



Greyhound

CHROMATOGRAPHY
AND ALLIED CHEMICALS

WELLINGTON LABORATORIES

STANDARDS FOR ENVIRONMENTAL
TESTING AND RESEARCH

2016-2018



CERTIFICATE OF REGISTRATION

This is to certify that

Wellington Laboratories

345 Southgate Drive, Guelph, Ontario N1G 3M5 Canada

operates a

Quality Management System

which complies with the requirements of

ISO 9001:2008

for the following scope of registration

The Registration covers the Quality Management System as it applies to the design and provision of reference standards and chemicals for use in environmental analysis and toxicological research.

Certificate No.: CERT-0074195
File No.: 1039334
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Certificate Expiry Date: December 26, 2016

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ISO 9001



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SAI GLOBAL

INFORM. INSPIRE. IMPROVE.

This year marks the 36th anniversary of Wellington Laboratories Inc. (Wellington) and we are proud to present our newest catalogue. Moreover, we are very pleased that we have been able to continue to provide you, our clients, with high quality products, efficient service, and knowledgeable technical support. Thank you for your trust and loyalty, and rest assured, they are well-placed.

In this catalogue you will note that many of the products from our previous catalogue have been retained. This is either due to their popularity, continued scientific relevance, or mandated use in regulations from various jurisdictions. Some products have been discontinued; however, inventory of these products may still be available. Please contact Wellington, or one of our distributors, if you are interested in purchasing withdrawn products and we will do our best to accommodate your request.

You may also note that we have added a number of new products, many of which were announced in our newsletter The Wellington Reporter. You can subscribe to receive these new product announcements by e-mail on our website (www.well-labs.com).

All of our products have been prepared according to detailed procedures that comprise our Quality Management System (QMS) which has been registered to ISO 9001. In addition, Wellington is accredited to ISO Guide 34 for reference material production and ISO/IEC 17025 for our testing and calibration activities. Up-to-date certificates for all of these registrations/accreditations are available upon request.

Finally, as you have or will come to know from our products and research activities, Wellington is a very dynamic company. This is largely due to our staff, who are all highly qualified and have somewhat diverse, yet complimentary backgrounds. Most notably, they are all still excited by the science behind our products.

We trust that our products, service, and overall dedication will give you ...

An Added Measure of Confidence

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As many of you may have noticed, polar bears are often utilized as a Wellington 'sub logo'. They are beautiful animals that are endangered primarily due to human activities. They have also acted as sentinels; contaminants that have been found in their tissues have essentially warned us that certain chemicals are persistent, bioaccumulative, and subject to long range transport. In a way, we are somewhat indebted to them.

The artwork used in this catalogue is dedicated to the polar bear. Each picture is an original created by a local Canadian artist in the medium of their choice. The contributing artists are acknowledged throughout the catalogue. We hope that you enjoy their interpretations and talent.

Front Cover Artwork: Jaqueline Gori - Breslau, Ontario, Canada

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"SUPPORT SOLUTIONS"

Throughout this catalogue, among the products listed are sets of Calibration and Verification Solutions designed for use with a variety of GC/MS applications. These solution sets or kits are denoted by the incorporation of the code CVS into their catalogue numbers, for example **EPA-1613CVS** or **DFP-CVS-B10**.

These calibration solutions are designed to be used with their corresponding "support solutions". These are the solution/mixtures of native or mass-labelled compounds required for sample processing and method validation as determined by the appropriate method.

As an example, the support solutions for **EPA-1613CVS** are:

EPA-1613LCS	for sample spiking prior to extraction;
EPA-1613CSS	for extract spiking prior to cleanup;
EPA-1613ISS	for spiking of the cleaned-up extract prior to analysis; and
EPA-1613PAR	a native spiking solution for method performance testing.

Some sets of calibration solutions in this catalogue (e.g. BDE-CVS-G) were designed by Wellington, with input from clients, and not for a specific method. Support solutions for these are noted where applicable.

GENERAL INFORMATION

WELLINGTON LABORATORIES INC.

Wellington Laboratories Inc. (Wellington) is recognized world-wide as a reputable and trusted source of certified reference standards of organic compounds of environmental concern.

The majority of our products are used for trace analysis or toxicological research and thus their quality is vital. This quality, as well as the success and longevity of the company, is primarily due to our people. Wellington has a well-qualified, dynamic mix of synthetic chemists, analytical chemists and administrative personnel who are committed to customer satisfaction and continual improvement. This is reflected in our ISO registration and accreditations.

THIS CATALOGUE / NEW PRODUCTS

Originally, Wellington's product line was essentially individual standards of polychlorinated dioxins (PCDDs), dibenzofurans (PCDFs) and biphenyls (PCBs). As can be seen from this catalogue, we now offer a very comprehensive selection of native and mass-labelled PCDDs, PCDFs and PCBs as well as ready-to-use calibration and support solutions for:

PCDD/PCDF methods, such as;

- EPA Method 1613B,
- EPA Method 8280,
- EPA Method 8290,
- EPA Method 23,
- JIS Methods K 0311 and K 0312, and,
- European Standard Method 1948-4.

...and, PCB methods, such as;

- EPA Method 1668C,
- Environment Canada Method 1/RM/31,
- JIS Methods K 0311 and K 0312, and,
- European Standard Method 1948-4 (WHO & Marker PCBs).

Throughout this catalogue, you will also find calibration sets for other target analytes such as PBDEs, PFCs, and PAHs as well as multi-point calibration sets for PCDDs, PCDFs and PCBs. We also have combined calibration sets for PCDDs, PCDFs and WHO PCBs, as well as combined sets for the Marker and WHO PCBs (EN 1948-4).

Since our last catalogue, we have added a number of new native and mass-labelled compounds. All of these were announced in a Wellington Reporter, which were posted on our website (www.well-labs.com).

Most notably, added to our product line are:

- Many new native and ¹³C-labelled perfluorinated compounds (PFCs)
- New native and ¹³C-labelled Hexabromocyclododecane mixtures (HBCDs)
- New experimental flame retardants (EFRs)
- New native and mass-labelled organophosphorus compounds
- New native and ¹³C-labelled halogenated carbazoles
- New native telomer acrylates and acetates

...in addition to many other new and creative products.

SYNTHESIS

The chemical standards offered by Wellington are prepared using unambiguous synthetic routes and purified using a battery of methods. All products are purified to a minimum of 98% chemical purity and the isotopic purity of ¹³C-labelled products is required to be > 99%. The structure of all of our compounds is unequivocally confirmed using a variety of techniques including, as appropriate, NMR (400 or 600 MHz), HRGC with LRMS and/or HRMS, UPLC-MS/MS, and SFC/UV/MS/MS.

ACCURACY/TRACEABILITY

All of the solutions listed in this catalogue are prepared in our laboratories using:

- NIST- or NRC-traceable weights for microbalance calibration
- Class A, NIST-traceable volumetric glassware
- Distilled-in-glass or HPLC grade solvents
- Replicate solutions to ensure accuracy and confirm homogeneity

When possible, these solutions are compared to standard reference materials or certified standards from another source. The expanded maximum percent relative uncertainty of solution concentrations is $\pm 5\%$, unless stated otherwise in this catalogue.

VALIDATION/CERTIFICATION

Wellington was the first supplier of PCDDs, PCDFs and WHO PCBs to validate their solution/mixtures using “truly blind” interlaboratory studies. Since 1991, solutions of our PCDD, PCDF and PCB standards have been submitted as part of 30 international round-robins, resulting in over 2000 independent sets of HRGC/HRMS data.

In addition, over the past several years, Wellington has also submitted standards for 13 interlaboratory studies on PBDEs and 17 studies involving PFCs.

Summaries of all of these interlaboratory studies are available on request. However, in all the studies, averages of the data received for all compounds were well within $\pm 10\%$ of the design values.

ANALYSIS/DOCUMENTATION

Each of our products comes with a detailed Certificate of Analysis (CofA) which includes data which the end user should be able to replicate using equivalent instrumentation and conditions. The CofA includes HRGC/LRMS and/or HRGC/HRMS data depending upon the intended use of the product. Those compounds that are not amenable to GC analysis come with LC/MS data.

Additionally, all of our mass-labelled products come with data that clearly shows their isotopic purity. All calibration sets include RRF summaries showing the required linearity. SDSs and handling guidelines are available for all products.

OTHER PRODUCTS/CUSTOM REQUESTS

For products not listed in this catalogue, please visit our website for updates or contact us at info@well-labs.com. Custom solution preparation and synthetic services are also available.

ORDERING, TERMS, WARRANTY & USE

ORDERING INFORMATION

To place an order, please contact the distributor that serves your country. Distributors are listed on pages 10 and 11, as well as on our website.

When ordering, please provide as much information as possible, including:

- Detailed shipping address and billing address
- Purchase order number, if known
- Catalogue number and description of product
- Quantity and unit size

TERMS & CONDITIONS OF SALE

Prices: A price list for the products listed in this catalogue *is available from your local distributor*. Prices are subject to change without notice.

Payment: Payment terms are net 30 days from date of invoice. Past due invoices will be subject to a 1.5% monthly finance charge.

Note: We may also accept credit card payments.

Shipping & Handling: All shipments will be F.O.B. Guelph, Ontario and will be made using an appropriate courier.

Returns: Please contact Wellington Laboratories Inc. or your local distributor for a return authorization number. No credit or exchange will be approved after 30 days from shipment and without prior authorization.

LIMITED WARRANTY

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the accompanying technical and purity specifications. Wellington Laboratories Inc. makes no other warranty, expressed or implied, pertaining to the suitability of the product for any specific application. In case of breach of this warranty, the entire liability of Wellington Laboratories Inc. will be limited to the invoice price of the goods. In no case will Wellington Laboratories Inc. be liable for any special, incidental or consequential damages resulting from the use of its products.

