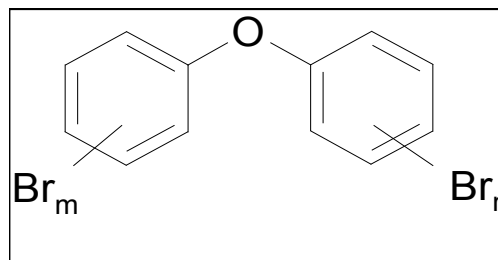


BMF 15 - Polybrominated Diphenylethers (PBDEs) and other flame retardants

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 for analytical purposes and as neat material up to gram quantities for toxicological studies. Mixtures are offered according to international methods **and on request**.

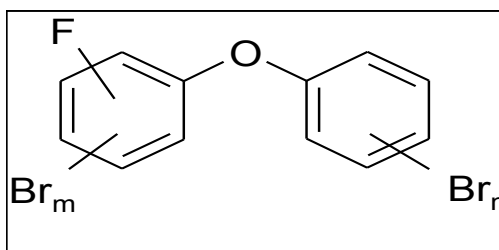
F-PBDEs® Internal standards: An overview of advantages

F-PBDEs® Fluorinated Internal Standards for PBDE analysis are flexible and cost-efficient

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

The F-PBDE® 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. Useful with electron impact ionization and negative ion chemical ionization.
- 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 elution rate.



ISO 22032: 2006

Water quality – Determination of selected polybrominated diphenyl ethers in sediments and sewage sludge – Method using extraction and gas chromatography/mass spectrometry.

Native ISO 22032 PBDEs

	IUPAC No.	Compound	Cat. No.	Cat. No.
Tetrabromo:	BDE-47	2,2',4,4'-Tetrabromodiphenyl ether	1962.12-50-IO	1962.12-5MG
Pentabromo:	BDE-99	2,2',4,4',5-Pentabromodiphenyl ether	1967.12-50-IO	1967.12-5MG
	BDE-100	2,2',4,4',6-Pentabromodiphenyl ether	1968.12-50-IO	1968.12-5MG
Hexabromo:	BDE-153	2,2',4,4',5,5'-Hexabromodiphenyl ether	1971.12-50-IO	1971.12-5MG
	BDE-154	2,2',4,4',5,6'-Hexabromodiphenyl ether	1972.12-50-IO	1972.12-5MG
Heptabromo:	BDE-183	2,2',3,4,4',5',6-Heptabromodiphenyl ether	1973.12-50-IO	1973.12-5MG
Octabromo:	BDE-205	2,3,3',4,4',5,5',6-Octabromodiphenyl ether	2647.12-50-IO	2647.12-5MG
Decabromo:	BDE-209	Decabromodiphenyl ether	1811.12-50-IO	1811.12-5MG
	Multiple components	ISO 22032 PBDEs, 10 µg/mL each in isooctane	S-4535-10-IO	-
	KIT	ISO 22032 PBDE single components, solutions Kit	8573.8-KIT	-

Solutions of single reference substances and multiple components solution; 50 µg/mL in isooctane (IO), 1 mL or as neat.

Internal Standards (IS) for ISO 22032: F-PBDEs®

	IUPAC No.	IS for BDE No.	Compound	Cat. No.
Tetrabromo:	6-F-BDE-47	47	6-Fluoro-2,2',4,4'-tetrabromodiphenyl ether	2161.12-50-T*
	5,5'-F ₂ -BDE-47	47	5,5'-Difluoro-2,2',4,4'-tetrabromodiphenyl ether	2506.12-50-T
Pentabromo:	3,6-F ₂ -BDE-99	99,100	3,6-Difluoro-2,2',4,4',5-pentabromodiphenyl ether	2505.12-50-IO
	3-F-BDE-100	99, 100	3-Fluoro-2,2',4,4',6-pentabromodiphenyl ether	2163.12-50-T
Hexabromo:	4'-F-BDE-160	153, 154,183	4'-Fluoro-2,3,3',4,5,6-hexabromodiphenyl ether	1929.12-50-T
Heptabromo:	3-F-BDE-183	183	3-Fluoro-2,2',3,4,4',5',6-heptabromodiphenyl ether	2166.12-50-T
Octabromo:	2,4'-F ₂ -BDE-199	205, 209	4,6'-Difluoro-2,2',3,3',4,5,5',6'-octabromodiphenyl ether	2167.12-50-T
Nonabromo:	4'-F-BDE-208	205, 209	4'-Fluoro-2,2',3,3',4,5,5',6,6'-nonabromodiphenyl ether	2168.12-50-T*
	Multiple components		Multicomponent Stock Solution of Native Substances: ISO 22032 PBDEs, 50 µg/mL each	S-4388-50-IO
	KIT		ISO 22032 F-PBDE® single components, solutions	8574.8.KIT

Solutions of single internal standards and multiple components solution; 50 µg/mL in isooctane (IO) or toluene (T), 1 mL.

