



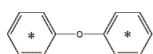
**Brominated
Flame Retardant
Standards
and Standard
Mixtures**

Isotope Labeled Brominated Diphenyl Ether (BDE) Standards

Generally used as flame-retardants, Brominated Diphenyl Ethers (BDEs) have become chemicals of significant environmental concern. BDEs may be generally considered as persistent and highly lipophilic substances, similar to well known environmental contaminants such as polychlorinated biphenyls (PCBs).

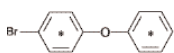
In 1996 Cambridge Isotope Laboratories (CIL) first introduced Chlorinated and Brominated Diphenyl Ether analytical standards. Since then, additional studies in Europe, Canada, Japan, and the United States have significantly increased interest in these products, and enabled CIL to extend its Flame Retardant offerings.

Diphenyl ether (¹³C₁₂, 99%) (BDE-0)



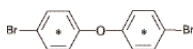
50 ± 5 µg/mL in Nonane
CLM-1587-1.2 1.2 mL

4-Monobromodiphenyl ether (¹³C₁₂, 99%) (BDE-3)



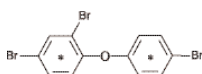
50 ± 5 µg/mL in Nonane
EO-4999 1.2 mL

4,4'-Dibromodiphenyl ether (¹³C₁₂, 99%) (BDE-15)



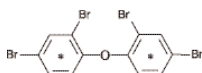
50 ± 5 µg/mL in Nonane
EO-5001 1.2 mL

2,4,4'-Tribromodiphenyl ether (¹³C₁₂, 99%) (BDE-28)



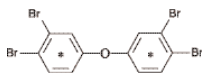
50 ± 5 µg/mL in Nonane
EO-5002 1.2 mL

2,2',4,4'-Tetrabromodiphenyl ether (¹³C₁₂, 99%) (BDE-47)



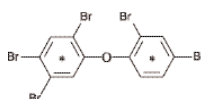
50 ± 5 µg/mL in Nonane
EO-4982 1.2 mL

3,3',4,4'-Tetrabromodiphenyl ether (¹³C₁₂, 99%) (BDE-77)



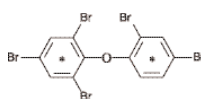
50 ± 5 µg/mL in Nonane
EO-1439 1.2 mL

2,2',4,4',5-Pentabromodiphenyl ether (¹³C₁₂, 99%) (BDE-99)



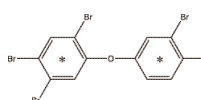
50 ± 5 µg/mL in Nonane
EO-4983 1.2 mL

2,2',4,4',6-Pentabromodiphenyl ether (¹³C₁₂, 99%) (BDE-100)



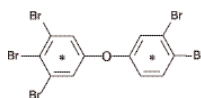
50 ± 5 µg/mL in Nonane
EO-4993 1.2 mL

2,3',4,4',5-Pentabromodiphenyl ether (¹³C₁₂, 99%) (BDE-118)



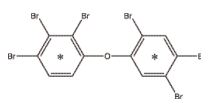
50 ± 5 µg/mL in Nonane
EO-5034^{new} 1.2 mL

3,3',4,4',5-Pentabromodiphenyl ether (¹³C₁₂, 99%) (BDE-126)



50 ± 5 µg/mL in Nonane
EO-4930 1.2 mL

2,2',3,4,4',5'-Hexabromodiphenyl ether (¹³C₁₂, 99%) (BDE-138)

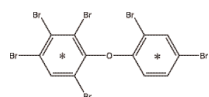


50 ± 5 µg/mL in Nonane
EO-5035^{new} 1.2 mL

Brominated Flame Retardant Standards and Standard Mixtures

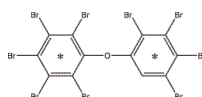
Isotope Labeled Brominated Diphenyl Ether (BDE) Standards (continued)

2,2',3,4,4',6-Hexabromodiphenyl ether (¹³C₁₂, 99%) (BDE-139)



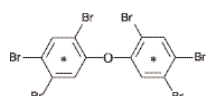
50 ± 5 µg/mL in Nonane
EO-5165^{new} 1.2 mL

2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether (¹³C₁₂, 99%) (BDE-206)



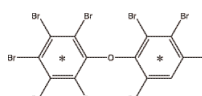
50 ± 5 µg/mL in Nonane
EO-5240^{new} 1.2 mL

2,2',4,4',5,5'-Hexabromodiphenyl ether (¹³C₁₂, 99%) (BDE-153)



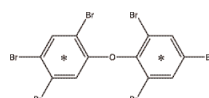
50 ± 5 µg/mL in Nonane
EO-4984 1.2 mL

2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether (¹³C₁₂, 99%) (BDE-207)



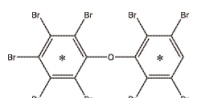
50 ± 5 µg/mL in Nonane
EO-5241^{new} 1.2 mL

2,2',4,4',5,6'-Hexabromodiphenyl ether (¹³C₁₂, 99%) (BDE-154)



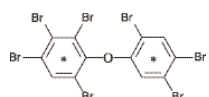
50 ± 5 µg/mL in Nonane
EO-5161^{new} 1.2 mL

2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether (¹³C₁₂, 99%) (BDE-208)



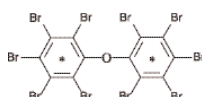
50 ± 5 µg/mL in Nonane
EO-5242^{new} 1.2 mL

2,2',3,4,4',5',6-Heptabromodiphenyl ether (¹³C₁₂, 99%) (BDE-183)



