 6 comps.

BZ#	
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

### ISO 6468 PCB Standard

Scope: Water quality determination of certain organochlorine insecticides, polychlorine biphenyls and chlorobenzenes by GC after liquid-liquid extraction.

**ISO6468-PCB** 1 x 1 mL  
 10 µg/mL each in n-Hexane 7 comps.

BZ#	
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
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl

### PCB Congener Content Evaluation Mix #1

**AE-00059** 1 x 1 mL  
**AE-00059-10ML** 1 x 10 mL  
 10 µg/mL each in Isooctane 6 comps.

BZ#	
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

### PCB Congener Content Evaluation Mix #2

**AE-00060** 1 x 1 mL  
**AE-00060-10ML** 1 x 10 mL  
 10 µg/mL each in Isooctane 3 comps.

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

### Individual Internal Standards

Each at 100 µg/mL in Isooctane **Cat. No.**  
 2,4,6-Trichlorobiphenyl C-030S-TP  
 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl C-209S-TP

### Technical Note

These Congener formulations have been formulated to meet the 1997 ANSI IEC 61619 International Standard titled "Insulating Liquids - Contamination by Polychlorinated Biphenyl (PCBs) - Method of Determination by Capillary Column Gas Chromatography".

### PCB Congeners Mix 2

Special Mixtures for the Analysis of PCBs & Aroclors (Industrial PCBs).  
**AE-00041** 1 x 1 mL  
**AE-00041-10ML** 1 x 10 mL  
 10 ng/µL each in Isooctane 10 comps.

BZ#	
18	2,2',5-Trichlorobiphenyl
31	2,4',5-Trichlorobiphenyl
44	2,2',3,5'-Tetrachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl
118	2,3',4,4',5-Pentachlorobiphenyl
138	2,2',3,4,4',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	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl

### PCB Congeners Mix 3

Special Mixtures for the Analysis of PCBs & Aroclors (Industrial PCBs).

**AE-00042** 1 x 1 mL  
**AE-00042-10ML** 1 x 10 mL  
 10 ng/µL each in Isooctane 14 comps.

BZ#	
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	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl

### Technical Note

These Congener Content Evaluation Mixes 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 Calibration Mix

**AE-00061** 1 x 1 mL  
**AE-00061-10ML** 1 x 10 mL  
 10 µg/mL each in Isooctane 14 comps.

BZ#	
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

### ISO 6468 PCB Standard

**ISO6468-PCB** 1 x 1 mL  
 10 µg/mL each in Isooctane 7 comps.

2,4,4'-Trichlorobiphenyl
2,2',5,5'-Tetrachlorobiphenyl
2,2',4,5,5'-Pentachlorobiphenyl
2,2',3,4,4',5'-Hexachlorobiphenyl
2,2',4,4',5,5'-Hexachlorobiphenyl
2,2',3,4,4',5,5'-Heptachlorobiphenyl
2,2',3,3',4,4',5,5'-Octachlorobiphenyl



# PCB Congeners

## Mixtures for Congener Specific PCB Analysis

### Formulations for Toxicity & Abundance Studies

#### Toxicity and Abundance based PCB congener formulations

A study was conducted in 1989 by McFarlane and J. Clarke, titled the Environmental Occurrence, Abundance, and Potential Toxicity of Polychlorinated Biphenyl Congeners: Consideration for a Congener - Specific Analysis.<sup>1</sup> The data that formed the basis for conclusions in the study have been referenced by the National Oceanic & Atmospheric Administration (NOAA) who came out with a method in the same year, Congener Specific Analysis.

#### 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 which of somewhat lesser toxicity are very abundant in the Aroclor 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 are less toxic but most 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<sup>2</sup> 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".

