



Dioxin and Furan Individual Standards

Solutions for a Greener World

Dioxin and Furan Reference Standards Preparation

The preparation of polychlorinated dibenzo-*p*-dioxin (PCDD) and dibenzofuran (PCDF) certified solution standards begins with the total synthesis of each isomer from known, well-characterized intermediates. Cerilliant QC protocol specifies that all materials be tested to determine identity (multiple techniques), isomer specificity, and purity (multiple techniques), prior to acceptance as a raw material. With few exceptions, our specifications require a chemical purity of >98% for native material and chemical purity of >97% for ¹³C material.

Preparation of CIL/Cerilliant-certified solution standards is tightly controlled using a validated process to ensure accuracy and consistency. Our gravimetric approach (both analyte and solvent are added by weight) is performed using high precision five-place, micro and ultra-micro analytical balances and governed by exacting procedures to ensure minimal uncertainty. Balances are fully qualified in their installed state, are calibrated semi-annually with weekly and pre-use verifications performed – all using NIST traceable weights. Various controls are employed during the dispensing process to ensure no evaporation, degradation, or contamination occurs and to ensure homogeneity and consistency of fill volume from ampoule to ampoule.

Fully certified standards are then put through rigorous QC testing to verify concentration accuracy, consistency with previous lots (when available), and comparison to the corresponding native or ¹³C analog. Finally, homogeneity is ensured through testing of samples pulled during the dispensing process using a random stratified sampling plan. The analytical results are detailed in a comprehensive certificate of analysis (COA) containing complete traceability documentation, which is supplied with each product at no additional charge.

An international round-robin study composed of independent government, commercial, and research laboratories analyzed all 17 CIL/Cerilliant 2,3,7,8-containing polychlorinated dibenzo-*p*-dioxin (PCDD) and dibenzofuran (PCDF) individual solution standards in August 1987. The objective of the study was to determine the accuracy of CIL/Cerilliant solution reference standards. The consensus average values for each of these solutions agreed closely with CIL/Cerilliant reported values – in fact, 15 out of the 17 were within 4%.

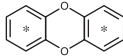
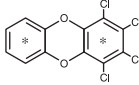
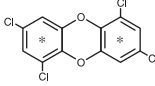
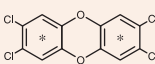
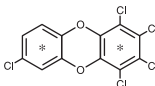
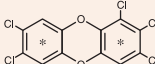
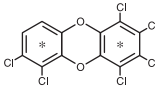
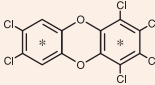
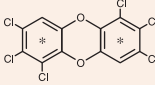
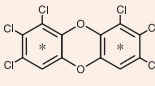
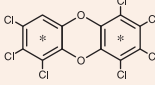
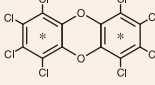
Unlabeled Chlorodioxin/Furan Standards for Elution Profiling

CIL offers the only set of all 136 tetra-octa chlorinated dioxin and furan congeners. These qualitative standards are available as ~25 ng/mL solutions in nonane and are used primarily for elution profiling and peak identification. Researchers can utilize this full suite of standards to help identify unknown peaks in their chromatograms and to fully assess samples in environmental forensic cases. Homolog group kits are available, as is a suite of all 136 congeners. See pages 24-25 for full product listings.

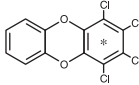
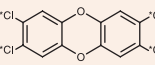
Brominated Dioxin and Furan Individual Standards

In an effort to counteract the effects of low-solubility common to many of the higher homolog brominated dioxins and furans, CIL and Cerilliant have reformulated many of these compounds in a cosolvent solution of 70% nonane with 30% toluene. And while most of the brominated dioxins and furans are already formulated at just 5 µg/mL, as detection limits continue to decrease with advances in instrumentation and cleanup procedures, CIL now offers these products as 1.2 mL units.