50 ± 5 µg/mL in Nonane
EO-4985 1.2 mL

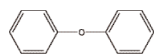
Decabromodiphenyl ether (¹³C₁₂, 99%) (BDE-209)



50 ± 5 µg/mL in Nonane
EO-5003 1.2 mL

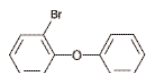
Unlabeled Brominated Diphenyl Ether (BDE) Standards

Diphenyl ether (BDE-0)



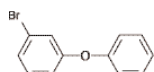
50 ± 5 µg/mL in Nonane
ULM-6782-1.2 ^{new} 1.2 mL

2-Monobromodiphenyl ether (BDE-1)



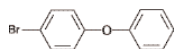
50 ± 5 µg/mL in Nonane
BDE-1-CS 1.2 mL

3-Monobromodiphenyl ether (BDE-2)



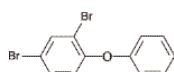
50 ± 5 µg/mL in Nonane
BDE-2-CS 1.2 mL

4-Monobromodiphenyl ether (BDE-3)



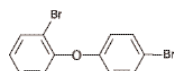
50 ± 5 µg/mL in Nonane
BDE-3-CS 1.2 mL

2,4-Dibromodiphenyl ether (BDE-7)



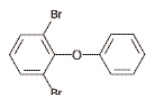
50 ± 5 µg/mL in Nonane
BDE-7-CS 1.2 mL

2,4'-Dibromodiphenyl ether (BDE-8)



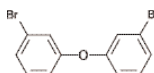
50 ± 5 µg/mL in Nonane
BDE-8-CS 1.2 mL

2,6-Dibromodiphenyl ether (BDE-10)



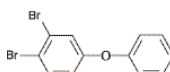
50 ± 5 µg/mL in Nonane
BDE-10-CS 1.2 mL

3,3'-Dibromodiphenyl ether (BDE-11)



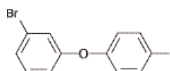
50 ± 5 µg/mL in Nonane
BDE-11-CS 1.2 mL

3,4-Dibromodiphenyl ether (BDE-12)



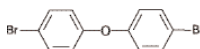
50 ± 5 µg/mL in Nonane
BDE-12-CS 1.2 mL

3,4'-Dibromodiphenyl ether (BDE-13)



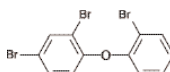
50 ± 5 µg/mL in Nonane
BDE-13-CS 1.2 mL

4,4'-Dibromodiphenyl ether (BDE-15)



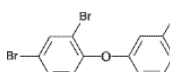
50 ± 5 µg/mL in Nonane
BDE-15-CS 1.2 mL

2,2',4-Tribromodiphenyl ether (BDE-17)



50 ± 5 µg/mL in Nonane
BDE-17-CS 1.2 mL

2,3',4-Tribromodiphenyl ether (BDE-25)

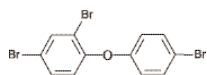


50 ± 5 µg/mL in Nonane
BDE-25-CS 1.2 mL

Brominated Flame Retardant Standards and Standard Mixtures

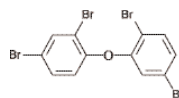
Unlabeled Brominated Diphenyl Ether (BDE) Standards (continued)

2,4,4'-Tribromodiphenyl ether (BDE-28)



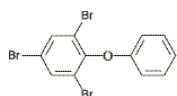
50 ± 5 µg/mL in Nonane
BDE-28-CS 1.2 mL

2,2',4,5'-Tetrabromodiphenyl ether (BDE-49)



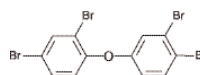
50 ± 5 µg/mL in Nonane
BDE-49-CS 1.2 mL

2,4,6-Tribromodiphenyl ether (BDE-30)



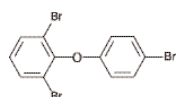
50 ± 5 µg/mL in Nonane
BDE-30-CS 1.2 mL

2,3',4,4'-Tetrabromodiphenyl ether (BDE-66)



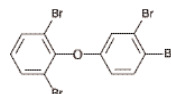
50 ± 5 µg/mL in Nonane
BDE-66-CS 1.2 mL

2,4',6-Tribromodiphenyl ether (BDE-32)



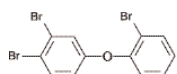
50 ± 5 µg/mL in Nonane
BDE-32-CS 1.2 mL

2,3',4',6-Tetrabromodiphenyl ether (BDE-71)



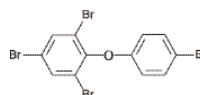
50 ± 5 µg/mL in Nonane
BDE-71-CS 1.2 mL

2',3,4,-Tribromodiphenyl ether (BDE-33)



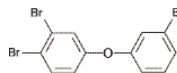
50 ± 5 µg/mL in Nonane
BDE-33-CS 1.2 mL

2,4,4',6-Tetrabromodiphenyl ether (BDE-75)



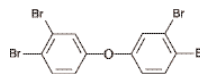
50 ± 5 µg/mL in Nonane
BDE-75-CS 1.2 mL

3,3',4-Tribromodiphenyl ether (BDE-35)



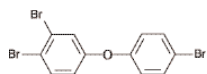
50 ± 5 µg/mL in Nonane
BDE-35-CS 1.2 mL

3,3',4,4'-Tetrabromodiphenyl ether (BDE-77)



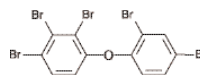
50 ± 5 µg/mL in Nonane
BDE-77-CS 1.2 mL

3,4,4'-Tribromodiphenyl ether (BDE-37)