ORDERING, TERMS, WARRANTY & USE

INTENDED USE

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are not for use in humans.

These chemicals should only be used by qualified personnel who are familiar with their potential hazards and are trained in their handling. With all of our products, due care should be exercised to prevent human contact and ingestion.

The absence of a toxicity warning on any of our products must not be interpreted as an indication that there is no possible health hazard.

Safety Data Sheets (SDSs) are supplied upon request.

PACKAGING

For the safety and convenience of our clients, the solutions provided by Wellington Laboratories Inc. are packaged in clear or amber glass flame-sealed ampoules. Crystalline materials are packaged in glass vials with teflon-lined screw caps.

The solution volumes stated in this catalogue are the minimum volumes which will be delivered and should be considered as approximate. To retain the accuracy of the solutions, dilutions should be made using volumetric glassware.

END USE ONLY/NOT FOR RESALE

The reference standards and materials supplied by Wellington Laboratories Inc. are for end use only by the original purchaser and are not to be resold without written authorization from Wellington Laboratories Inc.

DISTRIBUTORS

To determine which distributor serves your country, please visit our website at www.well-labs.com and follow the distributor link under order info.

DISTRIBUTOR	HEAD OFFICE	CONTACT INFORMATION
WELLINGTON LABORATORIES JAPAN INC.	JAPAN	1-22-12 Fujimidai Nerima-ku, Tokyo, Japan 177-0034 Phone: +(81) 3-5934-4184 Fax: +(81) 3-5241-4222 Website: www.well-labs.co.jp Email: info@well-labs.co.jp
KANTO CHEMICAL CO., INC.	JAPAN	East Muromachi Mitsui BLDG, 2-1, Nihonbashi Muromachi 2-chome, Chuo-ku, Tokyo, Japan 103-0022 Phone: +(81) 3-6214-1090 Fax: +(81) 3-3241-1047 Website: www.kanto.co.jp Email: reag-info@gms.kanto.co.jp
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CHEMICAL RESEARCH 2000 S.R.L.	ITALY	Via Santa Margherita di Belice, 16 00133, Rome, Italy Phone: +(39) 06 20630997 Fax: +(39) 06 20685490 Website: www.cr2000.it Email: info@cr2000.it
CAMPRO SCIENTIFIC GMBH	GERMANY	Darser Strasse 2A 14167 Berlin, Germany Phone: +49.(0)30.629.01.89.0 Fax: +49.(0)30.629.01.89.89 Website: www.campro.eu Email: info@campro.eu

DISTRIBUTORS

If your country is not served by an official distributor, please contact
Wellington Laboratories directly via e-mail at: info@well-labs.com

DISTRIBUTOR	HEAD OFFICE	CONTACT INFORMATION
TECHNO SPEC	SPAIN	Secretario Coloma, 112 08024 Barcelona, Spain Phone: +(34) 93-284-5676 Fax: +(34) 93-219-5626 Website: www.technospec.es Email: info@technospec.es
LABICOM S.R.O.	CZECH REPUBLIC	(VTP UP) Block C, Slechtitelu 920/19, 78371 Olomouc, Czech Republic Phone: + (420) -585436915 Fax: + (420) -585436916 Website: www.labicom.cz Email: info@labicom.cz
SMART E INTERNATIONAL (BJ) LTD.	CHINA	3107 Building D, SOHO New Town 88 Jianguo Road, Chaoyang District, Beijing, P.R. China 100022 Phone: +86-10-8580-1267 Fax: +86-10-8580-1268 Email: wellington_china@163.com
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BK SCIENTIFIC	KOREA	#202, 2 Fl, 336, Dongil-Ro Kwangjin-Gu, Seoul, Korea Tel: 82-2-499-7986 Fax: 82-2-499-7987 Cell: 82-10-6365-1512 e-mail: bkscientific@nate.com
BYMAZ PTY. LTD.	SOUTH AFRICA	61C 13th Avenue Boksburg North, Gauteng, South Africa Phone: +27(0) 11-894-4458 Cell: +27(0) 82-334-4007 Website: www.bymaz.co.za Email: info@laboratoryinstruments.co.za



Judy Riedt
Petersburg, Ontario, Canada

PCDD/PCDF ANALYTICAL METHOD SOLUTIONS

Repeated from our previous catalogues due to their popularity, sets of calibration solutions and support solutions are offered for the following methods:

U.S. EPA Method 1613B
HRGC/HRMS TCDD and TCDF Analysis Solutions
U.S. EPA Method 8280
U.S. EPA Method 8290
U.S. EPA Method 23
European Standard Method EN 1948-4

All of our calibration kits and support solutions are designed and prepared to be used as received according to the procedures set out in their respective methods. They are all accompanied by detailed certificates of analysis which incorporate HRMS data and RRF summaries for the calibration kits.

PCDD/PCDF RESOLUTION TESTING AND WINDOW DEFINING TEST MIXTURES

Also included in this section are the following solution/mixtures of PCDD and PCDF congeners. These are to be used to test and confirm the resolution of the HRGC column being used and to set retention time windows for the PCDD and PCDF congener groups.

CS3WT:	EPA-1613CS3 calibration solution combined with PCDD/PCDF window defining congeners and 2378-TCDD resolution testing isomers.
5CWDS:	PCDD/PCDF window defining congener mix.
5TCDD:	2378-TCDD resolution test mixture.
225TCDF:	2378-TCDF resolution test mixture.
TDTFWD:	Combined PCDD/PCDF window defining and resolution testing mixture for 3 HRGC columns of varying polarity.



EPA METHOD 1613 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-1613CVS	EPA Method 1613 Calibration and Verification Solutions CS1-CS5	1 kit (5 ampoules)
EPA-1613CSL*	CSL Extended Calibration/Low Level	500 µl
EPA-1613CS0.5*	CS0.5	500 µl
EPA-1613CS1	CS1	500 µl
EPA-1613CS2	CS2	500 µl
EPA-1613CS3	CS3 Calibration Verification	1 ml
EPA-1613CS4	CS4	500 µl
EPA-1613CS5	CS5	500 µl

NOTE: 200 µl AMPOULES OF THE CALIBRATION SOLUTIONS ARE ALSO AVAILABLE. PLEASE CONTACT WELLINGTON OR YOUR LOCAL DISTRIBUTOR FOR PRICING INFORMATION.

	1613CSL	1613CS0.5	1613CS1	1613CS2	1613CS3	1613CS4	1613CS5
	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)
NATIVE PCDDs & PCDFs							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1	0.25	0.5	2	10	40	200
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.5	1.25	2.5	10	50	200	1000
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.5	1.25	2.5	10	50	200	1000
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.5	1.25	2.5	10	50	200	1000
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.5	1.25	2.5	10	50	200	1000
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.5	1.25	2.5	10	50	200	1000
Octachlorodibenzo-p-dioxin	1.0	2.5	5.0	20	100	400	2000
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.25	0.5	2	10	40	200
1,2,3,7,8-Pentachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
2,3,4,7,8-Pentachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
1,2,3,4,7,8-Hexachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
1,2,3,6,7,8-Hexachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
1,2,3,7,8,9-Hexachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
2,3,4,6,7,8-Hexachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.5	1.25	2.5	10	50	200	1000
Octachlorodibenzofuran	1.0	2.5	5.0	20	100	400	2000
LABELLED PCDDs & PCDFs							
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	200	200	200	200	200	200	200
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100	100	100
CLEANUP STANDARD							
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	0.1	0.25	0.5	2	10	40	200
INTERNAL STANDARDS							
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100	100	100

* EPA-1613CS0.5 and EPA-1613CSL are not included in the EPA-1613CVS kit and must be ordered separately.

EPA METHOD 1613 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)					Qty/Conc
EPA-1613LCS*	Labelled Compound Stock Solution					1.2 ml
EPA-1613CSS*	Cleanup Standard Spiking Solution					1.2 ml
EPA-1613ISS	Internal Standard Spiking Solution					1.2 ml
EPA-1613PAR*	Precision and Recovery Stock Solution					1.2 ml
EPA-1613STOCK	EPA Method 1613 Native Stock Solution					1.2 ml
	1613LCS (ng/ml)	1613CSS (ng/ml)	1613ISS (ng/ml)	1613PAR (ng/ml)	1613STOCK (ng/ml)	
NATIVE PCDDs & PCDFs						
2,3,7,8-Tetrachlorodibenzo-p-dioxin	—	—	—	40	400	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	—	—	—	200	2000	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	—	—	—	200	2000	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	—	—	—	200	2000	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	—	—	—	200	2000	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	—	—	—	200	2000	
Octachlorodibenzo-p-dioxin	—	—	—	400	4000	
2,3,7,8-Tetrachlorodibenzofuran	—	—	—	40	400	
1,2,3,7,8-Pentachlorodibenzofuran	—	—	—	200	2000	
2,3,4,7,8-Pentachlorodibenzofuran	—	—	—	200	2000	
1,2,3,4,7,8-Hexachlorodibenzofuran	—	—	—	200	2000	
1,2,3,6,7,8-Hexachlorodibenzofuran	—	—	—	200	2000	
1,2,3,7,8,9-Hexachlorodibenzofuran	—	—	—	200	2000	
2,3,4,6,7,8-Hexachlorodibenzofuran	—	—	—	200	2000	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	—	—	—	200	2000	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	—	—	—	200	2000	
Octachlorodibenzofuran	—	—	—	400	4000	
LABELLED PCDDs & PCDFs						
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—	—	
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—	—	
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—	—	
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—	—	
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—	—	
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	200	—	—	—	—	
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—	—	
CLEANUP STANDARD						
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	—	40	—	—	—	
INTERNAL STANDARDS						
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	—	200	—	—	
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	—	200	—	—	