#### Literature Reference

1. V.A. McFarlane 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).

#### C-SCA-SET

5 x 1 mL (includes C-SCA-01, C-SCA-02, C-SCA-03, C-SCA-04, C-SCA-05)

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

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

#### IUPAC/BZ#

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

#### PCB Congeners Mix #2 Group 1b (Mix Type Inducers)

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

#### IUPAC/BZ#

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

#### PCB Congeners Mix #3 Group 2 (PB Type Inducers)

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

#### IUPAC/BZ#

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

#### PCB Congeners Mix #4 - Group 3 (Non Inducer Type)

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

#### IUPAC/BZ#

18 2,2',5-Trichlorobiphenyl  
44 2,2',3,5'-Tetrachlorobiphenyl  
49 2,2',4,5'-Tetrachlorobiphenyl  
52 2,2',5,5'-Tetrachlorobiphenyl  
70 2,3',4',5-Tetrachlorobiphenyl  
74 2,4,4',5-Tetrachlorobiphenyl  
151 2,2',3,5,5',6-Hexachlorobiphenyl  
177 2,2',3,3',4',5,6-Heptachlorobiphenyl  
187 2,2',3,4',5,5',6-Heptachlorobiphenyl  
201 2,2',3,3',4,5,5',6'-Octachlorobiphenyl

#### PCB Congeners 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.

#### IUPAC/BZ#

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

#### PCB Congeners Mix #6 (Food & Human Tissue analysis)

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

#### IUPAC/BZ#

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



# PCB Congeners

## Method 1668 (Congener Set) 209 Chlorinated Biphenyl Congeners by HRGC/HRMS

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)

Congener specific determination of all 209 chlorinated biphenyl congeners for calibration on an SPB-Octyl capillary column.

### PCB Congener Mix 1

M-1668A-1-0.01X

At stated conc. in Isooctane

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

### PCB Congener Mix 3

M-1668A-3-0.01X

At stated conc. in Isooctane

1 x 1 mL

29 comps.

BZ#	µg/mL
13	2.5
17	2.5
29	2.5
20	2.5
46	5.0
65	5.0
59	5.0
40	5.0
67	5.0
76	5.0
80	5.0
93	5.0
84	5.0
101	5.0
112	5.0
86	5.0
116	5.0
108	5.0
154	5.0
147	5.0
140	5.0
146	5.0
141	5.0
164	5.0
158	5.0
182	5.0
174	5.0
173	5.0
193	5.0

### PCB Congener Mix #5

M-1668A-5-0.01X

At stated conc. in Isooctane

1 x 1 mL

28 comps.

BZ#	µg/mL
1	2.5
3	2.5
4	2.5
15	2.5
19	2.5
16	2.5
37	2.5
54	5.0
43	5.0
44	5.0
74	5.0
56	5.0
77	5.0
104	5.0
98	5.0
125	5.0
110	5.0
126	5.0
155	5.0
138	5.0
169	5.0
188	5.0
189	5.0
202	7.5
205	7.5
208	7.5
206	7.5
209	7.5

### PCB Congener Mix 2

M-1668A-2-0.01X

At stated conc. in Isooctane

1 x 1 mL

54 comps.

BZ#	µg/mL
7	2.5
5	2.5
12	2.5
18	2.5
24	2.5
23	2.5
28	2.5
22	2.5
39	2.5
53	5.0
51	5.0
73	5.0
48	5.0
62	5.0
71	5.0
68	5.0
58	5.0
61	5.0
55	5.0
60	5.0
94	5.0
100	5.0
91	5.0
121	5.0
90	5.0
99	5.0
108	5.0
117	5.0
111	5.0
107	5.0
118	5.0
114	5.0
150	5.0
145	5.0
135	5.0
149	5.0
139	5.0
132	5.0
165	5.0
168	5.0
137	5.0
160	5.0
128	5.0
162	5.0
157	5.0
184	5.0
186	5.0
187	5.0
185	5.0
181	5.0
192	5.0
197	7.5
199	7.5
203	7.5

### PCB Congener Mix #4

M-1668A-4-0.01X

At stated conc. in Isooctane

1 x 1 mL

15 comps.

BZ#	µg/mL
25	2.5
21	2.5
69	5.0
47	5.0
42	5.0
64	5.0
70	5.0
102	5.0
97	5.0
115	5.0
123	5.0
134	5.0
131	5.0
163	5.0
180	5.0

# PCB Congeners

## Mixtures for Congener Specific PCB Analysis

### Level of Chlorination Calibration / Spike Set

#### M-1668A-LOC-SET

2 x 1 mL (M-1668A-NAT, M-1668A-PAR)

Determination of Chlorobiphenyl content at each level of chlorination

#### Native PCB Calibration Mix

##### M-1668A-NAT

1 x 1 mL

At stated conc. in Isooctane

19 comps.