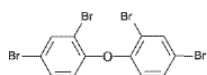
50 ± 5 µg/mL in Nonane
BDE-37-CS 1.2 mL

2,2',3,4,4'-Pentabromodiphenyl ether (BDE-85)



50 ± 5 µg/mL in Nonane
BDE-85-CS 1.2 mL

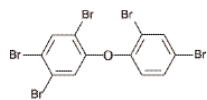
2,2',4,4'-Tetrabromodiphenyl ether (BDE-47)



50 ± 5 µg/mL in Nonane
BDE-47-CS 1.2 mL

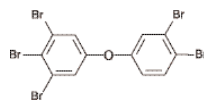
Unlabeled Brominated Diphenyl Ether (BDE) Standards (continued)

2,2',4,4',5-Pentabromodiphenyl ether (BDE-99)



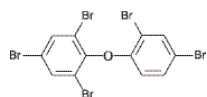
50 ± 5 µg/mL in Nonane
BDE-99-CS 1.2 mL

3,3',4,4',5-Pentabromodiphenyl ether (BDE-126)



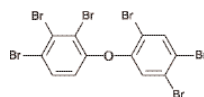
50 ± 5 µg/mL in Nonane
BDE-126-CS 1.2 mL

2,2',4,4',6-Pentabromodiphenyl ether (BDE-100)



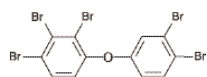
50 ± 5 µg/mL in Nonane
BDE-100-CS 1.2 mL

2,2',3,4,4',5'-Hexabromodiphenyl ether (BDE-138)



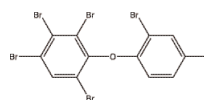
50 ± 5 µg/mL in Nonane
BDE-138-CS 1.2 mL

2,3,3',4,4'-Pentabromodiphenyl ether (BDE-105)



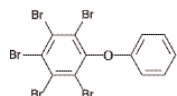
50 ± 5 µg/mL in Nonane
BDE-105-CS 1.2 mL

2,2',3,4,4',6-Hexabromodiphenyl ether (BDE-139)



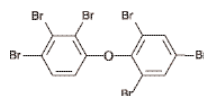
50 ± 5 µg/mL in Nonane
BDE-139-CS 1.2 mL

2,3,4,5,6-Pentabromodiphenyl ether (BDE-116)



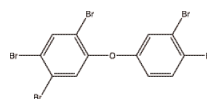
50 ± 5 µg/mL in Nonane
BDE-116-CS 1.2 mL

2,2',3,4,4',6'-Hexabromodiphenyl ether (BDE-140)



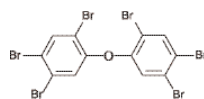
50 ± 5 µg/mL in Nonane
BDE-140-CS 1.2 mL

2,3',4,4',5-Pentabromodiphenyl ether (BDE-118)



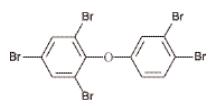
50 ± 5 µg/mL in Nonane
BDE-118-CS 1.2 mL

2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE-153)



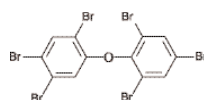
50 ± 5 µg/mL in Nonane
BDE-153-CS 1.2 mL

2,3',4,4',6-Pentabromodiphenyl ether (BDE-119)



50 ± 5 µg/mL in Nonane
BDE-119-CS 1.2 mL

2,2',4,4',5,6'-Hexabromodiphenyl ether (BDE-154)

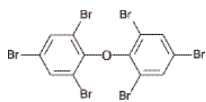


50 ± 5 µg/mL in Nonane
BDE-154-CS 1.2 mL

Brominated Flame Retardant Standards and Standard Mixtures

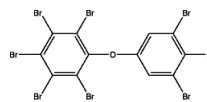
Unlabeled Brominated Diphenyl Ether (BDE) Standards (continued)

2,2',4,4',6,6'-Hexabromodiphenyl ether (BDE-155)



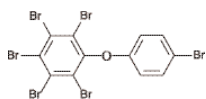
50 ± 5 µg/mL in Nonane
BDE-155-CS 1.2 mL

2,3,3',4,4',5,5',6-Octabromodiphenyl ether (BDE-205)



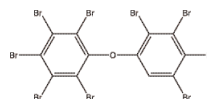
50 ± 5 µg/mL in Nonane
BDE-205-CS 1.2 mL

2,3,4,4',5,6-Hexabromodiphenyl ether (BDE-166)



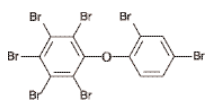
50 ± 5 µg/mL in Nonane
BDE-166-CS 1.2 mL

2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether (BDE-206)



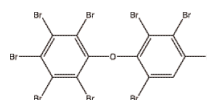
50 ± 5 µg/mL in Nonane
BDE-206-CS 1.2 mL

2,2',3,4,4',5,6-Heptabromodiphenyl ether (BDE-181)



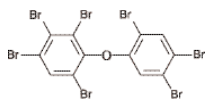
50 ± 5 µg/mL in Nonane
BDE-181-CS 1.2 mL

2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether (BDE-207)



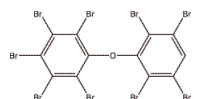
50 ± 5 µg/mL in Nonane
BDE-207-CS 1.2 mL

2,2',3,4,4',5',6-Heptabromodiphenyl ether (BDE-183)



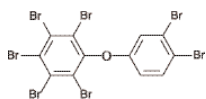
50 ± 5 µg/mL in Nonane
BDE-183-CS 1.2 mL

2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether (BDE-208)



