

Biomarker Focus

Flame Retardants: PBDEs and FluoroPBDE Internal Standards

Polybrominated Diphenylethers (PBDEs)

have been used as flame retardants over the past two decades, and are globally distributed in the environment. PBDEs accumulate in the food chain and there is a strong concern about the health effects of PBDE exposure.

Native PBDEs

Chiron offers single native PBDEs in solution and as neat material for toxicological studies. Mixtures are offered according to international methods and on request.

Internal Standards for PBDEs

Mono- and difluorinated PBDEs are closely similar to the parent PBDEs in terms of physico-chemical properties, and are **ideal internal or surrogate standards** including GC-MS and GC-ECD.

The **FluoroPBDE internal standards** offered by Chiron have **several advantages** over the more traditionally used ^{13}C isotopes and unlabelled internal standards:

- **Cost efficient** - much cheaper than the ^{13}C isotopes
- Gives **one single, pure isotope** (F has only one isotope)
- Can be used with **GC-ECD detection**, ^{13}C can not since they coelute with the native
- **Do not discriminate from the native** upon work-up
- **"Designer retention times"** (ortho-,meta-,para-F) possible for optimal results

Custom Synthesis

Chiron offers **custom synthesis** of native standards in larger quantities, new internal standards and metabolites.

International Standards and References

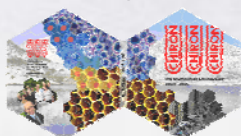
- ISO/DIS 22032 Water quality – PBDEs in sediments and sewage sludge by GC/MS
- EPA 1614 PBDEs in water, soil and sediments and tissue by HRGC/HRMS
- The Lake Michigan Study

**Ready made solutions for the above standards are available.
Please inquire for more info!**

Fluoro-PBDE Internal Standards

Compound	PBDE No.	Chiron No.	Conc. 1 mL
3'-Fluoro-2,4-dibromodiphenyl ether	Fluoro-BDE-7	2258,12	50 µg/mL
3'-Fluoro-3,4-dibromodiphenyl ether	Fluoro-BDE-12	2257,12	50 µg/mL
4'-Fluoro-2,3,4-tribromodiphenyl ether	Fluoro-BDE-25	1926,12	50 µg/mL
4'-Fluoro-2,3,6-tribromodiphenyl ether	Fluoro-BDE-27	1927,12	50 µg/mL
3'-Fluoro-,2,4,4'-tribromodiphenyl ether	Fluoro-BDE-28	2160,12	50 µg/mL
6-Fluoro-2,2',4,4'-tetrabromodiphenyl ether	Fluoro-BDE-47	2161,12	50 µg/mL
5,5'-Difluoro-2,2',4,4'-tetrabromodiphenyl ether	Difluoro-BDE-47	2506,12	50 µg/mL
6-Fluoro-2,3',4,4'-tetrabromodiphenyl ether	Fluoro-BDE-66	2162,12	50 µg/mL
4'-Fluoro-2,3',4,6-tetrabromodiphenyl ether	Fluoro-BDE-69	1928,12	50 µg/mL
5,6-Difluoro-2,2',3,4,4'-pentabromodiphenyl ether	Difluoro-BDE-85	2503,12	50 µg/mL
3,6-Difluoro-2,2',4,4',5-pentabromodiphenyl ether	Difluoro-BDE-99	2505,12	50 µg/mL
3-Fluoro-2,2',4,4',6-pentabromodiphenyl ether	Fluoro-BDE-100	2163,12	50 µg/mL
3-Fluoro-2,3',4,4',6-pentabromodiphenyl ether	Fluoro-BDE-119	2164,12	50 µg/mL
3,5-Difluoro-2,3',4,4',6-pentabromodiphenyl ether	Difluoro-BDE-119	2504,12	50 µg/mL
4'-Fluoro-2,3,3',4,5,6-hexabromodiphenyl ether	Fluoro-BDE-160	1929,12	50 µg/mL
2,4'-Difluoro-2,3,3',4,5,5',6,6'-octabromodiphenyl ether	Difluoro-BDE-201	2167,12	50 µg/mL
4'-Fluoro-2,2',3,3',4,5,5',6,6'-nonabromodiphenyl ether	Fluoro-BDE-208	2168,12	50 µg/mL