BZ#		µg/mL
3	4-Chlorobiphenyl	5
15	4,4'-Dichlorobiphenyl	5
28	2,4,4'-Trichlorobiphenyl	5
77	3,3',4,4'-Tetrachlorobiphenyl	1
105	2,3,3',4,4'-Pentachlorobiphenyl	5
114	2,3,4,4',5-Pentachlorobiphenyl	5
118	2,3',4,4',5-Pentachlorobiphenyl	5
123	2',3,4,4',5-Pentachlorobiphenyl	5
126	3,3',4,4',5-Pentachlorobiphenyl	5
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	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	20

#### PAR PCB Spike Mix

##### M-1668A-PAR

1 x 1 mL

At stated conc. in Isooctane

19 comps.

BZ#		µg/mL
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
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
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	2
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	10
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	2
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	10
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	10
209	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	20

## Method 1668A/1668 Combined Congener Standard

#### M-1668A-C-N-LOC-WD

1 x 1 mL

20 µg/mL each in Isooctane

33 comps.

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

#### GPC Calibration Solution

##### CLP-027-R2-WL-10ML

1 x 10 mL

At stated conc. in CH<sub>2</sub>Cl<sub>2</sub>

5 comps.

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

More EPA Methods can be found in our  
EPA Supplement Catalog



We manufacture Custom Formulations, as well as Synthesize and Package to meet your requirements.

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# PCB Congeners

## Mixtures for Congener Specific PCB Analysis

### Integrated Atmospheric Deposition Network (IADN)

The Integrated Atmospheric Deposition Network (IADN) is composed of five agencies: the US EPA, Environment Canada's (EC) Meteorological 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. As the only manufacturer synthesizing all 209 PCB congeners, AccuStandard was requested to develop a set of IADN PCB congener standards to meet this specific chemical list. Cat. No. **C-IADN-SET** is the culmination of this manufacturing job to develop these specifically monitored congeners.

Laboratories looking to monitor the additional organic chemicals and inorganic elements listed in the document can utilize stock AccuStandard formulations or have us prepare custom standards.

#### IADN Congener Set

##### C-IADN-SET

3 x 1 mL (Set Includes 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.

BZ#	
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
199	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.

BZ#	
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
201	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.

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

If you do not find the mixture you need,  
please inquire at your local Distributor for a  
very competitive prices.

# PCB Congeners

## Mixtures for Congener Specific PCB Analysis

### WNN

AccuStandard formulated the C-WNN standard to cover the analytes required for the WHO, NOAA, and NIST list of congeners. Use of this one Standard eliminates the need to purchase separate Standards for each agency's congener list, allows a single injection to cover the analyte list, and saves the lab analysis time and procurement costs.

### 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.

BZ#	
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
81	3,4,4',5'-Tetrachlorobiphenyl
101	2,2',4,5,5'-Pentachlorobiphenyl
105	2,3,3',4,4'-Pentachlorobiphenyl
114	2,3,4,4',5'-Pentachlorobiphenyl
118	2,3',4,4',5'-Pentachlorobiphenyl
123	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
156	2,3,3',4,4',5'-Hexachlorobiphenyl
157	2,3,3',4,4',5'-Hexachlorobiphenyl
167	2,3',4,4',5,5'-Hexachlorobiphenyl
169	3,3',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
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl
209	Decachlorobiphenyl