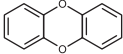
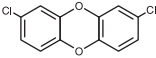
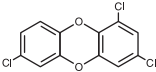
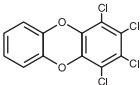
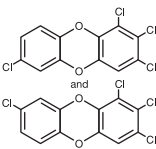
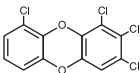
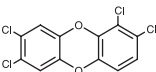
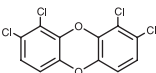
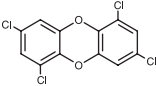
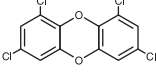
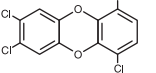
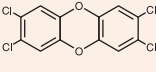
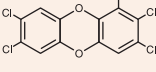
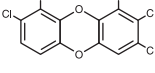
¹³C₁₂-Labeled Chlorodioxin Standards

Catalog No.	Compound	Structure	Concentration	Amount
CLM-1544-1.2	Dibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
ED-911 ED-911-1	1,2,3,4-Tetrachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane 1 ± 0.05 µg/mL in nonane	1.2 mL 1.2 mL
ED-4198	1,3,6,8-Tetrachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
ED-900	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-4076	1,2,3,4,7-Pentachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-955	1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-4077	1,2,3,4,6,7-Hexachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-946	1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-966	1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in 80% nonane/20% toluene	1.2 mL
ED-996	1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in 80% nonane/20% toluene	1.2 mL
ED-972	1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-981	Octachlorodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		10 ± 0.5 µg/mL in nonane	4 × 1.2 mL

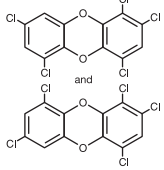
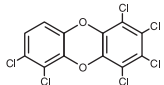
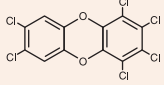
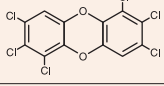
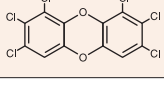
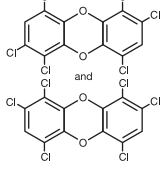
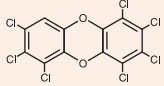
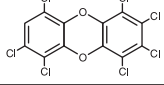
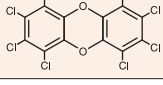
¹³C₆- and ³⁷Cl₄-Labeled Chlorodioxin Standards

Catalog No.	Compound	Structure	Concentration	Amount
ED-910	1,2,3,4-Tetrachlorodibenzo- <i>p</i> -dioxin (¹³ C ₆ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
ED-907	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin (³⁷ Cl ₄ , 96%)		50 ± 5 µg/mL in nonane	1.2 mL

Unlabeled Chlorodioxin Standards

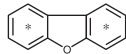
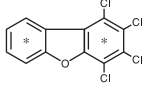
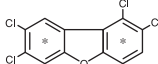
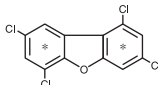
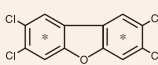
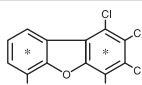
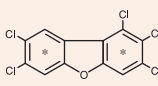
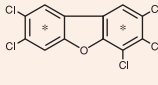
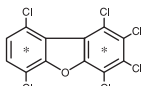
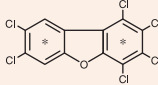
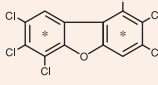
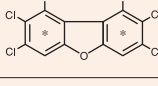
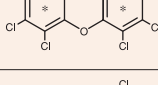
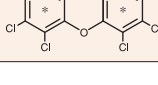
Catalog No.	Compound	Structure	Concentration	Amount
ULM-1711-1.2	Dibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-5568	2,8-Dichlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-4090	1,3,7-Trichlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-912	1,2,3,4-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-905	1,2,3,7-Tetrachlorodibenzo- <i>p</i> -dioxin/ 1,2,3,8-Tetrachlorodibenzo- <i>p</i> -dioxin isomer pair		50 ± 5 µg/mL in nonane	1.2 mL
ED-948	1,2,3,9-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-915	1,2,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-916	1,2,8,9-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-2518	1,3,6,8-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-4061	1,3,7,9-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-922	1,4,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-901	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane	4 × 1.2 mL
ED-901-A			10 ± 1 µg/mL in methanol	1.2 mL
ED-901-B			50 ± 5 µg/mL in DMSO	1.2 mL
ED-901-C			crystalline solid	1 mg
ED-901-D			32 ± 4 µg/µL in DMSO (100 nM)	0.2 mL
ED-950 ED-950-C	1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg
ED-924	1,2,3,8,9-Pentachlorodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in nonane	1.2 mL