Internal Standards (IS) for ISO 22032 PBDEs (Negative ion chemical ionization)

	IUPAC No.	IS for BDE No.	Compound	Cat. No.
Tetrabromo:	BDE-77	47, 99,100	3,3',4,4'-Tetrabromodiphenyl ether	1991.12-50-IO
Hexabromo:	BDE-181	153, 154,183	2,2',3,4,4',5,5'-6-Hexabromodiphenyl ether	2652.12-50-IO

Solutions of single internal standards and multiple component solution; 50 µg/mL in isooctane (IO), 1 mL.



EPA METHOD 1614, 2007

Brominated diphenyl ethers in Water, Soil, Sediments and Tissue by HRGC/HRMS.

Native PBDEs

Most relevant with respect to EPA Method 1614 (BDEs of primary interest as determined at the 4th Annual Workshop on Brominated Flame Retardants in the Environment, 2002).

IUPAC No.	Compound	Cat No.	Cat No. neat
BDE-28	2,4,4'-Tribromodiphenyl ether	1961.12-50-IO	1961.12-5MG
BDE-47	2,2',4,4'-Tetrabromodiphenyl ether	1962.12-50-IO	1962.12-5MG
BDE-99	2,2',4,4',5-Pentabromodiphenyl ether	1967.12-50-IO	1967.12-5MG
BDE-100	2,2',4,4',6-Pentabromodiphenyl ether	1968.12-50-IO	1968.12-5MG
BDE-153	2,2',4,4',5,5'-Hexabromodiphenyl ether	1971.12-50-IO	1971.12-5MG
BDE-154	2,2',4,4',5,6'-Hexabromodiphenyl ether	1972.12-50-IO	1972.12-5MG
BDE-183	2,2',3,4,4',5',6-Heptabromodiphenyl ether	1973.12-50-IO	1973.12-5MG
BDE-209	Decabromodiphenyl ether	1811.12-50-IO	1811.12-5MG
Multiple components	EPA 1614 PBDEs, 20 µg/mL each*	S-4390-20-IO	-
KIT	EPA 1614 PBDE single components, solutions	8575.8-KIT	-

Solutions of single reference substances, 50 µg/mL in isooctane, 1 mL or as 5 mg neat.

* Also available in other concentrations. Please inquire.

Internal Standards (IS) for EPA 1614 PBDEs

	IUPAC No.	IS for BDE No.	Compound	Cat. No.
Monobromo:	4'-F-BDE-2	3	3-Bromo-4'-fluorodiphenyl ether	1608.12-50-IO
Dibromo:	3'-F-BDE-7	15	3'-Fluoro-2,4-dibromodiphenyl ether	2258.12-50-IO
	3'-F-BDE-12	15	3'-Fluoro-3,4-dibromodiphenyl ether	2257.12-50-IO
Tribromo:	2'-F-BDE-28	28	2'-Fluoro-2,4,4'-tribromodiphenyl ether	2160.12-50-T
	4'-F-BDE-25	28	4'-Fluoro-2,3',4-tribromodiphenyl ether	1926.12-50-IO
	4'-F-BDE-27	28	4'-Fluoro-2,3',6-tribromodiphenyl ether	1927.12-50-IO
Tetrabromo:	6-F-BDE-47	47	6-Fluoro-2,2',4,4'-tetrabromodiphenyl ether	2161.12-50-T
	5,5'-F ₂ -BDE-47	47	5,5'-Difluoro-2,2',4,4'-tetrabromodiphenyl ether	2506.12-50-IO
	6-F-BDE-66	47	6-Fluoro-2,3',4,4'-tetrabromodiphenyl ether	2162.12-50-IO
	4'-F-BDE-69	47	4'-Fluoro-2,3',4,6-tetrabromodiphenyl ether	1928.12-50-IO
Penta-bromo:	3,6-F ₂ -BDE-99	99, 100	3,6-Difluoro-2,2',4,4',5-pentabromodiphenyl ether	2505.12-50-IO
	3-F-BDE-100	99, 100	3-Fluoro-2,2',4,4',6-pentabromodiphenyl ether	2163.12-50-T
	3-F-BDE-119	99, 100	3-Fluoro-2,3',4,4',6-pentabromodiphenyl ether	2164.12-50-IO
	3,5-F ₂ -BDE-119	99, 100	3,5-Difluoro-2,3',4,4',6-pentabromodiphenyl ether	2504.12-50-IO
	5,6-F ₂ -BDE-85	99,100	5,6-Difluoro-2,2',3,4,4'-pentabromodiphenyl ether	2503.12-50-IO
	4'-F-BDE-160	138,153,154	4'-Fluoro-2,3,3',4,5,6-hexabromodiphenyl ether	1929.12-50-T
Hepta-bromo:	3-F-BDE-183	183	3-Fluoro-2,2',3,4,4',5',6-Heptabromodiphenyl ether	2166.12-50-T
Nonabromo:	4'-F-BDE-208	209	4'-Fluoro-2,2',3,3',4,5,5',6,6'-nonabromodiphenyl ether	2168.12-50-IO