### West Coast Fish Studies

### PCB Congener Mix for West Coast Fish Studies

**C-WCFS** 1 x 1 mL  
 25 µg/mL each in Isooctane 24 comps.

BZ#	
31	2,4',5'-Trichlorobiphenyl
33	2',3,4-Trichlorobiphenyl
49	2,2',4,5'-Tetrachlorobiphenyl
56	2,3,3',4'-Tetrachlorobiphenyl
60	2,3,4,4'-Tetrachlorobiphenyl
70	2,3',4',5'-Tetrachlorobiphenyl
87	2,2',3,4,5'-Pentachlorobiphenyl
95	2,2',3,5',6-Pentachlorobiphenyl
97	2,2',3',4,5-Pentachlorobiphenyl
99	2,2',4,4',5-Pentachlorobiphenyl
110	2,3,3',4',6-Pentachlorobiphenyl
132	2,2',3,3',4,6'-Hexachlorobiphenyl
141	2,2',3,4,5,5'-Hexachlorobiphenyl
149	2,2',3,4',5',6-Hexachlorobiphenyl
151	2,2',3,5,5',6-Hexachlorobiphenyl
156	2,3,3',4,4',5-Hexachlorobiphenyl
158	2,3,3',4,4',6-Hexachlorobiphenyl
174	2,2',3,3',4,5,6-Heptachlorobiphenyl
177	2,2',3,3',4',5,6-Heptachlorobiphenyl
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl
201	2,2',3,3',4,5,5',6'-Octachlorobiphenyl
203	2,2',3,4,4',5,5',6-Octachlorobiphenyl
183	2,2',3,4,4',5',6-Heptachlorobiphenyl
74	2,4,4',5-Tetrachlorobiphenyl

### DCMA-PCB Congener Method

#### DCMA-PCB Isomer Mixture

**M-002** 1 x 1 mL  
**M-002-PAK** **SAVE** 5 x 1 mL  
 At stated conc. in Hexane 10 comps.

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

### Technical Note

The Dry Color Manufacturer's Association (DCMA) recommends that its members use this type of mixture to monitor their process streams for PCBs. The mixture is made from pure PCB congeners in Hexane.

### Congener Specific Matrices Solutions CEN's Analytical Method for PCBs in Waste Oil

#### PCB Congener Mixture

**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  
 100 µg/mL in Isooctane  
 (Set of Individual Solutions)

BZ#	
18	2,2',5-Trichlorobiphenyl (01)
20	2,3,3'-Trichlorobiphenyl (02)
28	2,4,4'-Trichlorobiphenyl (03)
31	2,4',5-Trichlorobiphenyl (04)
44	2,2',3,5'-Tetrachlorobiphenyl (05)
52	2,2',5,5'-Tetrachlorobiphenyl (06)
101	2,2',4,5,5'-Pentachlorobiphenyl (07)
105	2,3,3',4,4'-Pentachlorobiphenyl (08)
118	2,3',4,4',5-Pentachlorobiphenyl (09)
138	2,2',3,4,4',5'-Hexachlorobiphenyl (10)
149	2,2',3,4',5',6-Hexachlorobiphenyl (11)
153	2,2',4,4',5,5'-Hexachlorobiphenyl (12)
170	2,2',3,3',4,4',5-Heptachlorobiphenyl (13)
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl (14)
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl (15)

### Technical Note

The Commite' European de Normalisation (CEN) has assigned Workgroup Number 22 in Hamburg, Germany to develop a new method for "PCBs" in waste oil. The method uses fifteen of our 99% pure PCB congeners.

### World Health Organization

#### Congener Mix

**C-WHO-01** 1 x 1 mL  
 2.0 µg/mL each in Isooctane 12 comps.

3,3',4,4'-Tetrachlorobiphenyl
3,4,4',5-Tetrachlorobiphenyl
2,3,3',4,4'-Pentachlorobiphenyl
2,3,4,4',5-Pentachlorobiphenyl
2,3',4,4',5-Pentachlorobiphenyl
2',3,4,4',5-Pentachlorobiphenyl
3,3',4,4',5-Pentachlorobiphenyl
2,3,3',4,4',5-Hexachlorobiphenyl
2,3,3',4,4',5'-Hexachlorobiphenyl
2,3',4,4',5,5'-Hexachlorobiphenyl
3,3',4,4',5,5'-Hexachlorobiphenyl
2,3,3',4,4',5,5'-Heptachlorobiphenyl

# PCB Congeners

## PCB Congener Calibration Mixtures

9 Mixtures contain all 209 Congeners contained in Aroclors 1242, 1254 & 1260

PCB Congener Mixtures

### PCB Congener Mix #1

C-CS-01 1 x 1 mL  
10 µg/mL each in Isooctane 39 comps.