Unlabeled Chlorodioxin Standards

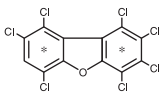
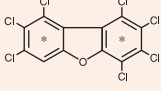
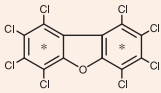
Catalog No.	Compound	Structure	Concentration	Amount
ED-927	1,2,4,6,8-Pentachlorodibenzo- <i>p</i> -dioxin/ 1,2,4,7,9-Pentachlorodibenzo- <i>p</i> -dioxin isomer pair		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-932	1,2,3,4,6,7-Hexachlorodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-961	1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-960 ED-960-C	1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg
ED-969 ED-969-C	1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg
ED-929	1,2,4,6,7,9-Hexachlorodibenzo- <i>p</i> -dioxin/ 1,2,4,6,8,9-Hexachlorodibenzo- <i>p</i> -dioxin isomer pair		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-971	1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin		50 ± 2.5 µg/mL in nonane	1.2 mL
ED-976	1,2,3,4,6,7,9-Heptachlorodibenzo- <i>p</i> -dioxin		50 ± 5 µg/mL in nonane	1.2 mL
ED-980 ED-980-C	Octachlorodibenzo- <i>p</i> -dioxin		10 ± 0.5 µg/mL in nonane crystalline solid	4 × 1.2 mL 10 mg

Other isomers may be available on a special request basis; please inquire.

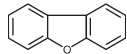
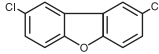
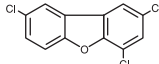
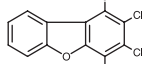
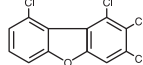
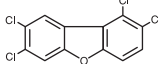
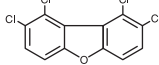
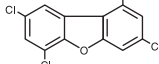
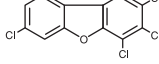
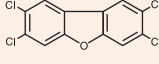
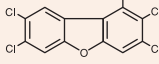
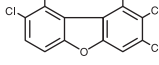
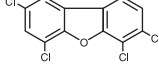
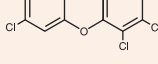
¹³C₁₂-Labeled Chlorofuran Standards

Catalog No.	Compound	Structure	Concentration	Amount
CLM-1561-1.2	Dibenzofuran (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-920	1,2,3,4-Tetrachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-1438	1,2,7,8-Tetrachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-5009	1,3,6,8-Tetrachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-904	2,3,7,8-Tetrachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-5050	1,2,3,4,6-Pentachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-952	1,2,3,7,8-Pentachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-958	2,3,4,7,8-Pentachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-5052	1,2,3,4,6,9-Hexachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-963	1,2,3,4,7,8-Hexachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-985	1,2,3,6,7,8-Hexachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-986	1,2,3,7,8,9-Hexachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-987	2,3,4,6,7,8-Hexachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-974	1,2,3,4,6,7,8-Heptachlorodibenzofuran (¹³ C ₁₂ , 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL

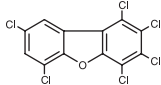
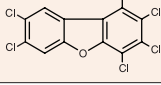
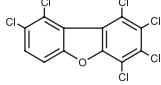
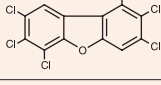
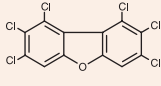
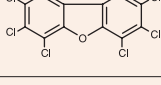
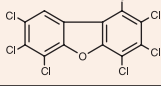
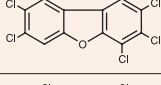
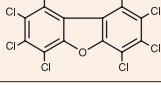
$^{13}\text{C}_{12}$ -Labeled Chlorofuran Standards