Solutions of single internal standards and multiple component solution, 50 µg/mL in isooctane or toluene, 1 mL or as neat.



Native Lake Michigan PBDEs

	IUPAC No.	Compound	Cat. No.	Cat. No. neat
Tribromo:	BDE-28	2,4,4'-Tribromodiphenyl ether	1961.12-50-IO	1961.12-5MG
Tetra-bromo:	BDE-47	2,2',4,4'-Tetrabromodiphenyl ether	1962.12-50-IO	1962.12-5MG
	BDE-66	2,3',4,4'-Tetrabromodiphenyl ether	1964.12-50-IO	1964.12-5MG
Penta-bromo:	BDE-85	2,2',3,4,4'-Pentabromodiphenyl ether	1966.12-50-IO	1966.12-5MG
	BDE-99	2,2',4,4',5'-Pentabromodiphenyl ether	1967.12-50-IO	1967.12-5MG
	BDE-100	2,2',4,4',6'-Pentabromodiphenyl ether	1968.12-50-IO	1968.12-5MG
Hexa-bromo:	BDE-138	2,2',3,4,4',5'-Hexabromodiphenyl ether	1970.12-50-IO	1970.12-5MG
	BDE-153	2,2',4,4',5,5'-Hexabromodiphenyl ether	1971.12-50-IO	1971.12-5MG
	BDE-154	2,2',4,4',5,6'-Hexabromodiphenyl ether	1972.12-50-IO	1972.12-5MG
	Multiple components	Lake Michigan PBDEs, 10 µg/mL each	S-4391-10-IO	-
	KIT	Lake Michigan single components, solutions	2653.9KIT	-

Solutions in isoctane (IO), 1 mL or as neat, different concentration.

Internal Standards for Lake Michigan PBDEs: "Lake Michigan F-PBDEs[®]"

	IUPAC No.	IS for BDE No.	Compound	Cat. No.
Tribromo:	2'-F-BDE-28	28	2'-Fluoro-2,4,4'-tribromodiphenyl ether	2160.12-50-T
Tetrabromo:	6-F-BDE-47	47	6-Fluoro-2,2',4,4'-tetrabromodiphenyl ether	2161.12-50-T
	5,5'-F ₂ -BDE-47	47	5,5'-Difluoro-2,2',4,4'-tetrabromodiphenyl ether	2506.12-50-IO
	6-F-BDE-66	66	6-Fluoro-2,3',4,4'-tetrabromodiphenyl ether	2162.12-50-IO
Pentabromo:	5,6-F ₂ -BDE-85	85	5,6-Difluoro-2,2',3,4,4'-pentabromodiphenyl ether	2503.12-50-IO
	3,6-F ₂ -BDE-99	99, 100	3,6-Difluoro-2,2',4,4',5'-pentabromodiphenyl ether	2505.12-50-IO
	3- F-BDE-100	99,100	3-Fluoro-2,2',4,4',6'-pentabromodiphenyl ether	2163.12-50-T
Hexabromo:	4'-F-BDE-160	138, 153, 154	4'-Fluoro-2,3,3',4,5,6-hexabromodiphenyl ether	1929.12-50-T
	Kit		Lake Michigan Study F-PBDEs [®] Kit single solutions (including 2160.12-50-T, 2161.12-50-T, 2162.12-50-IO, 2503.12-50-IO, 2505.12-50-IO, 2163.12-50-T, 1926.12-50-T)	9751.7-KIT

Solutions of single internal standards and multiple components solution, 50 µg/mL in isoctane (IO) or toluene.