(IUPAC/BZ #)	
1	2-Chlorobiphenyl
2	3-Chlorobiphenyl †
3	4-Chlorobiphenyl
4	<b>2,2'-Dichlorobiphenyl</b>
6	<b>2,3'-Dichlorobiphenyl</b>
8	<b>2,4'-Dichlorobiphenyl</b>
9	2,5-Dichlorobiphenyl
16	<b>2,2',3-Trichlorobiphenyl</b>
18	<b>2,2',5-Trichlorobiphenyl</b>
19	2,2',6-Trichlorobiphenyl
22	<b>2,3,4'-Trichlorobiphenyl</b>
25	2,3',4-Trichlorobiphenyl
28	<b>2,4,4'-Trichlorobiphenyl</b>
44	<b>2,2',3,5'-Tetrachlorobiphenyl</b>
52	<b>2,2',5,5'-Tetrachlorobiphenyl</b>
56	<b>2,3,3',4'-Tetrachlorobiphenyl</b>
66	<b>2,3',4,4'-Tetrachlorobiphenyl</b>
67	2,3',4,5-Tetrachlorobiphenyl
71	2,3',4',6-Tetrachlorobiphenyl
74	<b>2,4,4',5-Tetrachlorobiphenyl</b>
82	<b>2,2',3,3',4-Pentachlorobiphenyl</b>
87	<b>2,2',3,4,5'-Pentachlorobiphenyl</b>
99	<b>2,2',4,4',5-Pentachlorobiphenyl</b>
110	<b>2,3,3',4',6-Pentachlorobiphenyl</b>
138	<b>2,2',3,4,4',5'-Hexachlorobiphenyl</b>
146	<b>2,2',3,4',5,5'-Hexachlorobiphenyl</b>
147	2,2',3,4',5,6-Hexachlorobiphenyl †
153	<b>2,2',4,4',5,5'-Hexachlorobiphenyl</b>
173	2,2',3,3',4,5,6-Heptachlorobiphenyl
174	<b>2,2',3,3',4,5,6'-Heptachlorobiphenyl</b>
177	<b>2,2',3,3',4,5,6-Heptachlorobiphenyl</b>
179	<b>2,2',3,3',5,6,6'-Heptachlorobiphenyl</b>
180	<b>2,2',3,4,4',5,5'-Heptachlorobiphenyl</b>
187	<b>2,2',3,4',5,5',6-Heptachlorobiphenyl</b>
194	<b>2,2',3,3',4,4',5,5'-Octachlorobiphenyl</b>
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl
199/201	<b>2,2',3,3',4,5,5',6'-Octachlorobiphenyl</b>
203	<b>2,2',3,4,4',5,5',6-Octachlorobiphenyl</b>
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.

(IUPAC/BZ #)	
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	<b>2,3,3',4',5,6-Hexachlorobiphenyl</b>
165	2,3,3',5,5',6-Hexachlorobiphenyl †
175	2,2',3,3',4,5',6-Heptachlorobiphenyl
200/199	2,2',3,3',4,5,6,6'-Octachlorobiphenyl
201/200	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.