Catalog No.	Compound	Structure	Concentration	Amount
EF-5054	1,2,3,4,6,8,9-Heptachlorodibenzofuran ($^{13}\text{C}_{12}$, 99%)		50 ± 5 µg/mL in nonane	1.2 mL
EF-988	1,2,3,4,7,8,9-Heptachlorodibenzofuran ($^{13}\text{C}_{12}$, 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-983	Octachlorodibenzofuran ($^{13}\text{C}_{12}$, 99%)		50 ± 2.5 µg/mL in nonane	1.2 mL

Unlabeled Chlorofuran Standards

Catalog No.	Compound	Structure	Concentration	Amount
ULM-1712-1.2	Dibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-1789	2,8-Dichlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-1793	2,4,8-Trichlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-921	1,2,3,4-Tetrachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-4030	1,2,3,9-Tetrachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-918	1,2,7,8-Tetrachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-939	1,2,8,9-Tetrachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-944	1,3,6,8-Tetrachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-4031	2,3,4,7-Tetrachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-903 EF-903-C	2,3,7,8-Tetrachlorodibenzofuran		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg
EF-953 EF-953-C	1,2,3,7,8-Pentachlorodibenzofuran		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg
EF-954	1,2,3,8,9-Pentachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-942-50	1,3,4,6,8-Pentachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-956 EF-956-C	2,3,4,7,8-Pentachlorodibenzofuran		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg

Unlabeled Chlorofuran Standards

Catalog No.	Compound	Structure	Concentration	Amount
EF-943-50	1,2,3,4,6,8-Hexachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-964 EF-964-C	1,2,3,4,7,8-Hexachlorodibenzofuran		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 1 mg
EF-965	1,2,3,4,8,9-Hexachlorodibenzofuran		50 ± 5 µg/mL in nonane	1.2 mL
EF-962	1,2,3,6,7,8-Hexachlorodibenzofuran		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-967	1,2,3,7,8,9-Hexachlorodibenzofuran		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-968	2,3,4,6,7,8-Hexachlorodibenzofuran		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-973	1,2,3,4,6,7,8-Heptachlorodibenzofuran		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-975	1,2,3,4,7,8,9-Heptachlorodibenzofuran		50 ± 2.5 µg/mL in nonane	1.2 mL
EF-982 EF-982-C	Octachlorodibenzofuran		50 ± 2.5 µg/mL in nonane crystalline solid	1.2 mL 10 mg

Other isomers may be available on a special request basis; please inquire.

Unlabeled Chlorofuran Standards for Elution Profiling (Qualitative Solutions)