* Working solutions are prepared by diluting EPA-1613LCS (in acetone), EPA-1613CSS (in nonane) and EPA-1613PAR (in acetone) 1:50 (v/v)

This solution allows the HRGC/HRMS operator, with one injection, to:

- Set, or confirm, PCDD and PCDF congener group windows
- Test, or confirm, 2,3,7,8-TCDD resolution
- Verify the calibration

Catalogue Number	Product (nonane solution)	Qty/Conc
CS3WT	EPA Method 1613; Calibration and Verification Solution (CS3) combined with Window Defining and 2378-TCDD Resolution Testing Congeners	500 µl

QUANTITATIVE ANALYTES	(ng/ml)	SEMI-QUANTITATIVE ANALYTES	(ng/ml)
NATIVE PCDDs & PCDFs:			
2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	1,3,6,8-Tetrachlorodibenzo-p-dioxin	10
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	50	1,2,8,9-Tetrachlorodibenzo-p-dioxin	10
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	50	1,2,4,7,9-Pentachlorodibenzo-p-dioxin	50
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	50	1,2,3,8,9-Pentachlorodibenzo-p-dioxin	50
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	50	1,2,4,6,7,9-Hexachlorodibenzo-p-dioxin	50
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (WD)	50	1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin	50
Octachlorodibenzo-p-dioxin	100		
		1,3,6,8-Tetrachlorodibenzofuran	10
2,3,7,8-Tetrachlorodibenzofuran	10	1,2,8,9-Tetrachlorodibenzofuran	10
1,2,3,7,8-Pentachlorodibenzofuran	50	1,3,4,6,8-Pentachlorodibenzofuran	50
2,3,4,7,8-Pentachlorodibenzofuran	50	1,2,3,8,9-Pentachlorodibenzofuran	50
1,2,3,4,7,8-Hexachlorodibenzofuran	50	1,2,3,4,6,8-Hexachlorodibenzofuran	50
1,2,3,6,7,8-Hexachlorodibenzofuran	50		
1,2,3,7,8,9-Hexachlorodibenzofuran	50	2,3,7,8-TCDD RESOLUTION TESTING ISOMERS:	
2,3,4,6,7,8-Hexachlorodibenzofuran	50	1,2,3,4-Tetrachlorodibenzo-p-dioxin	5
1,2,3,4,6,7,8-Heptachlorodibenzofuran (WD)	50	1,2,3,7/1,2,3,8-Tetrachlorodibenzo-p-dioxin mix	5
1,2,3,4,7,8,9-Heptachlorodibenzofuran (WD)	50	1,2,3,9-Tetrachlorodibenzo-p-dioxin	10
Octachlorodibenzofuran	100		
LABELLED PCDDs & PCDFs:			
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	200		
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100		
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100		
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100		
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100		
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100		
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	100		
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100		
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	100		
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	100		
CLEANUP STANDARD:			
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	10		
INTERNAL STANDARDS:			
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100		

(WD) - Window Definer

* 1,2,3,4,6,7-Hexachlorodibenzo-p-dioxin (last eluting Hexachlorodibenzo-p-dioxin) was not included as it co-elutes with 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin. Use the 1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin to set the window.

* 1,2,3,4,8,9-Hexachlorodibenzofuran (last eluting Hexachlorodibenzofuran) was not included as it can interfere with 1,2,3,7,8,9-Hexachlorodibenzofuran. Use the 1,2,3,4,6,7,8-Heptachlorodibenzofuran to set the window.

HRGC/HRMS TCDD/TCDF ANALYSIS SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-513CVS	EPA Method 513 Calibration and Verification Solutions CS1-CS6 (6 x 500 µl)	1 kit (6 ampoules)
513-CS0.25*	CS0.25 Custom Calibration Solution	500 µl
	513-CS0.25 513-CS1 513-CS2 513-CS3 513-CS4 513-CS5 513-CS6 (ng/ml) (ng/ml) (ng/ml) (ng/ml) (ng/ml) (ng/ml) (ng/ml)	
NATIVE TCDD & TCDF		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.25 0.1 0.5 2 10 40 200	
2,3,7,8-Tetrachlorodibenzofuran	0.25 0.1 0.5 2 10 40 200	
LABELLED TCDD & TCDF		
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100 100 100 100 100 100 100	
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100 100 100 100 100 100 100	
INTERNAL STANDARDS		
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100 100 100 100 100 100 100	
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzofuran	100 100 100 100 100 100 100	
CLEANUP STANDARD		
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	0.25 0.1 0.5 2 10 40 200	
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100 100 100 100 100 100 100	
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100 100 100 100 100 100 100	
EPA-513LCSS	EPA Method 513 Labelled TCDD/TCDF Spiking Solution	1.2 ml
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		100 ng/ml
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		100 ng/ml
EPA-513ISS	EPA Method 513 Internal Standard Spiking Solution	1.2 ml
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		200 ng/ml
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzofuran		200 ng/ml
EPA-513CSSA	EPA Method 513 Cleanup Standard Spiking Solution	1.2 ml
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin		40 ng/ml
EPA-513CSSB	EPA Method 513 Alternative Cleanup Standard Spiking Solution	1.2 ml
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		100 ng/ml
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		100 ng/ml
EPA-513PAR	EPA Method 513 Precision and Recovery Solution	1.2 ml
2,3,7,8-Tetrachlorodibenzo-p-dioxin		40 ng/ml
2,3,7,8-Tetrachlorodibenzofuran		40 ng/ml

* **513-CS0.25** is not included in the EPA-513CVS kit and must be ordered separately.

EPA METHOD 8280 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-8280CVS	EPA Method 8280 Calibration and Verification Solutions CC1-CC5	1 kit (5 ampoules)
EPA-8280CC1	CC1	500 µl
EPA-8280CC2	CC2	500 µl
EPA-8280CC3	CC3 Calibration Verification	1 ml
EPA-8280CC4	CC4	500 µl
EPA-8280CC5	CC5	500 µl

NOTE: 200 µl AMPOULES OF THE CALIBRATION SOLUTIONS ARE ALSO AVAILABLE. PLEASE CONTACT WELLINGTON OR YOUR LOCAL DISTRIBUTOR FOR PRICING INFORMATION.

	8280CC1 (ng/µl)	8280CC2 (ng/µl)	8280CC3 (ng/µl)	8280CC4 (ng/µl)	8280CC5 (ng/µl)
NATIVE PCDDs & PCDFs					
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1	0.25	0.5	1.0	2.0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.1	0.25	0.5	1.0	2.0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	—	—	1.25	—	—
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.25	0.625	1.25	2.5	5.0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	—	—	1.25	—	—
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.25	0.625	1.25	2.5	5.0
Octachlorodibenzo-p-dioxin	0.5	1.25	2.5	5.0	10.0
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.25	0.5	1.0	2.0
1,2,3,7,8-Pentachlorodibenzofuran	0.1	0.25	0.5	1.0	2.0
2,3,4,7,8-Pentachlorodibenzofuran	—	—	0.5	—	—
1,2,3,4,7,8-Hexachlorodibenzofuran	—	—	1.25	—	—
1,2,3,6,7,8-Hexachlorodibenzofuran	0.25	0.625	1.25	2.5	5.0
1,2,3,7,8,9-Hexachlorodibenzofuran	—	—	1.25	—	—
2,3,4,6,7,8-Hexachlorodibenzofuran	—	—	1.25	—	—
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.25	0.625	1.25	2.5	5.0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	—	—	1.25	—	—
Octachlorodibenzofuran	0.5	1.25	2.5	5.0	10.0
INTERNAL STANDARDS					
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	0.5	0.5	0.5	0.5	0.5
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	0.5	0.5	0.5	0.5	0.5
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	1.0	1.0	1.0	1.0	1.0
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	0.5	0.5	0.5	0.5	0.5
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	1.0	1.0	1.0	1.0	1.0
CLEANUP STANDARD					
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	—	—	0.25	—	—
RECOVERY STANDARDS					
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	0.5	0.5	0.5	0.5	0.5
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	0.5	0.5	0.5	0.5	0.5

EPA METHOD 8280 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc				
EPA-8280IS	Internal Standard Solution	1.2 ml				
EPA-8280ISB*	Additional Internal Standard Solution	1.2 ml				
EPA-8280CS	Cleanup Standard Solution	1.2 ml				
EPA-8280RS	Recovery Standard Solution	1.2 ml				
EPA-8280MSS	Matrix Spiking Solution	1.2 ml				
8280IS 8280ISB 8280CS 8280RS 8280MSS						
(ng/μl) (ng/μl) (ng/μl) (ng/μl) (ng/μl)						
NATIVE PCDDs & PCDFs						
2,3,7,8-Tetrachlorodibenzo-p-dioxin	—	—	—	—	2.5	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	—	—	—	—	6.25	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	—	—	—	—	—	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	—	—	—	—	6.25	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	—	—	—	—	—	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	—	—	—	—	6.25	
Octachlorodibenzo-p-dioxin	—	—	—	—	12.5	
2,3,7,8-Tetrachlorodibenzofuran	—	—	—	—	2.5	
1,2,3,7,8-Pentachlorodibenzofuran	—	—	—	—	6.25	
2,3,4,7,8-Pentachlorodibenzofuran	—	—	—	—	—	
1,2,3,4,7,8-Hexachlorodibenzofuran	—	—	—	—	—	
1,2,3,6,7,8-Hexachlorodibenzofuran	—	—	—	—	6.25	
1,2,3,7,8,9-Hexachlorodibenzofuran	—	—	—	—	—	
2,3,4,6,7,8-Hexachlorodibenzofuran	—	—	—	—	—	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	—	—	—	—	6.25	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	—	—	—	—	—	
Octachlorodibenzofuran	—	—	—	—	12.5	
INTERNAL STANDARDS						
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	5.0	—	—	—	—	
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	5.0	—	—	—	—	
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	10.0	—	—	—	—	
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	5.0	—	—	—	—	
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	10.0	—	—	—	—	
CLEANUP STANDARD						
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	—	—	5.0	—	—	
RECOVERY STANDARDS						
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	—	—	5.0	—	
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	—	—	5.0	—	
ADDITIONAL INTERNAL STANDARDS						
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	5.0	—	—	—	
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	10.0	—	—	—	
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	—	5.0	—	—	—	
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	—	5.0	—	—	—	
Octachloro[¹³ C ₁₂]dibenzofuran	—	10.0	—	—	—	