(IUPAC/BZ #)	
5	2,3-Dichlorobiphenyl
7	2,4-Dichlorobiphenyl
10	2,6-Dichlorobiphenyl
17	<b>2,2',4-Trichlorobiphenyl</b>
24	2,3,6-Trichlorobiphenyl
26	<b>2,3',5-Trichlorobiphenyl</b>
31	<b>2,4',5-Trichlorobiphenyl</b>
32	<b>2,4',6-Trichlorobiphenyl</b>
37	<b>3,4,4'-Trichlorobiphenyl</b>
41	2,2',3,4-Tetrachlorobiphenyl
45	<b>2,2',3,6-Tetrachlorobiphenyl</b>
46	2,2',3,6'-Tetrachlorobiphenyl
48	<b>2,2',4,5-Tetrachlorobiphenyl</b>
60	<b>2,3,4,4'-Tetrachlorobiphenyl</b>
70	<b>2,3',4',5-Tetrachlorobiphenyl</b>
83	2,2',3,3',5-Pentachlorobiphenyl
84	<b>2,2',3,3',6-Pentachlorobiphenyl</b>
95	<b>2,2',3,5',6-Pentachlorobiphenyl</b>
103	2,2',4,5',6-Pentachlorobiphenyl †
109/107	2,3,3',4',5-Pentachlorobiphenyl
115	2,3,4,4',6-Pentachlorobiphenyl
131	2,2',3,3',4,6-Hexachlorobiphenyl
132	<b>2,2',3,3',4,6'-Hexachlorobiphenyl</b>
135	<b>2,2',3,3',5,6'-Hexachlorobiphenyl</b>
141	<b>2,2',3,4,5,5'-Hexachlorobiphenyl</b>
149	<b>2,2',3,4',5,6-Hexachlorobiphenyl</b>
164	2,3,3',4',5,6-Hexachlorobiphenyl
170	<b>2,2',3,3',4,4',5-Heptachlorobiphenyl</b>
171	<b>2,2',3,3',4,4',6-Heptachlorobiphenyl</b>
172	2,2',3,3',4,5,5'-Heptachlorobiphenyl
178	2,2',3,3',5,5',6-Heptachlorobiphenyl
183	<b>2,2',3,4,4',5,6-Heptachlorobiphenyl</b>
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.

(IUPAC/BZ #)	
12	3,4-Dichlorobiphenyl
33	<b>2',3,4-Trichlorobiphenyl</b>
49	<b>2,2',4,5'-Tetrachlorobiphenyl</b>
59	2,3,3',6-Tetrachlorobiphenyl
63	2,3,4',5-Tetrachlorobiphenyl
64	<b>2,3,4',6-Tetrachlorobiphenyl</b>
77	3,3',4,4'-Tetrachlorobiphenyl
85	<b>2,2',3,4,4'-Pentachlorobiphenyl</b>
91	2,2',3,4',6-Pentachlorobiphenyl
97	<b>2,2',3',4,5-Pentachlorobiphenyl</b>
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	<b>2,3,3',4,4',5-Hexachlorobiphenyl</b>
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.

(IUPAC/BZ #)	
15	<b>4,4'-Dichlorobiphenyl</b>
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	<b>2,2',3,4'-Tetrachlorobiphenyl</b>
47	<b>2,2',4,4'-Tetrachlorobiphenyl</b>
69	2,3',4,6-Tetrachlorobiphenyl †
92	2,2',3,5,5'-Pentachlorobiphenyl
93	2,2',3,5,6-Pentachlorobiphenyl †
101	<b>2,2',4,5,5'-Pentachlorobiphenyl</b>
105	<b>2,3,3',4,4'-Pentachlorobiphenyl</b>
118	<b>2,3',4,4',5-Pentachlorobiphenyl</b>
119	2,3',4,4',6-Pentachlorobiphenyl
128	<b>2,2',3,3',4,4'-Hexachlorobiphenyl</b>
134	2,2',3,3',5,6-Hexachlorobiphenyl
136	<b>2,2',3,3',6,6'-Hexachlorobiphenyl</b>
144	2,2',3,4,5',6-Hexachlorobiphenyl
151	<b>2,2',3,5,5',6-Hexachlorobiphenyl</b>
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	<b>2,3,3',4,4',5',6-Heptachlorobiphenyl</b>
207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl †
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl †
209	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl †

### 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 Congeners

## PCB Congener Calibration Mixtures

**9 Mixtures contain all 209 Congeners absent in Aroclors**

### PCB Congener Mix #6

C-CS-06	1 x 1 mL
10 µg/mL each in Isooctane	18 comps.
(IUPAC/BZ #)	
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.
(IUPAC/BZ #)	
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 †
107/108	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.
(IUPAC/BZ #)	
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 †
108/109	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 †