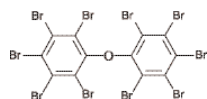
50 ± 5 µg/mL in Nonane
BDE-208-CS 1.2 mL

2,3,3',4,4',5,6-Heptabromodiphenyl ether (BDE-190)



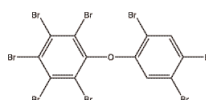
50 ± 5 µg/mL in Nonane
BDE-190-CS 1.2 mL

Decabromodiphenyl ether (BDE-209)



50 ± 5 µg/mL in Nonane
BDE-209-CS 1.2 mL

2,2',3,4,4',5,5',6-Octabromodiphenyl ether (BDE-203)



50 ± 5 µg/mL in Nonane
BDE-203-CS 1.2 mL

U.S. EPA Method 1614 Standard Mixtures

CATALOG #	COMPOUND	AMOUNT					
EO-5279 ^{new}	Method 1614 Calibration Solutions [CS1 - CS5]	5 X 0.2 mL in Nonane					
<i>All concentrations are in ng/mL</i>							
Native BDEs		Congener#	CS1	CS2	CS3	CS4	CS5
2,4,4'-TriBDE		28	1	5	50	500	2500
2,2',4,4'-TetraBDE		47	1	5	50	500	2500
2,2',4,4',5-PentaBDE		99	1	5	50	500	2500
2,2',4,4',6-PentaBDE		100	1	5	50	500	2500
2,2',4,4',5,5'-HexaBDE		153	1	5	50	500	2500
2,2',4,4',5,6'-HexaBDE		154	1	5	50	500	2500
2,2',3,4,4',5',6-HeptaBDE		183	1	5	50	500	2500
DecaBDE		209	10	50	500	5000	25000
Labeled BDEs		Congener#	CS1	CS2	CS3	CS4	CS5
2,4,4'-TriBDE (¹³ C ₁₂ ,99%)		28L	100	100	100	100	100
2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)		47L	100	100	100	100	100
2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)		99L	100	100	100	100	100
2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)		100L	100	100	100	100	100
2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)		153L	100	100	100	100	100
2,2',4,4',5,6'-HexaBDE (¹³ C ₁₂ ,99%)		154L	100	100	100	100	100
2,2',3,4,4',5',6-HeptaBDE (¹³ C ₁₂ ,99%)		183L	100	100	100	100	100
DecaBDE (¹³ C ₁₂ ,99%)		209L	1000	1000	1000	1000	1000
Labeled Clean-up		Congener#	CS1	CS2	CS3	CS4	CS5
2,2',3,4,4',6-HexaBDE (¹³ C ₁₂ ,99%)		139L	100	100	100	100	100
Labeled Injection Internal		Congener#	CS1	CS2	CS3	CS4	CS5
2,2',5,5'-TetraCB (¹³ C ₁₂ ,99%)		PCB-52L	100	100	100	100	100
2,2',3,4,4',5'-HexaCB (¹³ C ₁₂ ,99%)		PCB-138L	100	100	100	100	100

Brominated Flame Retardant Standards and Standard Mixtures

U.S. EPA Method 1614 Standard Mixtures (continued)

CATALOG #	COMPOUND	AMOUNT
EO-5277 ^{new}	Method 1614 Labeled Surrogate Stock Solution	1.2 mL in Nonane
	Labeled BDEs	BDE # Concentration (µg/mL)
	2,4,4'-TriBDE (¹³ C ₁₂ ,99%)	28L 1
	2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	47L 1
	2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	99L 1
	2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)	100L 1
	2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)	153L 1
	2,2',4,4',5,6'-HexaBDE (¹³ C ₁₂ ,99%)	154L 1
	2,2',3,4,4',5',6-HeptaBDE (¹³ C ₁₂ ,99%)	183L 1
	DecaBDE (¹³ C ₁₂ ,99%)	209L 10

CATALOG #	COMPOUND	AMOUNT
EO-5276 ^{new}	Method 1614 Labeled Clean-Up Stock Solution	1.2 mL in Nonane
	Labeled BDE	BDE # Concentration (µg/mL)
	2,2',3,4,4',6-HexaBDE (¹³ C ₁₂ ,99%)	139L 1

CATALOG #	COMPOUND	AMOUNT
EO-5275 ^{new}	Method 1614 Labeled Injection Internal Stock Solution	1.2 mL in Nonane
	Labeled PCBs	IUPAC # Concentration (µg/mL)
	2,2',5,5'-TetraCB (¹³ C ₁₂ ,99%)	52L 5
	2,2',3,4,4',5'-HexaCB (¹³ C ₁₂ ,99%)	138L 5

CATALOG #	COMPOUND	AMOUNT
EO-5278 ^{new}	Method 1614 Native PAR Stock Solution	1.2 mL in Nonane
	Unlabeled BDEs	BDE # Concentration (µg/mL)
	2,4,4'-TriBDE	28 1
	2,2',4,4'-TetraBDE	47 1
	2,2',4,4',5-PentaBDE	99 1
	2,2',4,4',6-PentaBDE	100 1
	2,2',4,4',5,5'-HexaBDE	153 1
	2,2',4,4',5,6'-HexaBDE	154 1
	2,2',3,4,4',5',6-HeptaBDE	183 1
	DecaBDE	209 10