All concentrations are ~25 ng/mL in nonane

Catalog No.	Compound	Amount
JR-F01-25	1,2,3,4-TetraCDF	0.2 mL
JR-F02-25	1,2,3,6-TetraCDF	0.2 mL
JR-F03-25	1,2,3,7-TetraCDF	0.2 mL
JR-F04-25	1,2,3,8-TetraCDF	0.2 mL
JR-F05-25	1,2,3,9-TetraCDF	0.2 mL
JR-F06-25	1,2,4,6-TetraCDF	0.2 mL
JR-F07-25	1,2,4,7-TetraCDF	0.2 mL
JR-F08-25	1,2,4,8-TetraCDF	0.2 mL
JR-F09-25	1,2,4,9-TetraCDF	0.2 mL
JR-F10-25	1,2,6,7-TetraCDF	0.2 mL
JR-F11-25	1,2,6,8-TetraCDF	0.2 mL
JR-F12-25	1,2,6,9-TetraCDF	0.2 mL
JR-F13-25	1,2,7,8-TetraCDF	0.2 mL
JR-F14-25	1,2,7,9-TetraCDF	0.2 mL
JR-F15-25	1,2,8,9-TetraCDF	0.2 mL
JR-F16-25	1,3,4,6-TetraCDF	0.2 mL
JR-F17-25	1,3,4,7-TetraCDF	0.2 mL
JR-F18-25	1,3,4,8-TetraCDF	0.2 mL
JR-F19-25	1,3,4,9-TetraCDF	0.2 mL
JR-F20-25	1,3,6,7-TetraCDF	0.2 mL
JR-F21-25	1,3,6,8-TetraCDF	0.2 mL
JR-F22-25	1,3,6,9-TetraCDF	0.2 mL
JR-F23-25	1,3,7,8-TetraCDF	0.2 mL
JR-F24-25	1,3,7,9-TetraCDF	0.2 mL
JR-F25-25	1,4,6,7-TetraCDF	0.2 mL
JR-F26-25	1,4,6,8-TetraCDF	0.2 mL
JR-F27-25	1,4,6,9-TetraCDF	0.2 mL
JR-F28-25	1,4,7,8-TetraCDF	0.2 mL
JR-F29-25	1,6,7,8-TetraCDF	0.2 mL
JR-F30-25	2,3,4,6-TetraCDF	0.2 mL
JR-F31-25	2,3,4,7-TetraCDF	0.2 mL
JR-F32-25	2,3,4,8-TetraCDF	0.2 mL
JR-F33-25	2,3,6,7-TetraCDF	0.2 mL
JR-F34-25	2,3,6,8-TetraCDF	0.2 mL
JR-F35-25	2,3,7,8-TetraCDF	0.2 mL
JR-F36-25	2,4,6,7-TetraCDF	0.2 mL
JR-F37-25	2,4,6,8-TetraCDF	0.2 mL
JR-F38-25	3,4,6,7-TetraCDF	0.2 mL
JR-F39-25	1,2,3,4,6-PentaCDF	0.2 mL
JR-F40-25	1,2,3,4,7-PentaCDF	0.2 mL
JR-F41-25	1,2,3,4,8-PentaCDF	0.2 mL
JR-F42-25	1,2,3,4,9-PentaCDF	0.2 mL
JR-F43-25	1,2,3,6,7-PentaCDF	0.2 mL
JR-F44-25	1,2,3,6,8-PentaCDF	0.2 mL

Catalog No.	Compound	Amount
JR-F45-25	1,2,3,6,9-PentaCDF	0.2 mL
JR-F46-25	1,2,3,7,8-PentaCDF	0.2 mL
JR-F47-25	1,2,3,7,9-PentaCDF	0.2 mL
JR-F48-25	1,2,3,8,9-PentaCDF	0.2 mL
JR-F49-25	1,2,4,6,7-PentaCDF	0.2 mL
JR-F50-25	1,2,4,6,8-PentaCDF	0.2 mL
JR-F51-25	1,2,4,6,9-PentaCDF	0.2 mL
JR-F52-25	1,2,4,7,8-PentaCDF	0.2 mL
JR-F53-25	1,2,4,7,9-PentaCDF	0.2 mL
JR-F54-25	1,2,4,8,9-PentaCDF	0.2 mL
JR-F55-25	1,2,6,7,8-PentaCDF	0.2 mL
JR-F56-25	1,2,6,7,9-PentaCDF	0.2 mL
JR-F57-25	1,3,4,6,7-PentaCDF	0.2 mL
JR-F58-25	1,3,4,6,8-PentaCDF	0.2 mL
JR-F59-25	1,3,4,6,9-PentaCDF	0.2 mL
JR-F60-25	1,3,4,7,8-PentaCDF	0.2 mL
JR-F61-25	1,3,4,7,9-PentaCDF	0.2 mL
JR-F62-25	1,3,6,7,8-PentaCDF	0.2 mL
JR-F63-25	1,4,6,7,8-PentaCDF	0.2 mL
JR-F64-25	2,3,4,6,7-PentaCDF	0.2 mL
JR-F65-25	2,3,4,6,8-PentaCDF	0.2 mL
JR-F66-25	2,3,4,7,8-PentaCDF	0.2 mL
JR-F67-25	1,2,3,4,6,7-HexaCDF	0.2 mL
JR-F68-25	1,2,3,4,6,8-HexaCDF	0.2 mL
JR-F69-25	1,2,3,4,6,9-HexaCDF	0.2 mL
JR-F70-25	1,2,3,4,7,8-HexaCDF	0.2 mL
JR-F71-25	1,2,3,4,7,9-HexaCDF	0.2 mL
JR-F72-25	1,2,3,4,8,9-HexaCDF	0.2 mL
JR-F73-25	1,2,3,6,7,8-HexaCDF	0.2 mL
JR-F74-25	1,2,3,6,7,9-HexaCDF	0.2 mL
JR-F75-25	1,2,3,6,8,9-HexaCDF	0.2 mL
JR-F76-25	1,2,3,7,8,9-HexaCDF	0.2 mL
JR-F77-25	1,2,4,6,7,8-HexaCDF	0.2 mL
JR-F78-25	1,2,4,6,7,9-HexaCDF	0.2 mL
JR-F79-25	1,2,4,6,8,9-HexaCDF	0.2 mL
JR-F80-25	1,3,4,6,7,8-HexaCDF	0.2 mL
JR-F81-25	1,3,4,6,7,9-HexaCDF	0.2 mL
JR-F82-25	2,3,4,6,7,8-HexaCDF	0.2 mL
JR-F83-25	1,2,3,4,6,7,8-HeptaCDF	0.2 mL
JR-F84-25	1,2,3,4,6,7,9-HeptaCDF	0.2 mL
JR-F85-25	1,2,3,4,6,8,9-HeptaCDF	0.2 mL
JR-F86-25	1,2,3,4,7,8,9-HeptaCDF	0.2 mL
JR-F87-25	1,2,3,4,6,7,8,9-OctaCDF	0.2 mL