EPA 527.1: 2005

Drinking water – Pesticides and PBDEs by GC-MS

Determination of selected pesticides and flame retardants in drinking water by solid phase extraction and capillary column gas chromatography/mass spectrometry.

IUPAC No.	Compound	Cat. No.	Cat. No. neat
PBB-153	2,2',4,4',5,5'-Hexabromobiphenyl	3108.12-50-HX	-
BDE-47	2,2',4,4'-Tetrabromodiphenyl ether	1962.12-50-IO	1962.12-5MG
BDE-99	2,2',4,4',5'-Pentabromodiphenyl ether	1967.12-50-IO	1967.12-5MG
BDE-100	2,2',4,4',6'-Pentabromodiphenyl ether	1968.12-50-IO	1968.12-5MG
BDE-153	2,2',4,4',5,5'-Hexabromodiphenyl ether	1971.12-50-IO	1971.12-5MG
Multiple components	EPA 527 Mix 3, BDE congeners and hexabromobiphenyl, 50 µg/mL each in isoctane:ethyl acetate	S-4484-50-MX	-

Solutions of single reference substances and multiple components solution, 50 µg/mL in hexane (HX), isoctane (IO) or a mix of solvents (MX). Please inquire.



Native PBDEs; complete list of most relevant PBDEs

Cat No.	Compound	IUPAC No.
8948.12-100-IO	Phenyl ether	
9124.12-50-IO	2-Bromodiphenyl ether	PBDE-1
8747.12-50-IO	3-Bromodiphenyl ether	PBDE-2
8748.12-50-IO	4-Bromodiphenyl ether	PBDE-3
8748.12-5MG	4-Bromodiphenyl ether	PBDE-3
9246.12-50-IO	2,4-Dibromodiphenyl ether	PBDE-7
8749.12-50-IO	3,4'-Dibromodiphenyl ether	PBDE-13
8750.12-50-IO	4,4'-Dibromodiphenyl ether	PBDE-15
8750.12-5MG	4,4'-Dibromodiphenyl ether	PBDE-15
8742.12-50-IO	2,2',4-Tribromodiphenyl ether	PBDE-17
8742.12-5MG	2,2',4-Tribromodiphenyl ether	PBDE-17
1960.12-50-IO	2,3',4-Tribromodiphenyl ether	PBDE-25
1960.12-5MG	2,3',4-Tribromodiphenyl ether	PBDE-25
1961.12-50-IO	2,4,4'-Tribromodiphenyl ether	PBDE-28
1961.12-5MG	2,4,4'-Tribromodiphenyl ether	PBDE-28
2116.12-50-IO	3,3',4-Tribromodiphenyl ether	PBDE-35
1962.12-50-IO	2,2',4,4'-Tetrabromodiphenyl ether	PBDE-47
1962.12-50-IOx10	2,2',4,4'-Tetrabromodiphenyl ether	PBDE-47
1962.12-50-IOx20	2,2',4,4'-Tetrabromodiphenyl ether	PBDE-47
1962.12-5MG	2,2',4,4'-Tetrabromodiphenyl ether	PBDE-47
1963.12-50-IO	2,2',4,5'-Tetrabromodiphenyl ether	PBDE-49
1963.12-5MG	2,2',4,5'-Tetrabromodiphenyl ether	PBDE-49
1964.12-50-IO	2,3',4,4'-Tetrabromodiphenyl ether	PBDE-66
1964.12-5MG	2,3',4,4'-Tetrabromodiphenyl ether	PBDE-66
1965.12-50-IO	2,3',4',6-Tetrabromodiphenyl ether	PBDE-71
1965.12-5MG	2,3',4',6-Tetrabromodiphenyl ether	PBDE-71
1990.12-50-IO	2,4,4',6-Tetrabromodiphenyl ether	PBDE-75
1990.12-5MG	2,4,4',6-Tetrabromodiphenyl ether	PBDE-75
1991.12-50-IO	3,3',4,4'-Tetrabromodiphenyl ether	PBDE-77
1991.12-5MG	3,3',4,4'-Tetrabromodiphenyl ether	PBDE-77
1966.12-50-IO	2,2',3,4,4'-Pentabromodiphenyl ether	PBDE-85
1966.12-5MG	2,2',3,4,4'-Pentabromodiphenyl ether	PBDE-85
1967.12-50-IO	2,2',4,4',5-Pentabromodiphenyl ether	PBDE-99