Isotope Labeled BDE Standard Mixtures

CATALOG #	COMPOUND	AMOUNT						
EO-5104 ^{new}	Brominated Diphenyl Ether Calibration Solution [CS1-CS6]	6 x 0.2 mL in Nonane <i>All concentrations are in ng/mL</i>						
	Unlabeled BDEs	BDE#	CS1	CS2	CS3	CS4	CS5	CS6
	2-MonoBDE	1	0.2	1	5	25	100	500
	3-MonoBDE	2	0.2	1	5	25	100	500
	4-MonoBDE	3	0.2	1	5	25	100	500
	2,4-DiBDE	7	0.2	1	5	25	100	500
	2,4'-DiBDE	8	0.2	1	5	25	100	500
	2,6-DiBDE	10	0.2	1	5	25	100	500
	3,3'-DiBDE	11	0.2	1	5	25	100	500
	3,4-DiBDE	12	0.2	1	5	25	100	500
	3,4'-DiBDE	13	0.2	1	5	25	100	500
	4,4'-DiBDE	15	0.2	1	5	25	100	500
	2,2',4-TriBDE	17	0.2	1	5	25	100	500
	2,3',4-TriBDE	25	0.2	1	5	25	100	500
	2,4,4'-TriBDE	28	0.2	1	5	25	100	500
	2,4,6-TriBDE	30	0.2	1	5	25	100	500
	2,4',6-TriBDE	32	0.2	1	5	25	100	500
	2',3,4-TriBDE	33	0.2	1	5	25	100	500
	3,3',4-TriBDE	35	0.2	1	5	25	100	500
	3,4,4'-TriBDE	37	0.2	1	5	25	100	500
	2,2',4,4'-TetraBDE	47	0.2	1	5	25	100	500
	2,2',4,5'-TetraBDE	49	0.2	1	5	25	100	500
	2,3',4,4'-TetraBDE	66	0.2	1	5	25	100	500
	2,3',4',6-TetraBDE	71	0.2	1	5	25	100	500
	2,4,4',6-TetraBDE	75	0.2	1	5	25	100	500
	3,3',4,4'-TetraBDE	77	0.2	1	5	25	100	500
	2,2',3,4,4'-PentaBDE	85	0.3	1.5	7.5	37.5	150	750
	2,2',4,4',5-PentaBDE	99	0.3	1.5	7.5	37.5	150	750
	2,2',4,4',6-PentaBDE	100	0.3	1.5	7.5	37.5	150	750
	2,3,4,5,6-PentaBDE	116	0.3	1.5	7.5	37.5	150	750
	2,3',4,4',5-PentaBDE	118	0.3	1.5	7.5	37.5	150	750
	2,3',4,4',6-PentaBDE	119	0.3	1.5	7.5	37.5	150	750
	3,3',4,4',5-PentaBDE	126	0.3	1.5	7.5	37.5	150	750
	2,2',3,4,4',5'-HexaBDE	138	0.6	3	15	75	300	1500
	2,2',4,4',5,5'-HexaBDE	153	0.4	2	10	50	200	1000
	2,2',4,4',5,6'-HexaBDE	154	0.4	2	10	50	200	1000
	2,2',4,4',6,6'-HexaBDE	155	0.4	2	10	50	200	1000
	2,3,4,4',5,6-HexaBDE	166	0.4	2	10	50	200	1000
	2,2',3,4,4',5,6-HeptaBDE	181	0.5	2.5	12.5	62.5	250	1250
	2,2',3,4,4',5',6-HeptaBDE	183	0.5	2.5	12.5	62.5	250	1250
	2,3,3',4,4',5,6-HeptaBDE	190	0.5	2.5	12.5	62.5	250	1250
	Labeled BDEs	BDE#	CS1	CS2	CS3	CS4	CS5	CS6
	4-MonoBDE (¹³ C ₁₂ ,99%)	3	100	100	100	100	100	100
	4,4'-DiBDE (¹³ C ₁₂ ,99%)	15	100	100	100	100	100	100
	2,4,4'-TriBDE (¹³ C ₁₂ ,99%)	28	100	100	100	100	100	100
	2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	47	100	100	100	100	100	100
	3,3',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	77	100	100	100	100	100	100
	2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	99	150	150	150	150	150	150
	2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)	100	150	150	150	150	150	150
	2,3',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	118	150	150	150	150	150	150
	3,3',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	126	150	150	150	150	150	150
	2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)	153	200	200	200	200	200	200
	2,2',3,4,4',5',6-HeptaBDE (¹³ C ₁₂ ,99%)	183	250	250	250	250	250	250

Brominated Flame Retardant Standards and Standard Mixtures

Isotope Labeled BDE Standard Mixtures (continued)

CATALOG #	COMPOUND	AMOUNT
EO-5100 ^{new}	Polybrominated Diphenyl Ether Surrogate Spiking Solution	1.2 mL in Nonane
EO-5100-10x-0.5 ^{new}	Polybrominated Diphenyl Ether Surrogate Spiking Stock Solution	0.5 mL in Nonane

Labeled BDEs	BDE#	EO-5100 Concentration (ng/mL)	EO-5100-10x-0.5 Concentration (ng/mL)
4-MonoBDE (¹³ C ₁₂ ,99%)	3	100	1000
4,4'-DiBDE (¹³ C ₁₂ ,99%)	15	100	1000
2,4,4'-TriBDE (¹³ C ₁₂ ,99%)	28	100	1000
2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	47	100	1000
2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	99	150	1500
2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)	100	150	1500
2,3',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	118	150	1500
2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)	153	200	2000
2,2',3,4,4',5',6-HeptaBDE (¹³ C ₁₂ ,99%)	183	250	2500

CATALOG #	COMPOUND	AMOUNT
EO-5101 ^{new}	Polybrominated Diphenyl Ether Performance Standard Solution	1.2 mL in Nonane
EO-5101-10x-1.2 ^{new}	Polybrominated Diphenyl Ether Performance Standard Stock (10X) Solution	1.2 mL in Nonane