Unlabeled Chlorodioxin Standards for Elution Profiling (Qualitative Solutions)

All concentrations are ~25 ng/mL in nonane

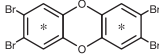
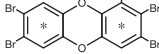
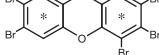
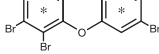
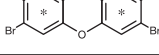
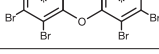
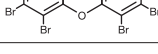
Catalog No.	Compound	Amount	Catalog No.	Compound	Amount
JR-D01-25	1,2,3,4-TetraCDD	0.2 mL	JR-D26-25	1,2,3,6,8-PentaCDD	0.2 mL
JR-D02-25	1,2,3,6-TetraCDD	0.2 mL	JR-D27-25	1,2,3,6,9-PentaCDD	0.2 mL
JR-D03-25	1,2,3,7-TetraCDD	0.2 mL	JR-D28-25	1,2,3,7,8-PentaCDD	0.2 mL
JR-D04-25	1,2,3,8-TetraCDD	0.2 mL	JR-D29-25	1,2,3,7,9-PentaCDD	0.2 mL
JR-D05-25	1,2,3,9-TetraCDD	0.2 mL	JR-D30-25	1,2,3,8,9-PentaCDD	0.2 mL
JR-D06-25	1,2,4,6-TetraCDD	0.2 mL	JR-D31-25	1,2,4,6,7-PentaCDD	0.2 mL
JR-D07-25	1,2,4,7-TetraCDD	0.2 mL	JR-D32-25	1,2,4,6,8-PentaCDD	0.2 mL
JR-D08-25	1,2,4,8-TetraCDD	0.2 mL	JR-D33-25	1,2,4,6,9-PentaCDD	0.2 mL
JR-D09-25	1,2,4,9-TetraCDD	0.2 mL	JR-D34-25	1,2,4,7,8-PentaCDD	0.2 mL
JR-D10-25	1,2,6,7-TetraCDD	0.2 mL	JR-D35-25	1,2,4,7,9-PentaCDD	0.2 mL
JR-D11-25	1,2,6,8-TetraCDD	0.2 mL	JR-D36-25	1,2,4,8,9-PentaCDD	0.2 mL
JR-D12-25	1,2,6,9-TetraCDD	0.2 mL	JR-D37-25	1,2,3,4,6,7-HexaCDD	0.2 mL
JR-D13-25	1,2,7,8-TetraCDD	0.2 mL	JR-D38-25	1,2,3,4,6,8-HexaCDD	0.2 mL
JR-D14-25	1,2,7,9-TetraCDD	0.2 mL	JR-D39-25	1,2,3,4,6,9-HexaCDD	0.2 mL
JR-D15-25	1,2,8,9-TetraCDD	0.2 mL	JR-D40-25	1,2,3,4,7,8-HexaCDD	0.2 mL
JR-D16-25	1,3,6,8-TetraCDD	0.2 mL	JR-D41-25	1,2,3,6,7,8-HexaCDD	0.2 mL
JR-D17-25	1,3,6,9-TetraCDD	0.2 mL	JR-D42-25	1,2,3,6,7,9-HexaCDD	0.2 mL
JR-D18-25	1,3,7,8-TetraCDD	0.2 mL	JR-D43-25	1,2,3,6,8,9-HexaCDD	0.2 mL
JR-D19-25	1,3,7,9-TetraCDD	0.2 mL	JR-D44-25	1,2,3,7,8,9-HexaCDD	0.2 mL
JR-D20-25	1,4,6,9-TetraCDD	0.2 mL	JR-D45-25	1,2,4,6,7,9-HexaCDD	0.2 mL
JR-D21-25	1,4,7,8-TetraCDD	0.2 mL	JR-D46-25	1,2,4,6,8,9-HexaCDD	0.2 mL
JR-D22-25	2,3,7,8-TetraCDD	0.2 mL	JR-D47-25	1,2,3,4,6,7,8-HeptaCDD	0.2 mL
JR-D23-25	1,2,3,4,6-PentaCDD	0.2 mL	JR-D48-25	1,2,3,4,6,7,9-HeptaCDD	0.2 mL
JR-D24-25	1,2,3,4,7-PentaCDD	0.2 mL	JR-D49-25	1,2,3,4,6,7,8,9-OctaCDD	0.2 mL
JR-D25-25	1,2,3,6,7-PentaCDD	0.2 mL			