* Not required by US EPA Method 8280

EPA METHOD 8290 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-8290HRCC1-5	EPA Method 8290 High Resolution Calibration Solutions (HRCC1-HRCC5)	1 kit (5 ampoules)
EPA-8290HRCC0.25*	HRCC0.25 Supplemental Calibration Solution	500 µl
EPA-8290HRCC0.5*	HRCC0.5 Supplemental Calibration Solution	500 µl
EPA-8290HRCC1	HRCC1	500 µl
EPA-8290HRCC2	HRCC2	500 µl
EPA-8290HRCC3	HRCC3 Calibration Verification	1 ml
EPA-8290HRCC4	HRCC4	500 µl
EPA-8290HRCC5	HRCC5	500 µl

NOTE: 200 µl AMPOULES OF THE CALIBRATION SOLUTIONS ARE ALSO AVAILABLE. PLEASE CONTACT WELLINGTON OR YOUR LOCAL DISTRIBUTOR FOR PRICING INFORMATION.

	8290- HRCC0.25 (ng/ml)	8290- HRCC0.5 (ng/ml)	8290- HRCC1 (ng/ml)	8290- HRCC2 (ng/ml)	8290- HRCC3 (ng/ml)	8290- HRCC4 (ng/ml)	8290- HRCC5 (ng/ml)
NATIVE PCDDs & PCDFs							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.25	0.5	1.0	2.5	10	50	200
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.625	1.25	2.5	6.25	25	125	500
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.625	1.25	2.5	6.25	25	125	500
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.625	1.25	2.5	6.25	25	125	500
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.625	1.25	2.5	6.25	25	125	500
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.625	1.25	2.5	6.25	25	125	500
Octachlorodibenzo-p-dioxin	1.25	2.5	5.0	12.5	50	250	1000
NATIVE PCDFs							
2,3,7,8-Tetrachlorodibenzofuran	0.25	0.5	1.0	2.5	10	50	200
1,2,3,7,8-Pentachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
2,3,4,7,8-Pentachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
1,2,3,4,7,8-Hexachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
1,2,3,6,7,8-Hexachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
1,2,3,7,8,9-Hexachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
2,3,4,6,7,8-Hexachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.625	1.25	2.5	6.25	25	125	500
Octachlorodibenzofuran	1.25	2.5	5.0	12.5	50	250	1000
INTERNAL STANDARDS							
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	50	50	50	50	50	50	50
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	50	50	50	50	50	50	50
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	125	125	125	125	125	125	125
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	125	125	125	125	125	125	125
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	250	250	250	250	250	250	250
INTERNAL PCDFs							
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	50	50	50	50	50	50	50
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	50	50	50	50	50	50	50
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	125	125	125	125	125	125	125
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	125	125	125	125	125	125	125
RECOVERY STANDARDS							
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	50	50	50	50	50	50	50
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	125	125	125	125	125	125	125

* **EPA-8290HRCC0.25** and **EPA-8290HRCC0.5** are not included in the EPA-8290HRCC1-5 kit and must be ordered separately.

EPA METHOD 8290 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-8290SFS	Sample Fortification Solution	1.2 ml
EPA-8290RSS	Recovery Standard Solution	1.2 ml
EPA-8290MSS	Matrix Spiking Solution	1.2 ml
EPA-8290STN	Native Stock PCDDs and PCDFs	1.2 ml

	8290SFS	8290RSS	8290MSS	8290STN
	(ng/ml)	(ng/ml)	(ng/ml)	(µg/ml)
NATIVE PCDDs & PCDFs				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	—	—	100	1.0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	—	—	250	2.5
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	—	—	250	2.5
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	—	—	250	2.5
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	—	—	250	2.5
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	—	—	250	2.5
Octachlorodibenzo-p-dioxin	—	—	500	5.0
2,3,7,8-Tetrachlorodibenzofuran	—	—	100	1.0
1,2,3,7,8-Pentachlorodibenzofuran	—	—	250	2.5
2,3,4,7,8-Pentachlorodibenzofuran	—	—	250	2.5
1,2,3,4,7,8-Hexachlorodibenzofuran	—	—	250	2.5
1,2,3,6,7,8-Hexachlorodibenzofuran	—	—	250	2.5
1,2,3,7,8,9-Hexachlorodibenzofuran	—	—	250	2.5
2,3,4,6,7,8-Hexachlorodibenzofuran	—	—	250	2.5
1,2,3,4,6,7,8-Heptachlorodibenzofuran	—	—	250	2.5
1,2,3,4,7,8,9-Heptachlorodibenzofuran	—	—	250	2.5
Octachlorodibenzofuran	—	—	500	5.0
INTERNAL STANDARDS				
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	—	—	—
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	250	—	—	—
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	250	—	—	—
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	500	—	—	—
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100	—	—	—
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	250	—	—	—
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	250	—	—	—
RECOVERY STANDARDS				
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	500	—	—
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	500	—	—

EPA METHOD 23 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-23CS1-5	EPA Method 23 HRGC/HRMS Calibration Solutions CS1-CS5	1 kit (5 ampoules)
EPA-23CS1	CS1	500 µl
EPA-23CS2	CS2	500 µl
EPA-23CS3	CS3 Calibration Verification	1 ml
EPA-23CS4	CS4	500 µl
EPA-23CS5	CS5	500 µl

NOTE: 200 µl AMPOULES OF THE CALIBRATION SOLUTIONS ARE ALSO AVAILABLE. PLEASE CONTACT WELLINGTON OR YOUR LOCAL DISTRIBUTOR FOR PRICING INFORMATION.

	23CS1 (ng/ml)	23CS2 (ng/ml)	23CS3 (ng/ml)	23CS4 (ng/ml)	23CS5 (ng/ml)
NATIVE PCDDs & PCDFs					
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.5	1	5	50	100
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	2.5	5	25	250	500
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	5	25	250	500
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	5	25	250	500
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	5	25	250	500
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.5	5	25	250	500
Octachlorodibenzo-p-dioxin	5.0	10	50	500	1000
2,3,7,8-Tetrachlorodibenzofuran	0.5	1	5	50	100
1,2,3,7,8-Pentachlorodibenzofuran	2.5	5	25	250	500
2,3,4,7,8-Pentachlorodibenzofuran	2.5	5	25	250	500
1,2,3,4,7,8-Hexachlorodibenzofuran	2.5	5	25	250	500
1,2,3,6,7,8-Hexachlorodibenzofuran	2.5	5	25	250	500
1,2,3,7,8,9-Hexachlorodibenzofuran	2.5	5	25	250	500
2,3,4,6,7,8-Hexachlorodibenzofuran	2.5	5	25	250	500
1,2,3,4,6,7,8-Heptachlorodibenzofuran	2.5	5	25	250	500
1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.5	5	25	250	500
Octachlorodibenzofuran	5.0	10	50	500	1000
INTERNAL STANDARDS					
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	200	200	200	200	200
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	100	100	100	100	100
SURROGATE STANDARDS					
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	0.5	1	5	50	100
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	2.5	5	25	250	500
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	2.5	5	25	250	500
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	2.5	5	25	250	500
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	2.5	5	25	250	500
ALTERNATIVE STANDARD					
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	2.5	5	25	250	500
RECOVERY STANDARDS					
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	100	100	100	100	100

EPA METHOD 23 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-23IS	Internal Standard Solution	1.2 ml
EPA-23ISS	Internal Standard Stock Solution	1.2 ml
EPA-23SS	Surrogate Standard Solution	1.2 ml
EPA-23SSS	Surrogate Standard Stock Solution	1.2 ml
EPA-23RS	Recovery Standard Solution	1.2 ml
EPA-23AS	Alternative Standard	1.2 ml

	23IS (ng/ml)	23ISS (µg/ml)	23SS (ng/ml)	23SSS (µg/ml)	23RS (ng/ml)	23AS (ng/ml)
INTERNAL STANDARDS						
2,3,7,8-Tetrachloro ¹³ C ₁₂]dibenzo-p-dioxin	100	1.0	—	—	—	—
1,2,3,7,8-Pentachloro ¹³ C ₁₂]dibenzo-p-dioxin	100	1.0	—	—	—	—
1,2,3,6,7,8-Hexachloro ¹³ C ₁₂]dibenzo-p-dioxin	100	1.0	—	—	—	—
1,2,3,4,6,7,8-Heptachloro ¹³ C ₁₂]dibenzo-p-dioxin	100	1.0	—	—	—	—
Octachloro ¹³ C ₁₂]dibenzo-p-dioxin	200	2.0	—	—	—	—
2,3,7,8-Tetrachloro ¹³ C ₁₂]dibenzofuran	100	1.0	—	—	—	—
1,2,3,7,8-Pentachloro ¹³ C ₁₂]dibenzofuran	100	1.0	—	—	—	—
1,2,3,6,7,8-Hexachloro ¹³ C ₁₂]dibenzofuran	100	1.0	—	—	—	—
1,2,3,4,6,7,8-Heptachloro ¹³ C ₁₂]dibenzofuran	100	1.0	—	—	—	—
SURROGATE STANDARDS						
2,3,7,8-[³⁷ Cl ₄]-Tetrachlorodibenzo-p-dioxin	—	—	100	1.0	—	—
1,2,3,4,7,8-Hexachloro ¹³ C ₁₂]dibenzo-p-dioxin	—	—	100	1.0	—	—
2,3,4,7,8-Pentachloro ¹³ C ₁₂]dibenzofuran	—	—	100	1.0	—	—
1,2,3,4,7,8-Hexachloro ¹³ C ₁₂]dibenzofuran	—	—	100	1.0	—	—
1,2,3,4,7,8,9-Heptachloro ¹³ C ₁₂]dibenzofuran	—	—	100	1.0	—	—
ALTERNATIVE STANDARD						
1,2,3,7,8,9-Hexachloro ¹³ C ₁₂]dibenzofuran	—	—	—	—	—	250
RECOVERY STANDARDS						
1,2,3,4-Tetrachloro ¹³ C ₁₂]dibenzo-p-dioxin	—	—	—	—	500	—
1,2,3,7,8,9-Hexachloro ¹³ C ₁₂]dibenzo-p-dioxin	—	—	—	—	500	—