1967.12-5MG	2,2',4,4',5-Pentabromodiphenyl ether	PBDE-99
1968.12-50-IO	2,2',4,4',6-Pentabromodiphenyl ether	PBDE-100
1968.12-5MG	2,2',4,4',6-Pentabromodiphenyl ether	PBDE-100
2867.12-50-IO	2,3',4,4',5-Pentachlorobiphenyl ether	PBDE-118
1969.12-50-IO	2,3',4,4',6-Pentabromodiphenyl ether	PBDE-119
1969.12-5MG	2,3',4,4',6-Pentabromodiphenyl ether	PBDE-119
1970.12-50-IO	2,2',3,4,4',5-Hexabromodiphenyl ether	PBDE-138
1970.12-5MG	2,2',3,4,4',5-Hexabromodiphenyl ether	PBDE-138
1971.12-50-IO	2,2',4,4',5,5'-Hexabromodiphenyl ether	PBDE-153
1971.12-5MG	2,2',4,4',5,5'-Hexabromodiphenyl ether	PBDE-153
1972.12-50-IO	2,2',4,4',5,6'-Hexabromodiphenyl ether	PBDE-154
1972.12-5MG	2,2',4,4',5,6'-Hexabromodiphenyl ether	PBDE-154
2652.12-50-IO	2,2',3,4,4',5,6-Heptabromodiphenyl ether	PBDE-181
1973.12-50-IO	2,2',3,4,4',5',6-Heptabromodiphenyl ether	PBDE-183
1973.12-5MG	2,2',3,4,4',5',6-Heptabromodiphenyl ether	PBDE-183
1992.12-50-IO	2,3,3',4,4',5,6-Heptabromodiphenyl ether	PBDE-190
1992.12-5MG	2,3,3',4,4',5,6-Heptabromodiphenyl ether	PBDE-190
2486.12-50-IO	2,2',3,3',4,4',5,6-Octabromodiphenyl ether	PBDE-195
9135.12-50-IO	2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	PBDE-196
1975.12-50-IO	2,2',3,4,4',5,5',6'-Octabromodiphenyl ether	PBDE-203
1975.12-5MG	2,2',3,4,4',5,5',6'-Octabromodiphenyl ether	PBDE-203
2647.12-50-IO	2,3,3',4,4',5,5',6-Octabromodiphenyl ether	PBDE-205
2647.12-5MG	2,3,3',4,4',5,5',6-Octabromodiphenyl ether	PBDE-205
9033.12-50-IO	2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	PBDE-206
9034.12-50-IO	2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	PBDE-207
9035.12-50-IO	2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether	PBDE-208
1811.12-50-T	Decabromodiphenyl ether	PBDE-209
1811.12-5MG	Decabromodiphenyl ether	PBDE-209
2653.9-KIT	Lake Michigan Study' PBDEs (Kit w/single solutions)	
8573.8-KIT	ISO 22032 single components, solutions	
8575.8-KIT	EPA 1614 PBDE single components, solutions	

Solutions of single reference substances, 50 µg/mL in 1mL isoctane (IO), toluene (T) or as neat.



Bromophenols

Cat No.	Compound
3822.6-K-IP	2-Bromophenol
2383.6-K-IP	4-Bromophenol
3721.6-K-IP	2,3-Dibromophenol
2061.6-K-IP	2,4-Dibromophenol
2470.6-10-5ME	2,5-Dibromophenol
2470.6-K-IP	2,5-Dibromophenol
2472.6-K-IP	2,6-Dibromophenol
8595.6-K-IP	3,4-Dibromophenol
2507.6-K-IP	2,3,4-Tribromophenol
2471.6-K-IP	2,3,6-Tribromophenol
2508.6-K-IP	2,4,5-Tribromophenol
2060.6-K-IP	2,4,6-Tribromophenol
2060.6-5K-5IP	2,4,6-Tribromophenol
2509.6-K-IP	2,3,4,6-Tetrabromophenol
2509.6-10MG	2,3,4,6-Tetrabromophenol
2672.6-50-IO	Pentabromophenol

Delivered in 1000 µg/mL in isopropanol or 50 µg/mL in isoctane or neat (2509.6).