Unlabeled Chlorodioxin and Chlorofuran Standard Kits for Elution Profiling

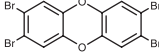
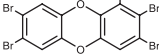
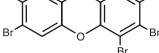
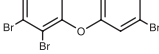
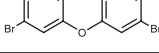
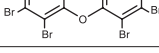
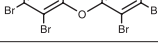
For convenience, CIL has bundled these standards by level of chlorination. Kits are available for tetra-through-hexa dioxins and tetra-through-hepta furans. A comprehensive kit containing all available standards is also available.

Catalog No.	Description	Contains	Amount
JR-TCDD-KIT	Comprehensive Tetrachlorodibenzo- <i>p</i> -dioxin Column Defining Kit	JR-D01-25 – JR-D22-25	1 Kit
JR-TCDF-KIT	Comprehensive Tetrachlorodibenzofuran Column Defining Kit	JR-F01-25 – JR-F38-25	1 Kit
JR-PECDD-KIT	Comprehensive Pentachlorodibenzo- <i>p</i> -dioxin Column Defining Kit	JR-D23-25 – JR-D36-25	1 Kit
JR-PECDF-KIT	Comprehensive Pentachlorodibenzofuran Column Defining Kit	JR-F39-25 – JR-F66-25	1 Kit
JR-HXCDD-KIT	Comprehensive Hexachlorodibenzo- <i>p</i> -dioxin Column Defining Kit	JR-D37-25 – JR-D46-25	1 Kit
JR-HXCDF-KIT	Comprehensive Hexachlorodibenzofuran Column Defining Kit	JR-F67-25 – JR-F82-25	1 Kit
JR-HPCDF-KIT	Comprehensive Heptachlorodibenzofuran Column Defining Kit	JR-F83-25 – JR-F86-25	1 Kit
JR-PCDD/F-KIT	Comprehensive Polychlorinated Dioxin and Furan Column Defining Kit (Includes all 136 "JR" dioxin and furan congeners)		1 Kit