Labeled BDEs	BDE#	EO-5101 Concentration (ng/mL)	EO-5101-10x-1.2 Concentration (ng/mL)
3,3',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	77	100	1000
3,3',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	126	150	1500

Isotope Labeled BDE Standard Mixtures (continued)

CATALOG #	COMPOUND	AMOUNT
EO-5099 ^{new}	Polybrominated Diphenyl Ether Analytical Standard Solution	1.2 mL in Nonane
	Unlabeled BDEs	BDE #
		Concentration (ng/mL)
	2-MonoBDE	1
	3-MonoBDE	2
	4-MonoBDE	3
	2,4-DiBDE	7
	2,4'-DiBDE	8
	2,6-DiBDE	10
	3,3'-DiBDE	11
	3,4-DiBDE	12
	3,4'-DiBDE	13
	4,4'-DiBDE	15
	2,2',4-TriBDE	17
	2,3',4-TriBDE	25
	2,4,4'-TriBDE	28
	2,4,6-TriBDE	30
	2,4',6-TriBDE	32
	2',3,4-TriBDE	33
	3,3',4-TriBDE	35
	3,4,4'-TriBDE	37
	2,2',4,4'-TetraBDE	47
	2,2',4,5'-TetraBDE	49
	2,3',4,4'-TetraBDE	66
	2,3',4',6-TetraBDE	71
	2,4,4',6-TetraBDE	75
	3,3',4,4'-TetraBDE	77
	2,2',3,4,4'-PentaBDE	85
	2,2',4,4',5-PentaBDE	99
	2,2',4,4',6-PentaBDE	100
	2,3,4,5,6-PentaBDE	116
	2,3',4,4',5-PentaBDE	118
	2,3',4,4',6-PentaBDE	119
	3,3',4,4',5-PentaBDE	126
	2,2',3,4,4',5'-HexaBDE	138
	2,2',4,4',5,5'-HexaBDE	153
	2,2',4,4',5,6'-HexaBDE	154
	2,2',4,4',6,6'-HexaBDE	155
	2,3,4,4',5,6-HexaBDE	166
	2,2',3,4,4',5,6-HeptaBDE	181
	2,2',3,4,4',5',6-HeptaBDE	183
	2,3,3',4,4',5,6-HeptaBDE	190

list continues on next page (EO-5099 product specification)

Isotope Labeled BDE Standard Mixtures (continued)

list continues from previous page (EO-5099 product specification)

Labeled BDEs	BDE #	Concentration (ng/mL)
4-MonoBDE (¹³ C ₁₂ ,99%)	3	100
4,4'-DiBDE (¹³ C ₁₂ ,99%)	15	100
2,4,4'-TriBDE (¹³ C ₁₂ ,99%)	28	100
2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	47	100
3,3',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	77	100
2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	99	150
2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)	100	150
2,3',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	118	150
3,3',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	126	150
2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)	153	200
2,2',3,4,4',5',6-HeptaBDE (¹³ C ₁₂ ,99%)	183	250

Isotope Labeled BDE Standard Mixtures (continued)

CATALOG #	COMPOUND	AMOUNT										
EO-5159 ^{new}	BFR Calibration Solutions [CS1-CS10]	10 x 0.5 mL in Nonane										
Unlabeled Compounds	BDE/PCB/PBB*	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8	CS9	CS10	
2,2',4-TriBDE	17	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,4,4'-TriBDE	28	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4'-TetraBDE	47	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,3',4,4'-TetraBDE	66	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4',6-PentaBDE	100	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4',5-PentaBDE	99	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',3,4,4'-PentaBDE	85	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4',5,6'-HexaBDE	154	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4',5,5'-HexaBDE	153	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',3,4,4',5,6'-HeptaBDE	183	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',3,4,4',5,5',6-OctaBDE	203	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',3,3',4,4',5,5',6,6'-DecaBDE	209	0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4',5,5'-HexaBB	153	0.2	0.5	1	5	10	50	100	500	1000	2000	
α -Hexabromocyclododecane		0.2	0.5	1	5	10	50	100	500	1000	2000	
2,2',4,4',5,5'-HexaCB	153	0.2	0.5	1	5	10	50	100	500	1000	2000	
Labeled Compounds	BDE/PCB/PBB*	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8	CS9	CS10	
1,2,3,4-TetraCDD (¹³ C ₆ ,99%)		25	25	25	25	25	25	25	25	25	25	
2,2',3,3',4,5,5',6,6'-NonaCB (¹³ C ₁₂ ,99%)	208	100	100	100	100	100	100	100	100	100	100	
2,4,4'-TriBDE (¹³ C ₁₂ ,99%)	28	75	75	75	75	75	75	75	75	75	75	
2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	47	75	75	75	75	75	75	75	75	75	75	
3,3',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	77	75	75	75	75	75	75	75	75	75	75	
2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)	100	75	75	75	75	75	75	75	75	75	75	
2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	99	75	75	75	75	75	75	75	75	75	75	
2,2',4,4',5,6'-HexaBDE (¹³ C ₁₂ ,99%)	154	75	75	75	75	75	75	75	75	75	75	
2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)	153	75	75	75	75	75	75	75	75	75	75	
2,2',3,4,4',6-HexaBDE (¹³ C ₁₂ ,99%)	139	75	75	75	75	75	75	75	75	75	75	
2,2',3,4,4',5,6'-HeptaBDE (¹³ C ₁₂ ,99%)	183	75	75	75	75	75	75	75	75	75	75	
DecaBDE (¹³ C ₁₂ ,99%)	209	75	75	75	75	75	75	75	75	75	75	
2,2',4,4',5,5'-HexaBB (¹³ C ₁₂ ,99%)	153	75	75	75	75	75	75	75	75	75	75	
2,2',4,4',5,5'-HexaCB (¹³ C ₁₂ ,99%)	153	75	75	75	75	75	75	75	75	75	75	