Flame retardants other than PBDEs

PBBs (polybromobiphenyls)

Cat No.	IUPAC No.	Compound
3089.12-50-IO	PBB-1	2-Bromobiphenyl
3090.12-50-IO	PBB-2	3-Bromobiphenyl
3091.12-50-IO	PBB-3	4-Bromobiphenyl
3092.12-50-IO	PBB-4	2,2'-Dibromobiphenyl
3093.12-50-IO	PBB-7	2,4-Dibromobiphenyl
3094.12-50-IO	PBB-9	2,5-Dibromobiphenyl
3095.12-50-IO	PBB-10	2,6-Dibromobiphenyl
3096.12-50-IO	PBB-15	4,4'-Dibromobiphenyl
3097.12-50-IO	PBB-18	2,2',5'-Tribromobiphenyl
3098.12-50-IO	PBB-26	2,3',5'-Tribromobiphenyl
2664.12-50-IO	PBB-29	2,4,5'-Tribromobiphenyl
2744.12-35-IO	PBB-30	2,4,6-Tribromobiphenyl
2744.12-50-IO	PBB-30	2,4,6-Tribromobiphenyl
3099.12-50-IO	PBB-31	2,4',5'-Tribromobiphenyl
3101.12-50-IO	PBB-38	3,4,5-Tribromobiphenyl
3102.12-50-IO	PBB-49	2,2',4,5'-Tetrabromobiphenyl
3103.12-50-IO	PBB-52	2,2',5,5'-Tetrabromobiphenyl
3104.12-50-IO	PBB-56	2,2',5,6'-Tetrabromobiphenyl
3105.12-50-IO	PBB-80	3,3',5,5'-Tetrabromobiphenyl
3106.12-50-IO	PBB-101	2,2',4,5,5'-Pentabromobiphenyl
3107.12-50-IO	PBB-103	2,2',4,5',6-Pentabromobiphenyl
3108.12-50-HX	PBB-153	2,2',4,4',5,5'-Hexabromobiphenyl
3110.12-50-IO	PBB-155	2,2',4,4',6,6'-Hexabromobiphenyl
3109.12-10-CY	PBB-169	3,3',4,4',5,5'-Hexabromobiphenyl
9534.12-50-IO	PBB-189	2,3,3',4,4',5,5'-Heptabromobiphenyl
9716.12.50-IO	PBB-194	2,2',3,3',4,4',5,5'-Octabromobiphenyl
9536.12-50-IO	PBB-206	2,2',3,3',4,4',5,5',6-Nonabromobiphenyl ether
2677.12-50-IO	PBB-209	Decabromodiphenyl
2679.12-50-IO	PBB-Mix	Octabromodiphenyl, techn.

Delivered in 50 µg/mL in isoctane (IO), hexane (HX) or cyclohexane (CY), 1 mL.