EUROPEAN METHOD EN-1948 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EN-1948CVS	European Method EN-1948 Calibration and Verification Solutions CS1-CS6	1 kit (6 ampoules)
EN-1948CSL*	CSL Extended Calibration/Low Level	500 µl
EN-1948CS1	CS1	500 µl
EN-1948CS2	CS2	500 µl
EN-1948CS3	CS3	500 µl
EN-1948CS4	CS4	500 µl
EN-1948CS5	CS5	500 µl
EN-1948CS6	CS6	500 µl

NOTE: 200 µl AMPOULES OF THE CALIBRATION SOLUTIONS ARE ALSO AVAILABLE. PLEASE CONTACT WELLINGTON OR YOUR LOCAL DISTRIBUTOR FOR PRICING INFORMATION.

	1948CSL (pg/µl)	1948CS1 (pg/µl)	1948CS2 (pg/µl)	1948CS3 (pg/µl)	1948CS4 (pg/µl)	1948CS5 (pg/µl)	1948CS6 (pg/µl)
NATIVE PCDDs & PCDFs							
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.04	0.2	0.8	4	16	80	320
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.08	0.4	1.6	8	32	160	640
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.08	0.4	1.6	8	32	160	640
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.08	0.4	1.6	8	32	160	640
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.08	0.4	1.6	8	32	160	640
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.16	0.8	3.2	16	64	320	1280
Octachlorodibenzo-p-dioxin	0.16	0.8	3.2	16	64	320	1280
2,3,7,8-Tetrachlorodibenzofuran	0.04	0.2	0.8	4	16	80	320
1,2,3,7,8-Pentachlorodibenzofuran	0.08	0.4	1.6	8	32	160	640
2,3,4,7,8-Pentachlorodibenzofuran	0.08	0.4	1.6	8	32	160	640
1,2,3,4,7,8-Hexachlorodibenzofuran	0.08	0.4	1.6	8	32	160	640
1,2,3,6,7,8-Hexachlorodibenzofuran	0.08	0.4	1.6	8	32	160	640
1,2,3,7,8,9-Hexachlorodibenzofuran	0.08	0.4	1.6	8	32	160	640
2,3,4,6,7,8-Hexachlorodibenzofuran	0.08	0.4	1.6	8	32	160	640
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.16	0.8	3.2	16	64	320	1280
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.16	0.8	3.2	16	64	320	1280
Octachlorodibenzofuran	0.16	0.8	3.2	16	64	320	1280
SAMPLING STANDARDS							
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	32	32	32	32	32	32	32
EXTRACTION STANDARDS							
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	16	16	16	16	16	16	16
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	16	16	16	16	16	16	16
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	16	16	16	16	16	16	16
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	16	16	16	16	16	16	16
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	32	32	32	32	32	32	32
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	32	32	32	32	32	32	32
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	16	16	16	16	16	16	16
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	32	32	32	32	32	32	32
Octachloro[¹³ C ₁₂]dibenzofuran	32	32	32	32	32	32	32
SYRINGE STANDARDS							
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	16	16	16	16	16	16	16
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	16	16	16	16	16	16	16

* **EN-1948CSL** is not included in the EN-1948CVS kit and must be ordered separately.

EUROPEAN METHOD EN-1948 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EN-1948ES	Extraction Standard Solution	1.2 ml
EN-1948IS	Syringe Standard Solution	1.2 ml
EN-1948SS	Sampling Standard Solution	1.2 ml
EN-1948STK	PCDD/PCDF Solution/Mixture	1.2 ml

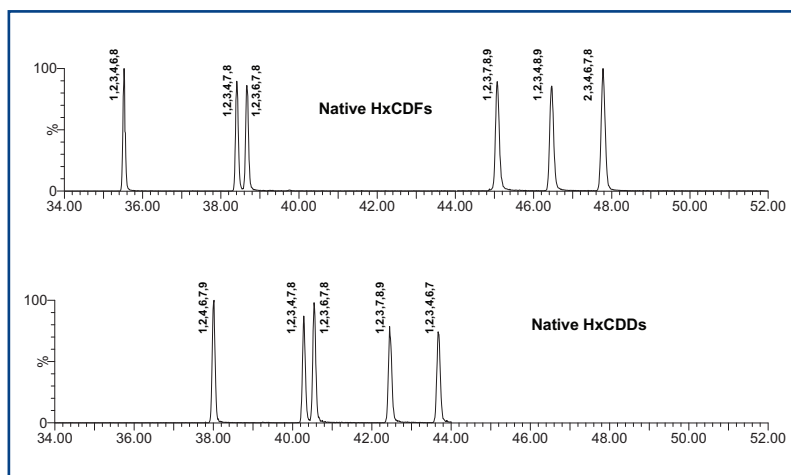
	1948ES (pg/μl)	1948IS (pg/μl)	1948SS (pg/μl)	1948STK (μg/ml)
NATIVE PCDDs & PCDFs				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	—	—	—	0.50
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	—	—	—	1.0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	—	—	—	1.0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	—	—	—	1.0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	—	—	—	1.0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	—	—	—	2.0
Octachlorodibenzo-p-dioxin	—	—	—	2.0
2,3,7,8-Tetrachlorodibenzofuran	—	—	—	0.50
1,2,3,7,8-Pentachlorodibenzofuran	—	—	—	1.0
2,3,4,7,8-Pentachlorodibenzofuran	—	—	—	1.0
1,2,3,4,7,8-Hexachlorodibenzofuran	—	—	—	1.0
1,2,3,6,7,8-Hexachlorodibenzofuran	—	—	—	1.0
1,2,3,7,8,9-Hexachlorodibenzofuran	—	—	—	1.0
2,3,4,6,7,8-Hexachlorodibenzofuran	—	—	—	1.0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	—	—	—	2.0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	—	—	—	2.0
Octachlorodibenzofuran	—	—	—	2.0
SAMPLING STANDARDS				
1,2,3,7,8-Pentachloro ^[13C₁₂] dibenzofuran	—	—	200	—
1,2,3,7,8,9-Hexachloro ^[13C₁₂] dibenzofuran	—	—	200	—
1,2,3,4,7,8,9-Heptachloro ^[13C₁₂] dibenzofuran	—	—	400	—
EXTRACTION STANDARDS				
2,3,7,8-Tetrachloro ^[13C₁₂] dibenzo-p-dioxin	200	—	—	—
1,2,3,7,8-Pentachloro ^[13C₁₂] dibenzo-p-dioxin	200	—	—	—
1,2,3,4,7,8-Hexachloro ^[13C₁₂] dibenzo-p-dioxin	200	—	—	—
1,2,3,6,7,8-Hexachloro ^[13C₁₂] dibenzo-p-dioxin	200	—	—	—
1,2,3,4,6,7,8-Heptachloro ^[13C₁₂] dibenzo-p-dioxin	400	—	—	—
Octachloro ^[13C₁₂] dibenzo-p-dioxin	400	—	—	—
2,3,7,8-Tetrachloro ^[13C₁₂] dibenzofuran	200	—	—	—
2,3,4,7,8-Pentachloro ^[13C₁₂] dibenzofuran	200	—	—	—
1,2,3,4,7,8-Hexachloro ^[13C₁₂] dibenzofuran	200	—	—	—
1,2,3,6,7,8-Hexachloro ^[13C₁₂] dibenzofuran	200	—	—	—
2,3,4,6,7,8-Hexachloro ^[13C₁₂] dibenzofuran	200	—	—	—
1,2,3,4,6,7,8-Heptachloro ^[13C₁₂] dibenzofuran	400	—	—	—
Octachloro ^[13C₁₂] dibenzofuran	400	—	—	—
SYRINGE STANDARDS				
1,2,3,4-Tetrachloro ^[13C₁₂] dibenzo-p-dioxin	—	800	—	—
1,2,3,7,8,9-Hexachloro ^[13C₁₂] dibenzo-p-dioxin	—	800	—	—