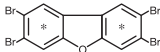
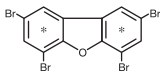
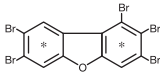
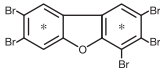
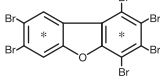
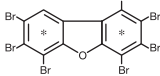
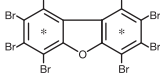
¹³C₁₂-Labeled Bromodioxin Standards

Catalog No.	Compound	Structure	Concentration	Amount
ED-1440-1.2	2,3,7,8-Tetrabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-1450-1.2	1,2,3,7,8-Pentabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
NEW ED-2534-A-1.2	1,2,3,4,7,8-Hexabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
NEW ED-5237-A-1.2	1,2,3,6,7,8-Hexabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
NEW ED-5238-A-1.2	1,2,3,7,8,9-Hexabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
ED-5357-1.2	1,2,3,4,6,7,8-Heptabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
ED-5089-1.2	Octabromodibenzo- <i>p</i> -dioxin (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL

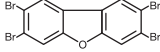
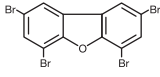
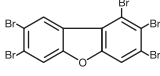
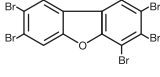
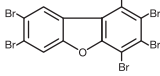
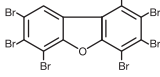
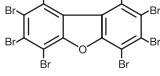
Unlabeled Bromodioxin Standards

Catalog No.	Compound	Structure	Concentration	Amount
ED-1441-1.2	2,3,7,8-Tetrabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in nonane	1.2 mL
ED-1451-1.2	1,2,3,7,8-Pentabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in nonane	1.2 mL
NEW ED-1462-A-1.2	1,2,3,4,7,8-Hexabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
ED-1465-1.2	1,2,3,6,7,8-Hexabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
NEW ED-1466-A-1.2	1,2,3,7,8,9-Hexabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
ED-5356-1.2	1,2,3,4,6,7,8-Heptabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
ED-1481-1.2	Octabromodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in toluene	1.2 mL

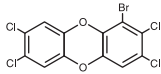
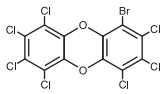
¹³C₁₂-Labeled Bromofuran Standards

Catalog No.	Compound	Structure	Concentration	Amount
EF-1442-1.2	2,3,7,8-Tetrabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-5082-1.2	2,4,6,8-Tetrabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-1452-1.2	1,2,3,7,8-Pentabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-1454-1.2	2,3,4,7,8-Pentabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-1463-1.2	1,2,3,4,7,8-Hexabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-5259-1.2	1,2,3,4,6,7,8-Heptabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
EF-5266-1.2	Octabromodibenzofuran (¹³ C ₁₂ , 99%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL

Unlabeled Bromofuran Standards

Catalog No.	Compound	Structure	Concentration	Amount
EF-1443-1.2	2,3,7,8-Tetrabromodibenzofuran		5 ± 0.5 µg/mL in nonane	1.2 mL
NEW EF-5081-1.2	2,4,6,8-Tetrabromodibenzofuran		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-1453-1.2	1,2,3,7,8-Pentabromodibenzofuran		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-1455-1.2	2,3,4,7,8-Pentabromodibenzofuran		5 ± 0.5 µg/mL in nonane	1.2 mL
EF-1464-1.2	1,2,3,4,7,8-Hexabromodibenzofuran		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
EF-1486-1.2	1,2,3,4,6,7,8-Heptabromodibenzofuran (CP 96%)		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL
EF-5263-1.2	Octabromodibenzofuran		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL

Unlabeled Mixed Bromo/Chlorodioxin Standards

Catalog No.	Compound	Structure	Concentration	Amount
NEW EBC-2501	1-Bromo-2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin		50 ± 0.5 µg/mL in <i>n</i> -nonane	1.2 mL
NEW EBC-2507-A-1.2	1-Bromo-2,3,4,6,7,8,9-heptachlorodibenzo- <i>p</i> -dioxin		5 ± 0.5 µg/mL in 70% nonane/30% toluene	1.2 mL

