



CIL

Cambridge Isotope Laboratories, Inc.
www.isotope.com

ENVIRONMENTAL STANDARDS

PCB Calibration Series and $^{13}\text{C}_{12}$ -labeled Spiking Mixtures for CEN/TS 1948-4:2007

The European Committee for Standardization (CEN) has published a final draft of Technical Specification prCEN/TS 1948-4:

"Stationary source emissions – Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs – Part 4: Sampling and analysis of dioxin-like PCBs."

In 2006 Cambridge Isotope Laboratories (CIL) collaborated with the CEN organizing laboratory to define and develop PCB Calibration Series and $^{13}\text{C}_{12}$ -labeled Spiking Mixtures to be used with method CEN/TS 1948-4. CIL supplied these standards to the organizing laboratory for use in their Interlaboratory Evaluation Study.

With the intercalibration study successfully completed, and further comments incorporated, the method has been published as a "Technical Specification" (TS), awaiting final vote to be established as a European Standard" (EN).

The following standards are now available from CIL:

Description	CIL#
EN-1948-4 WHO PCB Calibration Series (CS1-CS6)	EC-5380
EN-1948-4 PCB Sampling Standard ($^{13}\text{C}_{12}$, 99%)	EC-5370
EN-1948-4 WHO PCB Extraction Standard ($^{13}\text{C}_{12}$, 99%)	EC-5372
EN-1948-4 PCB Recovery Standard ($^{13}\text{C}_{12}$, 99%)	EC-5371
EN-1948-4 Marker PCB Calibration Series (CS1-CS6)	EC-5385
EN-1948-4 Marker PCB Extraction Standard ($^{13}\text{C}_{12}$, 99%)	EC-5379



EC-5380	EN-1948-4 WHO PCB Calibration Series 6 x 0.2mL in Isooctane/Nonane						
	IUPAC	CS1	CS2	CS3	CS4	CS5	CS6
Native WHO PCBs		ng/mL	ng/mL	ng/mL	ng/mL	ng/mL	ng/mL
3,3',4,4'-TetraCB	77	0.1	1	10	50	200	800
3,4,4',5-TetraCB	81	0.1	1	10	50	200	800
3,3',4,4',5-PentaCB	126	0.1	1	10	50	200	800
3,3',4,4',5,5'-HexaCB	169	0.1	1	10	50	200	800
2,3,3',4,4'-PentaCB	105	0.1	1	10	50	200	800
2,3,4,4',5-PentaCB	114	0.1	1	10	50	200	800
2,3',4,4',5-PentaCB	118	0.6	6	60	300	1200	4800
2',3,4,4',5-PentaCB	123	0.1	1	10	50	200	800
2,3,3',4,4',5-HexaCB	156	0.1	1	10	50	200	800
2,3,3',4,4',5'-HexaCB	157	0.1	1	10	50	200	800
2,3',4,4',5,5'-HexaCB	167	0.1	1	10	50	200	800
2,3,3',4,4',5,5'-HeptaCB	189	0.1	1	10	50	200	800
Sampling Standards							
¹³ C ₁₂ -2,3,4,4'-TetraCB	60	10	10	10	10	10	10
¹³ C ₁₂ -3,3',4,5,5'-PentaCB	127	10	10	10	10	10	10
¹³ C ₁₂ -2,3,3',4,5,5'-HexaCB	159	10	10	10	10	10	10
Extraction Standards							
¹³ C ₁₂ -3,3',4,4'-TetraCB	77	10	10	10	10	10	10
¹³ C ₁₂ -3,4,4',5-TetraCB	81	10	10	10	10	10	10
¹³ C ₁₂ -3,3',4,4',5-PentaCB	126	10	10	10	10	10	10
¹³ C ₁₂ -3,3',4,4',5,5'-HexaCB	169	10	10	10	10	10	10
¹³ C ₁₂ -2,3,3',4,4'-PentaCB	105	10	10	10	10	10	10
¹³ C ₁₂ -2,3,4,4',5-PentaCB	114	10	10	10	10	10	10
¹³ C ₁₂ -2,3',4,4',5-PentaCB	118	10	10	10	10	10	10
¹³ C ₁₂ -2',3,4,4',5-PentaCB	123	10	10	10	10	10	10
¹³ C ₁₂ -2,3,3',4,4',5-HexaCB	156	10	10	10	10	10	10
¹³ C ₁₂ -2,3,3',4,4',5'-HexaCB	157	10	10	10	10	10	10
¹³ C ₁₂ -2,3',4,4',5,5'-HexaCB	167	10	10	10	10	10	10
¹³ C ₁₂ -2,3,3',4,4',5,5'-HeptaCB	189	10	10	10	10	10	10
Recovery Standards							
¹³ C ₁₂ -2,3',4,5-TetraCB	70	10	10	10	10	10	10
¹³ C ₁₂ -2,3,3',5,5'-PentaCB	111	10	10	10	10	10	10
¹³ C ₁₂ -2,2',3,3',4,4',5-HeptaCB	170	10	10	10	10	10	10