Brominated Flame Retardant Standards and Standard Mixtures

Isotope Labeled BDE Standard Mixtures (continued)

CATALOG #	COMPOUND	AMOUNT
EO-5158 ^{new}	BFR Spiking Solution in Methanol	10 mL in 99% Methanol, 1% Nonane
	Labeled Compounds	BDE/PBB* Concentration (ng/mL)
	2,4,4'-TriBDE (¹³ C ₁₂ ,99%)	28 7.5
	2,2',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	47 7.5
	2,2',4,4',6-PentaBDE (¹³ C ₁₂ ,99%)	100 7.5
	2,2',4,4',5-PentaBDE (¹³ C ₁₂ ,99%)	99 7.5
	2,2',4,4',5,6'-HexaBDE (¹³ C ₁₂ ,99%)	154 7.5
	2,2',4,4',5,5'-HexaBDE (¹³ C ₁₂ ,99%)	153 7.5
	2,2',3,4,4',5',6-HeptaBDE (¹³ C ₁₂ ,99%)	183 7.5
	DecaBDE (¹³ C ₁₂ ,99%)	209 7.5
	2,2',4,4',5,5'-HexaBB (¹³ C ₁₂ ,99)	153 7.5

CATALOG #	COMPOUND	AMOUNT
EO-5169 ^{new}	BFR Recovery Spiking Solution	10 mL in 88% Hexane, 2% Dodecane 10% Nonane
	Labeled Compounds	BDE/PBB* Concentration (ng/mL)
	1,2,3,4-TetraCDD (¹³ C ₆ ,99%)	2.5
	3,3',4,4'-TetraBDE (¹³ C ₁₂ ,99%)	77 7.5
	2,2',3,4,4',6-HexaBDE (¹³ C ₁₂ ,99%)	139 7.5
	2,2',3,3',4,5,5',6,6'-NonaCB (¹³ C ₁₂ ,99%)	208 10

Unlabeled BDE Standard Mixtures

CATALOG #	COMPOUND	AMOUNT
EO-5103 ^{new}	Polybrominated Diphenyl Ether Predominant Congener Mixture	1.2 mL in Nonane
	Unlabeled BDEs	BDE# Concentration (µg/mL)
	2,2',4-TriBDE	17 2.5
	2,4,4'-TriBDE	28 2.5
	2,2',4,4'-TetraBDE	47 2.5
	2,3',4,4'-TetraBDE	66 2.5
	2,3',4',6-TetraBDE	71 2.5
	2,2',3,4,4'-PentaBDE	85 2.5
	2,2',4,4',5-PentaBDE	99 2.5
	2,2',4,4',6-PentaBDE	100 2.5
	2,2',3,4,4',5'-HexaBDE	138 3.75
	2,2',4,4',5,5'-HexaBDE	153 2.5
	2,2',4,4',5,6'-HexaBDE	154 2.5
	2,2',3,4,4',5',6-HeptaBDE	183 2.5
	2,3,3',4,4',5,6-HeptaBDE	190 2.5
	DecaBDE	209 10

CATALOG #	COMPOUND	AMOUNT
EO-5113 ^{new}	Polybrominated Diphenyl Ether PAR Solution (Unlabeled)	0.5 mL in Nonane
EO-5113-7.5X-0.5 ^{new}	Polybrominated Diphenyl Ether PAR Solution (Unlabeled) (7.5X Solution of Congeners in EO-5113)	0.5 mL in Nonane

Unlabeled Congeners	BDE#	EO-5113 Concentration (ng/mL)	EO-5113-7.5X-0.5 Concentration (ng/mL)
2-MonoBDE	1	100	750
3-MonoBDE	2	100	750
4-MonoBDE	3	100	750
2,4-DiBDE	7	100	750
2,4'-DiBDE	8	100	750
2,6-DiBDE	10	100	750
3,3'-DiBDE	11	100	750
3,4-DiBDE	12	100	750
3,4'-DiBDE	13	100	750
4,4'-DiBDE	15	100	750
2,2',4-TriBDE	17	100	750

list continues on next page (EO-5113 product specification)

Brominated Flame Retardant Standards and Standard Mixtures

Unlabeled BDE Standard Mixtures (continued)

list continues from previous page (EO-5113 product specification)