CAPILLARY COLUMN PERFORMANCE TEST MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
5CWDS	Window Defining Mixture for DB-5, BP5, HP-2, Rtx-5, SPB-5, or Equivalent Capillary Columns	1.2 ml
	1,3,6,8-Tetrachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,8,9-Tetrachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,4,7,9-Pentachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,3,8,9-Pentachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,4,6,7,9-Hexachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,3,4,6,7-Hexachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.0 µg/ml
	Octachlorodibenzo-p-dioxin	1.0 µg/ml
	1,3,6,8-Tetrachlorodibenzofuran	1.0 µg/ml
	1,2,8,9-Tetrachlorodibenzofuran	1.0 µg/ml
	1,3,4,6,8-Pentachlorodibenzofuran	1.0 µg/ml
	1,2,3,8,9-Pentachlorodibenzofuran	1.0 µg/ml
	1,2,3,4,6,8-Hexachlorodibenzofuran	1.0 µg/ml
	1,2,3,4,8,9-Hexachlorodibenzofuran	1.0 µg/ml
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.0 µg/ml
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0 µg/ml
	Octachlorodibenzofuran	1.0 µg/ml
5TCDD	2378-TCDD Isomer Specificity Test Mixture for DB-5, BP5, HP-2, Rtx-5, SPB-5, or Equivalent Columns	1.2 ml
	1,2,3,4-Tetrachlorodibenzo-p-dioxin	0.5 µg/ml
	1,2,3,7 and 1,2,3,8-Tetrachlorodibenzo-p-dioxin mix	0.5 µg/ml
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,3,9-Tetrachlorodibenzo-p-dioxin	1.0 µg/ml
	1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	0.5 µg/ml
	2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	0.5 µg/ml
225TCDF	2378-TCDF Isomer Specificity Test Mixture for DB-225, BP225, HP-225, Rtx-225, SPB-225, or Equivalent Columns	1.2 ml
	1,3,6,8-Tetrachlorodibenzofuran	1.0 µg/ml
	2,3,4,7-Tetrachlorodibenzofuran	1.0 µg/ml
	2,3,7,8-Tetrachlorodibenzofuran	2.0 µg/ml
	2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	0.5 µg/ml
	1,2,3,9-Tetrachlorodibenzofuran	1.0 µg/ml
	1,2,8,9-Tetrachlorodibenzofuran	1.0 µg/ml

CAPILLARY COLUMN PERFORMANCE TEST MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
STDWD	Combined Window Defining/TCDD Resolution Testing Mixture for DB-5, BP5, HP-2, Rtx-5, SPB-5, or Equivalent Columns	1.2 ml
WINDOW DEFINERS		
1,3,6,8-Tetrachlorodibenzo-p-dioxin		100 ng/ml
1,2,8,9-Tetrachlorodibenzo-p-dioxin		100 ng/ml
1,2,4,7,9-Pentachlorodibenzo-p-dioxin		100 ng/ml
1,2,3,8,9-Pentachlorodibenzo-p-dioxin		100 ng/ml
1,2,4,6,7,9-Hexachlorodibenzo-p-dioxin		100 ng/ml
1,2,3,4,6,7-Hexachlorodibenzo-p-dioxin		100 ng/ml
1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin		100 ng/ml
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		100 ng/ml
Octachlorodibenzo-p-dioxin		100 ng/ml
1,3,6,8-Tetrachlorodibenzofuran		100 ng/ml
1,2,8,9-Tetrachlorodibenzofuran		100 ng/ml
1,3,4,6,8-Pentachlorodibenzofuran		100 ng/ml
1,2,3,8,9-Pentachlorodibenzofuran		100 ng/ml
1,2,3,4,8,9-Hexachlorodibenzofuran		100 ng/ml
1,2,3,4,6,8-Hexachlorodibenzofuran		100 ng/ml
1,2,3,4,6,7,8-Heptachlorodibenzofuran		100 ng/ml
1,2,3,4,7,8,9-Heptachlorodibenzofuran		100 ng/ml
Octachlorodibenzofuran		100 ng/ml
2378-TCDD RESOLUTION TESTING ISOMERS		
1,2,3,4-Tetrachlorodibenzo-p-dioxin		50 ng/ml
1,2,3,7 and 1,2,3,8-Tetrachlorodibenzo-p-dioxin mix		50 ng/ml
2,3,7,8-Tetrachlorodibenzo-p-dioxin		100 ng/ml
1,2,3,9-Tetrachlorodibenzo-p-dioxin		100 ng/ml
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		50 ng/ml
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		50 ng/ml
OTHERS		
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin		50 ng/ml



GC/MS DATA: Native HxCDFs and HxCDDs on a 60m SP-2331 Column.

CAPILLARY COLUMN PERFORMANCE TEST MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
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TDTFWD	Combined Window Defining and Resolution Testing Mixture for 3 Capillary Columns.	1.2 ml
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Concentrations for each compound are listed in brackets (ng/ml ± 20%)^a

WINDOW DEFINING STANDARDS

5/2 ^b		2331 ^c /225 ^d	
FIRST	LAST	FIRST	LAST
1368-TCDD (50)	1289-TCDD (50)	1368-TCDD (50)	1289-TCDD (50)
12479-PeCDD (50)	12389-PeCDD (50)	12479-PeCDD (50)	12389-PeCDD (50)
124679-HxCDD (50)	123467-HxCDD (50)	124679-HxCDD (50)	123467-HxCDD (50)
1234679-HpCDD (50)	1234678-HpCDD (50)	1234679-HpCDD (50)	1234678-HpCDD (50)
	OCDD (50)		OCDD (50)
1368-TCDF (100)	1289-TCDF (100)	1368-TCDF (100)	1289-TCDF (100)
13468-PeCDF (50)	12389-PeCDF (50)	13468-PeCDF (50)	23467-PeCDF (50)
123468-HxCDF (50)	123489-HxCDF (50)	123468-HxCDF (50)	234678-HxCDF (50)
1234678-HpCDF (50)	1234789-HpCDF (50)	1234678-HpCDF (50)	1234789-HpCDF (50)
	OCDF (50)		OCDF (50)

RESOLUTION TESTING MIXTURES

	5/2 ^b	2331 ^c	225 ^d
2378-TCDD	1234-TCDD (25) 1237 and 1238-TCDD (25) ^e 2378-TCDD (50) 1239-TCDD (50)	1478-TCDD (25) 2378-TCDD (50) 1237 and 1238-TCDD (25) ^e 1234-TCDD (25)	1478-TCDD (25) 2378-TCDD (50) 1237 and 1238-TCDD (25) ^e 1234-TCDD (25)
2378-TCDF	2347-TCDF/ 2348-TCDF/ 2378-TCDF (not resolved)	1269-TCDF (50) 2378-TCDF (100) 2348-TCDF (50)	2347-TCDF (50) 2378-TCDF (100) 1239-TCDF (50)

OTHER PCDDs AND PCDFs INCLUDED

12378-PeCDD (50)	123478-HxCDD (50)	123478-HxCDF (50)	¹³ C ₁₂ -1234-TCDD (25)
12378-PeCDF (50)	123678-HxCDD (50)	123678-HxCDF (50)	¹³ C ₁₂ -2378-TCDD (25)
23478-PeCDF (50)	123789-HxCDD (50)	123789-HxCDF (50)	¹³ C ₁₂ -2378-TCDF (25)
			¹³ C ₁₂ -123789-HxCDD (50)

- a Maximum percent relative combined uncertainty of weights and volumes
 b 5/2 - DB-5, BP5, HP-2, Rtx-5, SPB-5 or equivalent capillary column
 c 2331 - SP-2331, Rtx-2330 or equivalent capillary column
 d 225 - DB-225, BP225, HP-225, Rtx-225, SPB-225 or equivalent capillary column
 e Total concentration of both isomers

INDIVIDUAL PCDD & PCDF CONGENERS: NATIVE AND MASS-LABELLED

Wellington has prepared and offers a large selection of individual native and mass-labelled chlorinated dibenzo-p-dioxins (PCDDs) and chlorinated dibenzofurans (PCDFs).

All of these compounds have been synthesized using single product, unambiguous routes and purified using a variety of techniques. Prior to release, their structures and chemical and isotopic purities are confirmed using a number of methods and this data is summarized in the Certificates of Analysis (CofAs).

Accurate solutions of these compounds were prepared as described in the introduction to this catalogue and the maximum percent relative uncertainty associated with their concentrations is $\pm 5\%$. In addition, the concentrations of the 2,3,7,8-substituted PCDDs and PCDFs have been continually certified since 1991 through a large number of interlaboratory studies and are thus traceable to these studies.

The following product groups are presented in this section:

Native Chlorinated Dibenzo-p-dioxins (PCDDs)

Native Chlorinated Dibenzofurans (PCDFs)

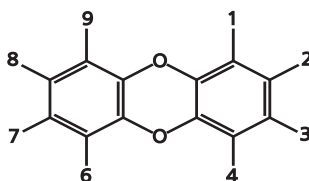
Mass-labelled PCDDs

Mass-labelled PCDFs



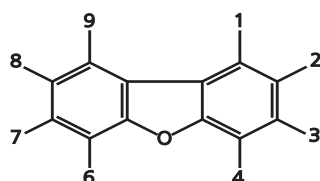
NATIVE CHLORINATED DIBENZO-p-DIOXINS (PCDDs)

Catalogue Number	Product (toluene or nonane solution)	Qty/Conc
DD-0-S	Dibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1-S	1-Chlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-2-S	2-Chlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-23-S	2,3-Dichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-27-S	2,7-Dichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-28-S	2,8-Dichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-123-S	1,2,3-Trichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-124-S	1,2,4-Trichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-237-S	2,3,7-Trichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1234-S	1,2,3,4-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1247/8-S	1,2,4,7/1,2,4,8-Tetrachlorodibenzo-p-dioxin mix	1.2 ml 50 µg/ml
DD-1278-S	1,2,7,8-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1289-S	1,2,8,9-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1368-S	1,3,6,8-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1378-S	1,3,7,8-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1379-S	1,3,7,9-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1478-S	1,4,7,8-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-2378-S	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-12378-S	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-12478-S	1,2,4,7,8-Pentachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-123467-S	1,2,3,4,6,7-Hexachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-123468-S	1,2,3,4,6,8-Hexachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-123478-S	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-123678-S	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-123789-S	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-124679-S	1,2,4,6,7,9-Hexachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-1234678-S	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml
DD-12346789-S	Octachlorodibenzo-p-dioxin	1.2 ml 50 µg/ml