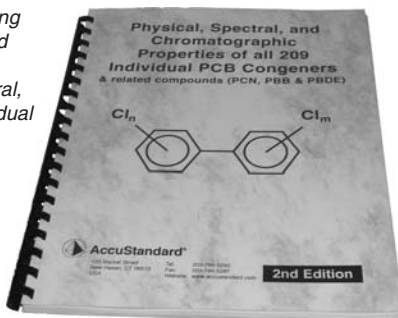
### PCB Congener Mix #9

C-CS-09	1 x 1 mL
10 µg/mL each in Isooctane	21 comps.
(IUPAC/BZ #)	
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 †

AccuStandard's FT/IR, Mass Spectral data, melting point and chromatographic information is included along with chromatographic data from George Frame's study is available in the Physical, Spectral, and Chromatographic Properties of all 209 Individual PCB Congeners.

To order the complete book, use Cat. No. below

Physical, Spectral and Chromatographic Properties of all 209 Individual PCB Congeners  
S-3571



## Congener Calibration Solution Sets

Mixes containing all 209 PCB Congeners.	Mixes for Congeners found in Aroclor® 1242, 1254 and 1260	Mixes for non-Aroclor Congeners
<b>C-CSQ-SET</b> 9 x 1 mL	<b>C-CSA-SET</b> 5 x 1 mL	<b>C-CSN-SET</b> 4 x 1 mL
1 mL each of:	1 mL each of:	1 mL each of:
C-CS-01 C-CS-04 C-CS-07	C-CS-01 C-CS-03 C-CS-05	C-CS-06 C-CS-08 C-CS-09
C-CS-02 C-CS-05 C-CS-08	C-CS-02 C-CS-04	C-CS-07
C-CS-03 C-CS-06 C-CS-09		

### Technical Note

IUPAC congener numbering system was used to designate each congener in the following mixes (specifically 107, 108, 109, 199, 200, 201).

# PCB Congeners

## PCB Congener Calibration Mixtures

### 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.

BZ#	Compound
0	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	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl

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

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

#### PCB/Selective Ion Monitoring Solution

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

BZ#	Compound	µg/mL	BZ#	Compound	µg/mL
1	2-Chlorobiphenyl	10	50	2,2',4,6-Tetrachlorobiphenyl	20
6	2,3-Dichlorobiphenyl	10	209	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	50
29	2,4,5-Trichlorobiphenyl	10	77	3,3',4,4'-Tetrachlorobiphenyl	20
104	2,2',4,6,6'-Pentachlorobiphenyl	20	200	2,2',3,3',4,4',5,6-Octachlorobiphenyl	30
87	2,2',3,4,5'-Pentachlorobiphenyl	20	188	2,2',3,4',5,6,6'-Heptachlorobiphenyl	30
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	40	154	2,2',4,4',5,6'-Hexachlorobiphenyl	20

#### Technical Note

For use with Methyl phenyl silicone type columns

## Method 680

#### PCB Congener Calibration Kit (EPA Method 680)

The EPA has designated the following isomers for use in quantifying PCB's by GC/MS. Three isomers have been chosen by the EPA as retention time calibration standards: 3,3',4,4'-Tetrachlorobiphenyl (BZ# 77), 2,2',4,6,6'-Pentachlorobiphenyl (BZ# 104), and 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ# 208). All response factors are calculated using Chrysene-d<sub>12</sub>, also included in the kit.

Determination of Pesticides and PCBs in Water and Soil Sediment by GC/MS. Method 680 EMSL/EPA Cincinnati, Ohio by Ann Alford Stevens, Thomas A. Bellar, James W. Eichelberger and William L. Budde.

Level of Chlorination	Isomer Selected	BZ #	RF Value vs. Chrysene-d <sub>12</sub>	Mean RF Value vs. Chrysene-d <sub>12</sub>
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	200	0.207	0.191
9,10	2,2',3,3',4,4',5,5',6,6'-deca	209	0.144	0.150

#### Retention Time Calibration Standard

M-680-RT 1 x 1 mL  
 M-680-RT-PAK **SAVE** 5 x 1 mL  
 100 µg/mL each in Hexane 3 comps.