EC-5370	EN-1948-4 PCB Sampling Standard 1.2 mL in Nonane	
Congener	IUPAC	Concentration (ng/mL)
¹³ C ₁₂ -2,3,4,4'-TetraCB	60	100
¹³ C ₁₂ -3,3',4,5,5'-PentaCB	127	100
¹³ C ₁₂ -2,3,3',4,5,5'-HexaCB	159	100

EC-5371	EN-1948-4 PCB Recovery Standard 1.2 mL in Nonane	
Congener	IUPAC	Concentration (ng/mL)
¹³ C ₁₂ -2,3',4,5-TetraCB	70	100
¹³ C ₁₂ -2,3,3',5,5'-PentaCB	111	100
¹³ C ₁₂ -2,2',3,3',4,4',5-HeptaCB	170	100

EC-5372	EN-1948-4 WHO PCB Extraction Standard 1.2 mL in Nonane	
Congener	IUPAC	Concentration (ng/mL)
$^{13}\text{C}_{12}$ -3,3',4,4'-TetraCB	77	100
$^{13}\text{C}_{12}$ -3,4,4',5'-TetraCB	81	100
$^{13}\text{C}_{12}$ -3,3',4,4',5'-PentaCB	126	100
$^{13}\text{C}_{12}$ -3,3',4,4',5',5'-HexaCB	169	100
$^{13}\text{C}_{12}$ -2,3,3',4,4'-PentaCB	105	100
$^{13}\text{C}_{12}$ -2,3,4,4',5'-PentaCB	114	100
$^{13}\text{C}_{12}$ -2,3',4,4',5'-PentaCB	118	100
$^{13}\text{C}_{12}$ -2',3,4,4',5'-PentaCB	123	100
$^{13}\text{C}_{12}$ -2,3,3',4,4',5'-HexaCB	156	100
$^{13}\text{C}_{12}$ -2,3,3',4,4',5'-HexaCB	157	100
$^{13}\text{C}_{12}$ -2,3',4,4',5',5'-HexaCB	167	100
$^{13}\text{C}_{12}$ -2,3,3',4,4',5',5'-HeptaCB	189	100

EC-5385	EN-1948-4 Marker PCB Calibration Series 6 x 0.2 mL in Isooctane/Nonane						
	IUPAC	CS1	CS2	CS3	CS4	CS5	CS6
Native Marker PCBs		ng/mL	ng/mL	ng/mL	ng/mL	ng/mL	ng/mL
2,4,4'-TriCB	28	0.1	1	10	100	500	5000
2,2',5',5'-TetraCB	52	0.1	1	10	100	500	5000
2,2',4,5,5'-PentaCB	101	0.1	1	10	100	500	5000
2,2',3,4,4',5'-HexaCB	138	0.1	1	10	100	500	5000
2,2',4,4',5,5'-HexaCB	153	0.1	1	10	100	500	5000
2,2',3,4,4',5,5'-HeptaCB	180	0.1	1	10	100	500	5000
Sampling Standards							
$^{13}\text{C}_{12}$ -2,3,4,4'-TetraCB	60	10	10	10	10	10	10
$^{13}\text{C}_{12}$ -3,3',4,5,5'-PentaCB	127	10	10	10	10	10	10
$^{13}\text{C}_{12}$ -2,3,3',4,5,5'-HexaCB	159	10	10	10	10	10	10
Extraction Standards							
$^{13}\text{C}_{12}$ -2,4,4'-TriCB	28	100	100	100	100	100	100
$^{13}\text{C}_{12}$ -2,2',5,5'-TetraCB	52	100	100	100	100	100	100
$^{13}\text{C}_{12}$ -2,2',4,5,5'-PentaCB	101	100	100	100	100	100	100
$^{13}\text{C}_{12}$ -2,2',3,4,4',5'-HexaCB	138	100	100	100	100	100	100
$^{13}\text{C}_{12}$ -2,2',4,4',5,5'-HexaCB	153	100	100	100	100	100	100
$^{13}\text{C}_{12}$ -2,2',3,4,4',5,5'-HeptaCB	180	100	100	100	100	100	100
Recovery Standards							
$^{13}\text{C}_{12}$ -2,3',4,5'-TetraCB	70	10	10	10	10	10	10
$^{13}\text{C}_{12}$ -2,3,3',5,5'-PentaCB	111	10	10	10	10	10	10
$^{13}\text{C}_{12}$ -2,2',3,3',4,4',5'-HeptaCB	170	10	10	10	10	10	10

EC-5379	EN-1948-4 Marker PCB Extraction Standard 1.2 mL in Nonane	
Congener	IUPAC	Concentration (ng/mL)
$^{13}\text{C}_{12}$ -2,4,4'-TriCB	28	1000
$^{13}\text{C}_{12}$ -2,2',5,5'-TetraCB	52	1000
$^{13}\text{C}_{12}$ -2,2',4,5,5'-PentaCB	101	1000
$^{13}\text{C}_{12}$ -2,2',3,4,4',5'-HexaCB	138	1000
$^{13}\text{C}_{12}$ -2,2',4,4',5,5'-HexaCB	153	1000
$^{13}\text{C}_{12}$ -2,2',3,3',4,4',5'-HeptaCB	180	1000