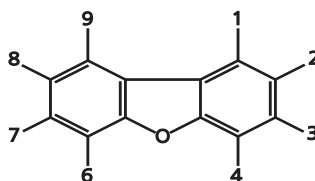
NATIVE CHLORINATED DIBENZOFURANS (PCDFs)

Catalogue Number	Product (toluene or nonane solution)	Qty/Conc
DF-0-S	Dibenzofuran	1.2 ml 50 µg/ml
DF-2-S	2-Chlorodibenzofuran	1.2 ml 50 µg/ml
DF-4-S	4-Chlorodibenzofuran	1.2 ml 50 µg/ml
DF-23-S	2,3-Dichlorodibenzofuran	1.2 ml 50 µg/ml
DF-24-S	2,4-Dichlorodibenzofuran	1.2 ml 50 µg/ml
DF-26-S	2,6-Dichlorodibenzofuran	1.2 ml 50 µg/ml
DF-27-S	2,7-Dichlorodibenzofuran	1.2 ml 50 µg/ml
DF-28-S	2,8-Dichlorodibenzofuran	1.2 ml 50 µg/ml
DF-136-S	1,3,6-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-138-S	1,3,8-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-146-S	1,4,6-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-147-S	1,4,7-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-149-S	1,4,9-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-234-S	2,3,4-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-236-S	2,3,6-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-238-S	2,3,8-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-246-S	2,4,6-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-247-S	2,4,7-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-248-S	2,4,8-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-267-S	2,6,7-Trichlorodibenzofuran	1.2 ml 50 µg/ml
DF-1236-S	1,2,3,6-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1238-S	1,2,3,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1239-S	1,2,3,9-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1246-S	1,2,4,6-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1247-S	1,2,4,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1248-S	1,2,4,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1267-S	1,2,6,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1278-S	1,2,7,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1279-S	1,2,7,9-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1347-S	1,3,4,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml



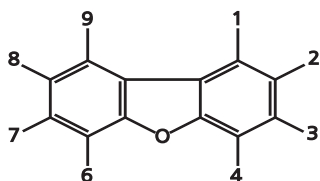
NATIVE CHLORINATED DIBENZOFURANS (PCDFs)

Catalogue Number	Product (toluene or nonane solution)	Qty/Conc
DF-1348-S	1,3,4,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1349-S	1,3,4,9-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1367-S	1,3,6,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1368-S	1,3,6,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1369-S	1,3,6,9-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1378-S	1,3,7,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1467-S	1,4,6,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1478-S	1,4,7,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2346-S	2,3,4,6-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2347-S	2,3,4,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2348-S	2,3,4,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2368-S	2,3,6,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2378-S	2,3,7,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2467-S	2,4,6,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-2468-S	2,4,6,8-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-3467-S	3,4,6,7-Tetrachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12347-S	1,2,3,4,7-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12348-S	1,2,3,4,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12367-S	1,2,3,6,7-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12378-S	1,2,3,7,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12379-S	1,2,3,7,9-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12389-S	1,2,3,8,9-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12467-S	1,2,4,6,7-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12468-S	1,2,4,6,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12478-S	1,2,4,7,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-13467-S	1,3,4,6,7-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-13478-S	1,3,4,7,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-13479-S	1,3,4,7,9-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-13678-S	1,3,6,7,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-23467-S	2,3,4,6,7-Pentachlorodibenzofuran	1.2 ml 50 µg/ml
DF-23469-S	2,3,4,6,9-Pentachlorodibenzofuran (or 1,4,6,7,8)	1.2 ml 50 µg/ml
DF-23478-S	2,3,4,7,8-Pentachlorodibenzofuran	1.2 ml 50 µg/ml



NATIVE CHLORINATED DIBENZOFURANS (PCDFs)

Catalogue Number	Product (toluene or nonane solution)	Qty/Conc
DF-123467-S	1,2,3,4,6,7-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-123468-S	1,2,3,4,6,8-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-123478-S	1,2,3,4,7,8-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-123489-S	1,2,3,4,8,9-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-123678-S	1,2,3,6,7,8-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-123789-S	1,2,3,7,8,9-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-124678-S	1,2,4,6,7,8-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-234678-S	2,3,4,6,7,8-Hexachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1234678-S	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1234689-S	1,2,3,4,6,8,9-Heptachlorodibenzofuran	1.2 ml 50 µg/ml
DF-1234789-S	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.2 ml 50 µg/ml
DF-12346789-S	Octachlorodibenzofuran	1.2 ml 50 µg/ml

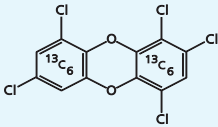
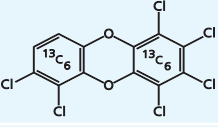
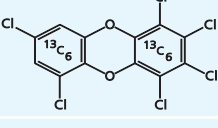
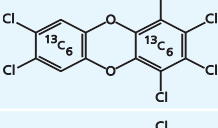
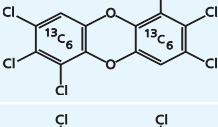
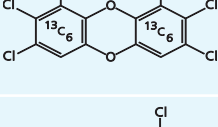
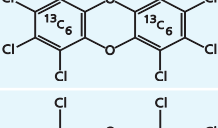
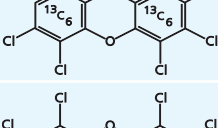
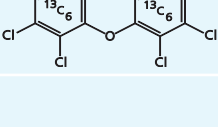
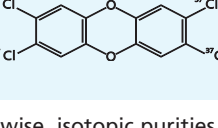


MASS-LABELLED CHLORINATED DIBENZO-p-DIOXINS

Catalogue Number	Product
MDD-0	 <p>[¹³C₁₂]Dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-2	 <p>2-Chloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-23	 <p>2,3-Dichloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-237	 <p>2,3,7-Trichloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-1234	 <p>1,2,3,4-Tetrachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-1278	 <p>1,2,7,8-Tetrachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-1368	 <p>1,3,6,8-Tetrachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-1378	 <p>1,3,7,8-Tetrachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-2378	 <p>2,3,7,8-Tetrachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-12378	 <p>1,2,3,7,8-Pentachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-12389	 <p>1,2,3,8,9-Pentachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-12478	 <p>1,2,4,7,8-Pentachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

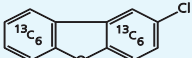
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED DIBENZO-p-DIOXINS

Catalogue Number	Product
MDD-12479	 <p>1,2,4,7,9-Pentachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-123467	 <p>1,2,3,4,6,7-Hexachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-123468	 <p>1,2,3,4,6,8-Hexachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-123478	 <p>1,2,3,4,7,8-Hexachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-123678	 <p>1,2,3,6,7,8-Hexachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-123789	 <p>1,2,3,7,8,9-Hexachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-1234678	 <p>1,2,3,4,6,7,8-Heptachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-1234679	 <p>1,2,3,4,6,7,9-Heptachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDD-12346789	 <p>Octachloro[¹³C₁₂]dibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MCDD-2378	 <p>2,3,7,8-[³⁷Cl₄]-Tetrachlorodibenzo-p-dioxin 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene (isotopic purity; 94 to 95%)</p>

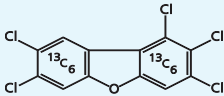
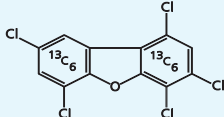
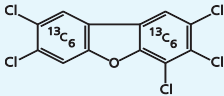
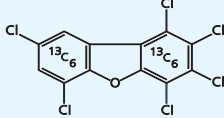
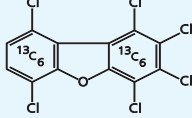
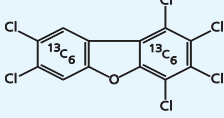
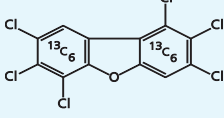
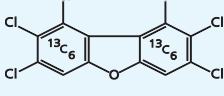
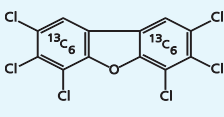
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED DIBENZOFURANS

Catalogue Number	Product
MDF-0	 <p>[¹³C₁₂]Dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-2	 <p>2-Chloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-23	 <p>2,3-Dichloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-238	 <p>2,3,8-Trichloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-1234	 <p>1,2,3,4-Tetrachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-1278	 <p>1,2,7,8-Tetrachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-1368	 <p>1,3,6,8-Tetrachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-2378	 <p>2,3,7,8-Tetrachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-12346	 <p>1,2,3,4,6-Pentachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

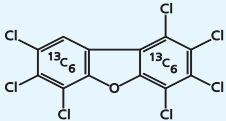
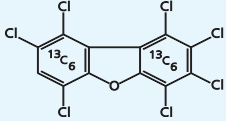
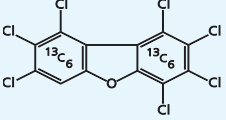
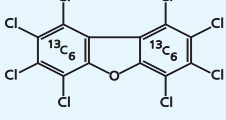
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED DIBENZOFURANS