3,3',4,4'-Tetrachlorobiphenyl	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl
2,2',4,6,6'-Pentachlorobiphenyl	

#### PCB Locator Mixture

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

Compound	µg/mL	Compound	µg/mL
Aroclor 1242	0.5	3-Chlorobiphenyl	0.1
Aroclor 1260	0.5	Decachlorobiphenyl	0.1
2-Chlorobiphenyl	0.1		

#### PCB Isomer Calibration Kit

M-680 2 x 1 mL  
 includes M-680A (Mix) and M-680B (Internal Standard)

#### PCB Isomer Calibration Mix

M-680A 1 x 1 mL  
 At stated conc. in Hexane 9 comps.

BZ#	Compound	µg/mL	BZ#	Compound	µg/mL
1	2-mono	50	154	2,2',4,4',5,6'-hexa	100
5	2,3-di	50	188	2,2',3,4',5,6,6'-hepta	150
29	2,4,5-tri	50	200	2,2',3,3',4,4',5,6,6'-octa	150
50	2,2',4,6-tetra	100	209	2,2',3,3',4,4',5,5',6,6'-deca	250
87	2,2',3,4,5'-penta	100			

#### Internal Standard

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

Chrysene-d<sub>12</sub>

#### Internal Standards

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

Chrysene-d<sub>12</sub> Phenanthrene-d<sub>10</sub>

#### Tuning Standard

M-680-TS 1 x 1 mL  
 M-680-TS-PAK **SAVE** 5 x 1 mL  
 10 µg/mL in CH<sub>2</sub>Cl<sub>2</sub>

Decafluorotriphenylphosphine (DFTPP)

AE-00041:11	C-SCA-04:12	10X-PAK:20
AE-00041-	C-SCA-05:12	M-680-IS-
10ML:11	C-SCA-06:12	PAK:20
AE-00042:11	C-SCA-	M-680-RT:20
AE-00042-	SET:12	M-680-RT-
10ML:11	C-WCFS:17	PAK:20
AE-00059:11	C-WDM:20	M-680-TS:20
AE-00059-	C-WDM-H-	M-680-TS-
10ML:11	R1:11	PAK:20
AE-00059-H-	C-WDM-	M-680A:20
2X:11	PAK:20	M-680B:20
AE-00060:11	C-WHO-01:17	M-PCBL:20
AE-00060-	C-WNN:17	M-PCBL-
10ML:11	C-WNN-	PAK:20
AE-00061:11	PAK:17	PCB-SIM:20
AE-00061-	CLP-027-R2-	PCB-SIM-
10ML:11	WL-10ML:15	PAK:20
C-030S-TP:11	DIN38407-3-	PCB-W22:17
C-209S-TP:11	01:11	PCB-W22-
C-CAN-01:13	DIN38414-	PAK:17
C-CAN-02:13	20:11	PCB-W22-
C-CAN-03:13	DIN38414-20-	SET:17
C-CAN-04:13	IS:11	
C-CAN-	ISO6468-	
SET:13	PCB:11	
C-CCSEC:20	M-002:17	
C-CCSEC-	M-002-	
PAK:20	PAK:17	
C-CCSEC-	M-1668A-	
R:20	0.01X-SET:14	
C-CCSEC-R-	M-1668A-1-	
PAK:20	0.01X:14	
C-CS-01:18	M-1668A-2-	
C-CS-02:18	0.01X:14	
C-CS-03:18	M-1668A-3-	
C-CS-04:18	0.01X:14	
C-CS-05:18	M-1668A-4-	
C-CS-06:19	0.01X:14	
C-CS-07:19	M-1668A-5-	
C-CS-08:19	0.01X:14	
C-CS-09:19	M-1668A-C-	
C-CSA-	NT-LOC-WD:15	
SET:19	M-1668A-C-	
C-CSN-	NT-LOC-WD-	
SET:19	PAK:15	
C-CSQ-	M-1668A-	
SET:19	LOC-SET:15	
C-IADN-01:16	M-1668A-	
C-IADN-02:16	NAT:15	
C-IADN-03:16	M-1668A-	
C-IADN-	PAR:15	
SET:16	M-680:20	
C-QME-01:13	M-680-IS:20	
C-SCA-01:12	M-680-IS-	
C-SCA-02:12	10X:20	
C-SCA-03:12	M-680-IS-	