Inquire for
a free
catalogue



Native PBDEs

Compound	PBDE No.	Chiron No.	Conc. 1 mL
2,3',4'-Tribromodiphenyl ether	BDE-25	1960,12	50 µg/mL
2,4,4'-Tribromodiphenyl ether	BDE-28	2160,12	50 µg/mL
2,2',4,4'-Tetrabromodiphenyl ether	BDE-47	1962,12	50 µg/mL
2,2',4,5'-Tetrabromodiphenyl ether	BDE-49	1963,12	50 µg/mL
2,3',4,4'-Tetrabromodiphenyl ether	BDE-66	1964,12	50 µg/mL
2',3',4',6-Tetrabromodiphenyl ether	BDE-71	1965,12	50 µg/mL
2,4,4',6-Tetrabromodiphenyl ether	BDE-75	1990,12	50 µg/mL
3,3',4,4'-Tetrabromodiphenyl ether	BDE-77	1991,12	50 µg/mL
2,2',3,4,4'-Pentabromodiphenyl ether	BDE-85	1966,12	50 µg/mL
2,2',4,4',5-Pentabromodiphenyl ether	BDE-99	1967,12	50 µg/mL
2,2',4,4',6-Pentabromodiphenyl ether	BDE-100	1968,12	50 µg/mL
2,3',4,4',6-Pentabromodiphenyl ether	BDE-119	1969,12	50 µg/mL
2,2',3,4,4',5'-Hexabromodiphenyl ether	BDE-138	1970,12	50 µg/mL
2,2',4,4',5,5'-Hexabromodiphenyl ether	BDE-153	1971,12	50 µg/mL
2,2',4,4',5,6'-Hexabromodiphenyl ether	BDE-154	1972,12	50 µg/mL
2,2',3,4,4',5',6-Heptabromodiphenyl ether	BDE-183	1973,12	50 µg/mL
2,3,3',4,4',5,6-Heptabromodiphenyl ether	BDE-190	1992,12	50 µg/mL
2,2',3,4,4',5,5',6-Octabromodiphenyl ether	BDE-203	1975,12	50 µg/mL
2,3,3',4,4',5,5',6-Octabromodiphenyl ether	BDE-205	2647,12	50 µg/mL
Decabromodiphenyl ether	BDE-209	1811,12	50 µg/mL

Lake Michigan Study – Chiron No. 2653,9

Solutions of single reference substances
KIT: 9 compounds, 50 microg/mL each in isoctane

Compound	PBDE No.	Chiron No.	Conc. 1 mL
2,4,4'-Tribromodiphenyl ether	BDE-28	2160,12	50 µg/mL
2,2',4,4'-Tetrabromodiphenyl ether	BDE-47	1962,12	50 µg/mL
2,3',4,4'-Tetrabromodiphenyl ether	BDE-66	1964,12	50 µg/mL
2,2',3,4,4'-Pentabromodiphenyl ether	BDE-85	1966,12	50 µg/mL
2,2',4,4',5-Pentabromodiphenyl ether	BDE-99	1967,12	50 µg/mL
2,2',4,4',6-Pentabromodiphenyl ether	BDE-100	1968,12	50 µg/mL
2,2',3,4,4',5'-Hexabromodiphenyl ether	BDE-138	1970,12	50 µg/mL
2,2',4,4',5,5'-Hexabromodiphenyl ether	BDE-153	1971,12	50 µg/mL
2,2',4,4',5,6'-Hexabromodiphenyl ether	BDE-154	1972,12	50 µg/mL

Lake Michigan Study

Multiple component solution of the above PBDEs	S-4391	Each 10 µg/mL (1mL)
--	--------	---------------------

Other relevant PBDEs– Chiron No. 2665,10

Solutions of single reference substances
KIT: 10 compounds, 50 microg/mL each in isoctane

Compound	PBDE No.	Chiron No.	Conc. 1 mL
2,3',4'-Tribromodiphenyl ether	BDE-25	1960,12	50 µg/mL
2,2',4,5'-Tetrabromodiphenyl ether	BDE-49	1963,12	50 µg/mL
2',3',4',6-Tetrabromodiphenyl ether	BDE-71	1965,12	50 µg/mL
2,4,4',6-Tetrabromodiphenyl ether	BDE-75	1990,12	50 µg/mL
3,3',4,4'-Tetrabromodiphenyl ether	BDE-77	1991,12	50 µg/mL
2,3',4,4',6-Pentabromodiphenyl ether	BDE-119	1969,12	50 µg/mL
2,2',3,4,4',5',6-Heptabromodiphenyl ether	BDE-183	1973,12	50 µg/mL
2,3,3',4,4',5,6-Heptabromodiphenyl ether	BDE-190	1992,12	50 µg/mL
2,2',3,4,4',5,5',6-Octabromodiphenyl ether	BDE-203	1975,12	50 µg/mL
Decabromodiphenyl ether	BDE-209	1811,12	50 µg/mL

Inquire for
a free
catalogue