Internal Standard (IS) F-PBDEs®: Complete list

Cat. No.	IUPAC No.	Compound
1604.12-50-IO	2-F-PBDE-0	2-Fluorodiphenyl ether
1605.12-50-IO	4-F-PBDE-0	4-Fluorodiphenyl ether
2178.12-K-IO	2,4'-F ₂ -PBDE-0	2,4'-Difluorodiphenyl ether
3620.12-K-IO	3,3'-F ₂ -PBDE-0	3,3'-Difluorodiphenyl ether
1608.12-50-IO	3-F-PBDE-2	3-Bromo-4'-fluorodiphenyl ether
2258.12-50-IO	3'-F-PBDE-7	3'-Fluoro-2,4-dibromodiphenyl ether
2257.12-50-IO	3'-F-PBDE-12	3'-Fluoro-3,4-dibromodiphenyl ether
1926.12-50-IO	4'-F-PBDE-25	4'-Fluoro-2,3',4-tribromodiphenyl ether
1927.12-50-IO	4'-F-PBDE-27	4'-Fluoro-2,3',6-tribromodiphenyl ether
2160.12-50-IO	2'-F-PBDE-28	2'-Fluoro-2,4,4'-tribromodiphenyl ether
2160.12-50-T	2'-F-PBDE-28	2'-Fluoro-2,4,4'-tribromodiphenyl ether
2161.12-50-IO	6-F-PBDE-47	6-Fluoro-2,2',4,4'-tetrabromodiphenyl ether
2161.12-50-T	6-F-PBDE-47	6-Fluoro-2,2',4,4'-tetrabromodiphenyl ether
2506.12-50-IO	5,5'-F ₂ -PBDE-47	5,5'-Difluoro-2,2',4,4'-tetrabromodiphenyl ether (2,2',4,4'-Tetrabromo-5,5'-difluorodiphenyl ether)
2162.12-50-IO	6-F-PBDE-66	6-Fluoro-2,3',4,4'-tetrabromodiphenyl ether
1928.12-50-IO	4'-F-PBDE-69	4'-Fluoro-2,3',4,6-tetrabromodiphenyl ether
2503.12-50-IO	5,6-F ₂ -PBDE-85	5,6-Difluoro-2,2',3,4,4'-pentabromodiphenyl ether (2,2',3,4,4'-Pentabromo-5,6-difluorodiphenyl ether)
2505.12-50-IO	3,6-F ₂ -PBDE-99	3,6-Difluoro-2,2',4,4',5-pentabromodiphenyl ether (2,2',4,4',5-Pentabromo-3,6-difluorodiphenyl ether)
2163.12-50-T	3-F-PBDE-100	3-Fluoro-2,2',4,4',6-pentabromodiphenyl ether
2163.12-50-IO	3-F-PBDE-100	3-Fluoro-2,2',4,4',6-pentabromodiphenyl ether
2164.12-50-IO	3-F-PBDE-119	3-Fluoro-2,3',4,4',6-pentabromodiphenyl ether
2504.12-50-IO	3,5-F ₂ -PBDE-119	3,5-Difluoro-2,3',4,4',6-pentabromodiphenyl ether (2,3',4,4',6-Pentabromo-3,5-difluorodiphenyl ether)
1929.12-50-T	4'-F-PBDE-160	4'-Fluoro-2,3,3',4,5,6-hexabromodiphenyl ether
2166.12-50-T	3-F-PBDE-183	3-Fluoro-2,2',4,4',5,5',6-heptabromodiphenyl ether
2167.12-50-T	4',6-F ₂ -PBDE-199	4',6-Difluoro-2,2',3,3',4,5,5',6'-octabromodiphenyl ether
2168.12-50-T	4'-F-PBDE-208	4'-Fluoro-2,2',3,3',4,5,5',6'-nonabromodiphenyl ether
2168.12-50-IO	4'-F-PBDE-208	4'-Fluoro-2,2',3,3',4,5,5',6'-nonabromodiphenyl ether
8574.8-KIT		ISO 22032 F-PBDE® single components, solutions Kit

Solutions of single reference substances, 50 µg/mL in isooctane (IO) or toluene (T), 1 mL.

Other halogenated and non-halogenated flame retardants

Cat No.	Compound	
8751.21-50-T	2,2-Bis[3,5-dibromo-4-(2,3-dibromopropoxy)phenyl]propane	BDBPT
8885.24-10MG	Bis(2-ethylhexyl)tetrabromophthalate	TBPH
8757.14-50-T	1,2-Bis(2,4,6-tribromophenoxy)ethane	BTBPE
8897.3-100MG	2-Bromo-2-nitro-1,3-propanediol	Bronopol
2071.7-K-IP	4-Chloro-3-methylphenol	
2670.14-50-CB	Decabromodiphenylethane	
8770.18-50-T	Dechlorane plus	
8898.2-100MG	2,2-Dibromo-2-cyano-acetamide	DBNPA
2671.5-50-IP	Dibromoneopentylglycol	
2061.6-10-5ME	2,4-Dibromophenol	
2061.6-K-IP	2,4-Dibromophenol	
8884.18-50-T	Ethylene bis(tetrabromophthalamide)	
2678.6-50-IO	Hexabromobenzene	
1894.6-50-IO	1,2,3,4,5,6-Hexabromocyclohexane	
1893.12-K-T	1,2,5,6,9,10-Hexabromocyclododecane	HBCD, Racemic mixture
8881.8-50-IO	Pentabromoethylbenzene	PBEB
9561.16-K-IO	Butyldiphenylphosphate	DPhBP

Solutions of single reference substances in isooctane (IO), methanol (ME), isopropanol (IP) or toluene (T), 1 mL, various concentrations. Please inquire.