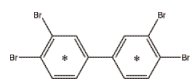
Unlabeled Congeners	BDE#	EO-5113 Concentration (ng/mL)	EO-5113-7.5X-0.5 Concentration (ng/mL)
2,3',4-TriBDE	25	100	750
2,4,4'-TriBDE	28	100	750
2,4,6-TriBDE	30	100	750
2,4',6-TriBDE	32	100	750
2',3,4-TriBDE	33	100	750
3,3',4-TriBDE	35	100	750
3,4,4'-TriBDE	37	100	750
2,2',4,4'-TetraBDE	47	100	750
2,2',4,5'-TetraBDE	49	100	750
2,3',4,4'-TetraBDE	66	100	750
2,3',4',6-TetraBDE	71	100	750
2,4,4',6-TetraBDE	75	100	750
3,3',4,4'-TetraBDE	77	100	750
2,2',3,4,4'-PentaBDE	85	150	1125
2,2',4,4',5-PentaBDE	99	150	1125
2,2',4,4',6-PentaBDE	100	150	1125
2,3,4,5,6-PentaBDE	116	150	1125
2,3',4,4',5-PentaBDE	118	150	1125
2,3',4,4',6-PentaBDE	119	150	1125
3,3',4,4',5-PentaBDE	126	150	1125
2,2',3,4,4',5'-HexaBDE	138	300	2250
2,2',4,4',5,5'-HexaBDE	153	200	1500
2,2',4,4',5,6'-HexaBDE	154	200	1500
2,2',4,4',6,6'-HexaBDE	155	200	1500
2,3,4,4',5,6-HexaBDE	166	200	1500
2,2',3,4,4',5,6-HeptaBDE	181	250	1875
2,2',3,4,4',5',6-HeptaBDE	183	250	1875
2,3,3',4,4',5,6-HeptaBDE	190	250	1875

BDE Technical Mixtures

CATALOG #	COMPOUND AND CONCENTRATION	AMOUNT
EO-4958-1.2	Bromkal 70-5 Diphenyl Ether Technical Mix 50 µg/mL in Methanol	1.2 mL
EO-5031 ^{new}	PentaBDE Technical Mix (DE-71) 50 µg/mL in Methanol	1.2 mL
EO-5030 ^{new}	OctaBDE Technical Mix (DE-79) 50 µg/mL in Methanol	1.2 mL
EO-5060 ^{new}	DecaBDE Technical Mix (Saytex 102E) 10 µg/mL in Methanol	10 mL

Isotope Labeled Polybrominated Biphenyl (PBB) Standards

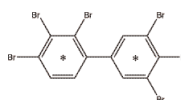
3,3',4,4'-TetraBB (¹³C₁₂, 99%) (PBB-77)



40 ± 2 µg/mL in Nonane

EB-5055^{new} 3 mL

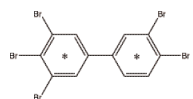
2,3,3',4,4',5'-HexaBB (¹³C₁₂, 99%) (PBB-157)



40 ± 2 µg/mL in Nonane

EB-5106^{new} 3 mL

3,3',4,4',5-PentaBB (¹³C₁₂, 99%) (PBB-126)

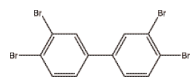


40 ± 2 µg/mL in Nonane

EB-5056^{new} 3 mL

Unlabeled Polybrominated Biphenyl (PBB) Standards

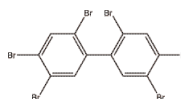
3,3',4,4'-TetraBB Certified Standard (PBB-77)



100 µg/mL in Isooctane

PBB-77-CS^{new} 1.2 mL

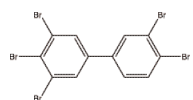
2,2',4,4',5,5'-HexaBB Certified Standard (PBB-153)



100 µg/mL in Isooctane

PBB-153-CS^{new} 1.2 mL

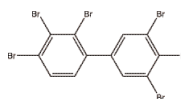
3,3',4,4',5-PentaBB Certified Standard (PBB-126)



100 µg/mL in Isooctane

PBB-126-CS^{new} 1.2 mL

2,3,3',4,4',5'-HexaBB Certified Standard (PBB-157)



100 µg/mL in Isooctane

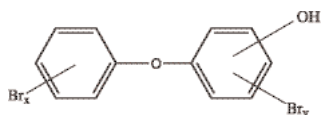
PBB-157-CS^{new} 1.2 mL

Tetrabromobisphenol A (TBBPA) and Hexabromocyclododecane (HBCD) Standards

CATALOG #	COMPOUND AND CONCENTRATION	AMOUNT
CLM-4694-1.2	Tetrabromobisphenol A (Ring- ¹³ C ₁₂ ,99%) 50 µg/mL in Methanol	1.2 mL
ULM-4694-1.2	Tetrabromobisphenol A (Unlabeled) 50 µg/mL in Methanol	1.2 mL
ULM-6236-1.2 ^{new}	Dimethyl Tetrabromobisphenol A (Unlabeled) 50 µg/mL in Nonane	1.2 mL
CLM-7102-1.2 ^{new}	Hexabromocyclododecane (¹³ C ₁₂ ,99%) (mix of α,β and γ isomers) 50 µg/mL in Toluene	1.2 mL
ULM-4834-1.2	α-Hexabromocyclododecane (Unlabeled) 50 µg/mL in Toluene	1.2 mL
ULM-4835-1.2	β-Hexabromocyclododecane (Unlabeled) 50 µg/mL in Toluene	1.2 mL
ULM-4836-1.2	γ-Hexabromocyclododecane (Unlabeled) 50 µg/mL in Toluene	1.2 mL

¹³C Labeled and Unlabeled BDE Metabolites

OH-BDE



Brominated Flame Retardants (BFRs), and in particular, the widely-used class of Brominated Diphenyl Ethers (BDEs) have been the subject of extensive scrutiny in recent years by Toxicologists, Analytical Chemists, and Risk Assessors. Recently, researchers have suggested that BDE body burdens are not completely represented by measurements of BDEs in tissue or milk. Analytical data indicates that the liver hydrolyzes BDEs in its attempts to expel them. BDE toxicity is still being established, but there is a likelihood that BDE metabolites have similar or greater toxicity than the parent BDEs. CIL has been producing both unlabeled and ¹³C₁₂ Methoxy- and Hydroxy-BDEs. Please contact CIL or your CIL representative if you are interested in analyzing BDE Metabolites.

MEO-BDE