2672.6-50-IO	Pentabromophenol	
2673.7-50-IO	Pentabromotoluene	
2674.15-50-IO	3,3',5,5'-Tetrabromobisphenol A	TBBA
8887.21-50-T	3,3',5,5'-Tetrabromobisphenol A diallyl ether	
2675.17-50-IO	3,3',5,5'-Tetrabromobisphenol A dimethyl ether	
8771.21-50-IO	3,3',5,5'-Tetrabromobisphenol A bis(2,3-dibromopropyl) ether	
8772.19-50-IO	3,3',5,5'-Tetrabromobisphenol A bis(2-hydroxyethyl) ether	
8882.9-50-IO	2,4,6-Tribromophenylallyl ether	ATE
2060.6-K-IP	2,4,6-Tribromophenol	
2676.8-50-IO	Tetrabromophthalic anhydride	
1812.18-50-CY	Tetradecabromo-1,4-diphenoxybenzene	
	Melamine (triazine)-based flame retardants	
8754.3-1G	Melamine cyanurate	Reflam MCA
8755.0-1G	Melamine micronized	Reflam MA
8752.0-1G	Melamine phosphate	Reflam MP
8753.0-1G	Melamine polyphosphate	Reflam MPP
	Phosphor-Phosphate-based flame retardants	
8798.0-1G	Ammonium polyphosphate (Phase II n>1000)	Reflam APP
8764.6-50-IO	Bis(2,3-dibromopropyl)phosphate	
8764.6-10MG	Bis(2,3-dibromopropyl)phosphate	
8756.0-100MG	Bisphenol A bis(diphenyl)phosphate, Rx product of Phosphoric acid trichloride biphenol A and phenol	BDP
8738.20-K-IO	Ditolylphenylphosphate - Mixture of <i>o</i> -, <i>m</i> -, <i>p</i> -tolyl isomers	
3967.19-K-IO	Diphenyltolylphosphate - Mixture of <i>o</i> -, <i>m</i> -, <i>p</i> -tolyl isomers	
8777.9-1G	Isopropylated trisphenyl phosphate (Phenol, isopropylated, phosphate)	IPPP
8767.0-1G	Phenoxyterminated carbonate oligomer of tetrabromobisphenol A	
8769.0-1G	Polyphosphoric acids ammonium salt	APP
8768.0-1G	2,4,6-Tribromophenylterminated tetrabromobisphenol-A carbonate oligomer	
1399.12-K-IO	Tri- <i>n</i> -butylphosphate	TBP
8026.6-K-IO	Triethylphosphate	TEP
3966.12-K-IO	Tri- <i>iso</i> -butylphosphate	TiBP
1400.3-K-IO	Trimethylphosphate	TMP
3968.12-100MG	Trimethylpropanephosphate	
8027.9-K-IO	Tri- <i>n</i> -propylphosphate	
2138.18-K-IO	Triphenylphosphate	TPP
2209.6-100-ME	Tris-(aziridinyl)-phosphineoxide	TEPA
2209.6-K-ME	Tris-(aziridinyl)-phosphineoxide	TEPA
2209.6-10MG	Tris-(aziridinyl)-phosphineoxide	TEPA
2209.6-100MG	Tris-(aziridinyl)-phosphineoxide	TEPA
8586.9-100MG	Tris(2,3-dibromopropyl)phosphate	TBPP
8586.9-1G	Tris(2,3-dibromopropyl)phosphate	TBPP
8436.6-1G	Tris(2-chloroethyl)phosphate	
8457.9-1G	Tris(monochloropropyl)phosphate	TCPP
8774.9-10MG	Tris(2-chloropropyl)phosphate	
8505.9-1G	Tris(1,3-dichloro-2-propyl)phosphate	
8775.9-K-ME	Tris(2,3-dichloropropyl)phosphate	
2135.21-K-IO	Tri- <i>o</i> -tolylphosphate	ToTP
2134.21-K-IO	Tri- <i>m</i> -tolylphosphate	TmTP
2136.21-K-IO	Tri- <i>p</i> -tolylphosphate	TpTP
2137.21-K-IO	Tritolylphosphate (isomer mixture) "Tricresylphosphate"	TCP
9490.26-1G	2-Ethylhexyldiphenylphosphate	
	Labelled Phosphate based Flame retardants	
9491.12-100-IO	Tri- <i>n</i> -butylphosphate-d27	TBP-d27
9492.6-100-IO	Triethylphosphate-d15	TEP-d15
9493.3-100-IO	Trimethylphosphate-d9	TMP-d9
9494.18-100-IO	Triphenylphosphate-d15	TPP-d15
9495.9-100-IO	Tri- <i>n</i> -propylphosphate-d21	