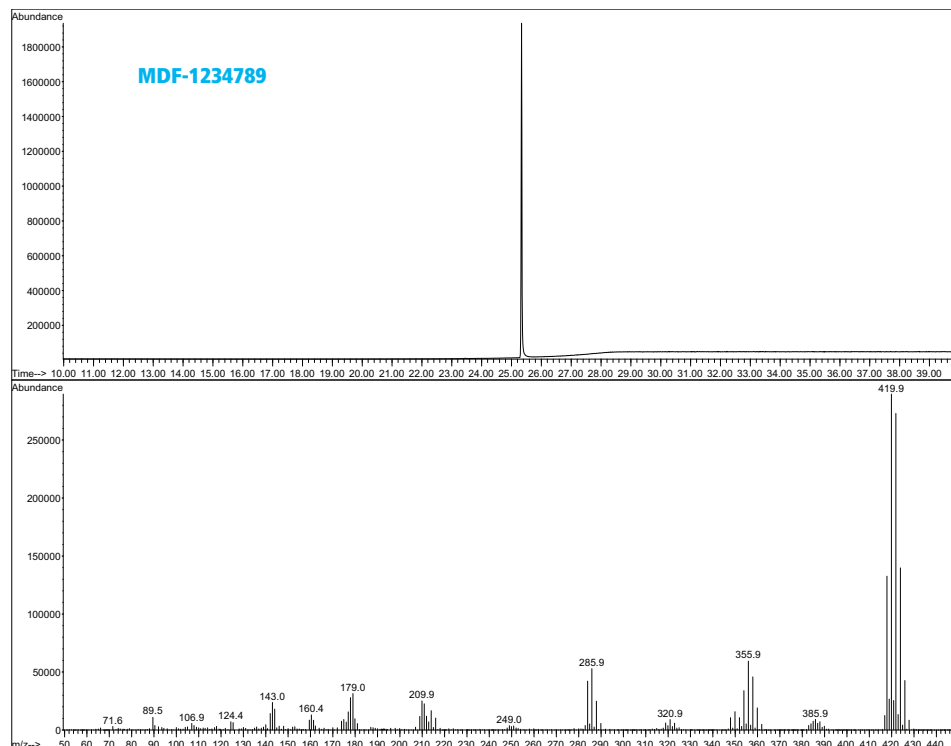
Catalogue Number	Product
MDF-12378	 <p>1,2,3,7,8-Pentachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-13468	 <p>1,3,4,6,8-Pentachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-23478	 <p>2,3,4,7,8-Pentachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-123468	 <p>1,2,3,4,6,8-Hexachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-123469	 <p>1,2,3,4,6,9-Hexachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-123478	 <p>1,2,3,4,7,8-Hexachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-123678	 <p>1,2,3,6,7,8-Hexachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-123789	 <p>1,2,3,7,8,9-Hexachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-234678	 <p>2,3,4,6,7,8-Hexachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

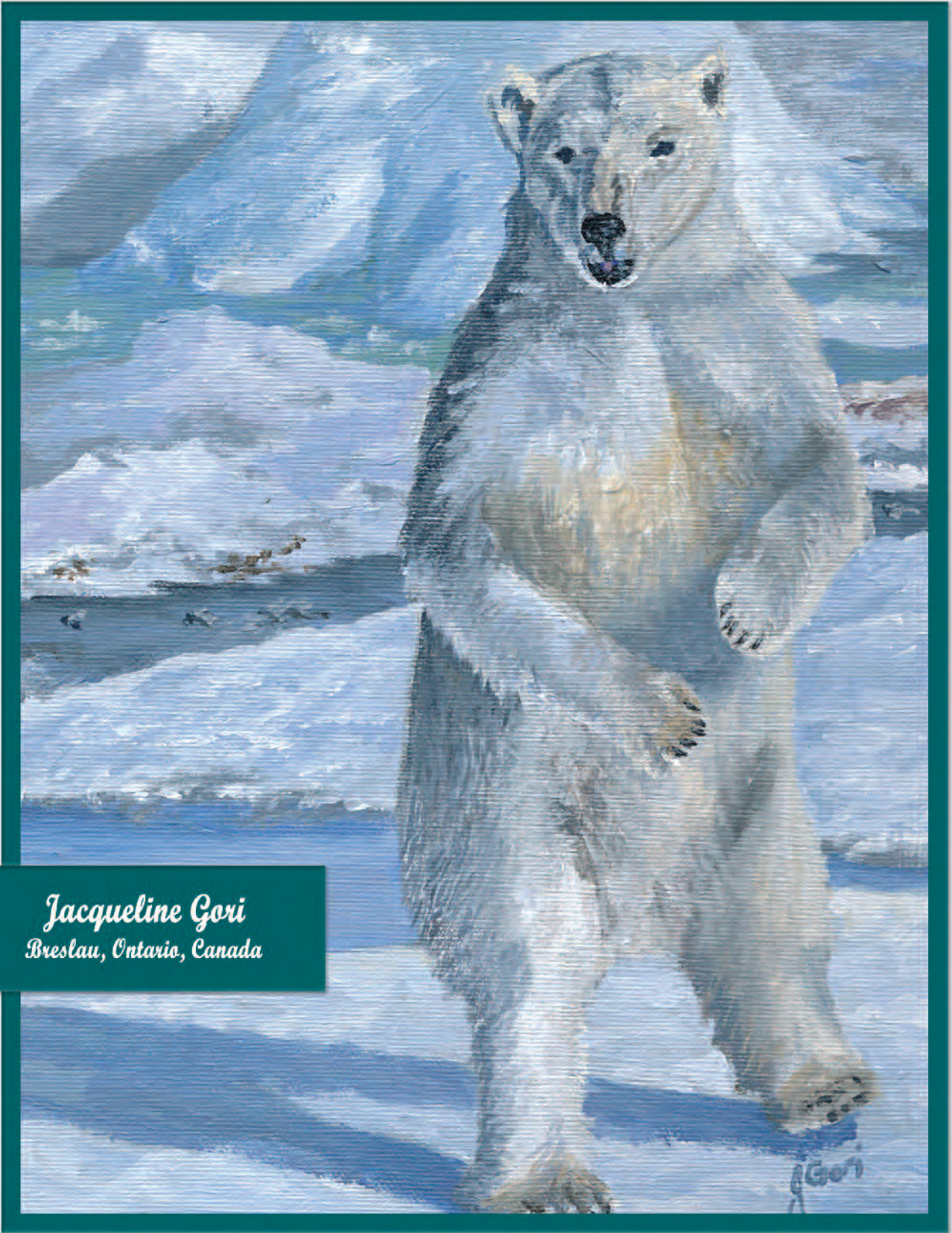
MASS-LABELLED CHLORINATED DIBENZOFURANS

Catalogue Number	Product
MDF-1234678	 <p>1,2,3,4,6,7,8-Heptachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-1234689	 <p>1,2,3,4,6,8,9-Heptachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-1234789	 <p>1,2,3,4,7,8,9-Heptachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MDF-12346789	 <p>Octachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.



HRGC/LRMS data of 1,2,3,4,7,8,9-Heptachloro[¹³C₁₂]dibenzofuran (30m DB-5 column).



Jacqueline Gori
Breslau, Ontario, Canada

PCDDs & PCDFs:

JAPANESE INDUSTRIAL STANDARD METHODS JIS K 0311 AND JIS K 0312 & ADDITIONAL PCDD/PCDF SPECIALTY SOLUTION/MIXTURES

Wellington has also prepared several other calibration sets containing native and mass-labelled chlorinated dibenzo-p-dioxins (PCDDs) and chlorinated dibenzofurans (PCDFs). Some of these have become quite popular as they are multi-point sets including as many as 13 individual calibration solutions. This allows some flexibility in selecting the calibration range. In addition, these calibration sets and their support solutions incorporate additional mass-labelled PCDDs and PCDFs which can be used as part of a more involved sampling and sample processing regime.

All of these calibration sets and support solutions are suitable for use with the Japanese Industrial Standards JIS K 0311 and JIS K 0312. In addition, provided that all performance criteria are achieved, they can be used with other regulatory methods from other countries.

In our previous catalogue, we introduced DFP-CVS-B10 which is a combination calibration set for PCDD, PCDF and dioxin-like PCB congener analysis. These solutions remain very popular and will continue to be offered.



DF-CVS-A10

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-CVS-A10-Set 1	CS1/CS3/CS5/CS7/CS9	1 kit (5 x 200 µl ampoules)
DF-CVS-A10-Set 2	CS2/CS4/CS6/CS8/CS10	1 kit (5 x 200 µl ampoules)
DF-CVS-A10-Set 3	CS3/CS5/CS7/CS9/CS11	1 kit (5 x 200 µl ampoules)
DF-A10-CSL	CSL Extended Calibration/Low Level	200 µl
DF-A10-CS1	CS1	200 µl
DF-A10-CS2	CS2	200 µl
DF-A10-CS3	CS3	200 µl
DF-A10-CS4	CS4	200 µl

	DF-A10-CSL (ng/ml)	DF-A10-CS1 (ng/ml)	DF-A10-CS2 (ng/ml)	DF-A10-CS3 (ng/ml)	DF-A10-CS4 (ng/ml)
NATIVE PCDDs & PCDFs					
1,3,6,8-Tetrachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,3,7,9-Tetrachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,2,8,9-Tetrachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.05	0.1	0.2	0.5	1
Octachlorodibenzo-p-dioxin	0.1	0.2	0.4	1	2
1,3,6,8-Tetrachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,7,8-Tetrachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,8,9-Tetrachlorodibenzofuran	0.05	0.1	0.2	0.5	1
2,3,7,8-Tetrachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,3,7,8-Pentachlorodibenzofuran	0.05	0.1	0.2	0.5	1
2,3,4,7,8-Pentachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,3,4,7,8-Hexachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,3,6,7,8-Hexachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,3,7,8,9-Hexachlorodibenzofuran	0.05	0.1	0.2	0.5	1
2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.05	0.1	0.2	0.5	1
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.05	0.1	0.2	0.5	1
Octachlorodibenzofuran	0.1	0.2	0.4	1	2
MASS-LABELLED PCDDs & PCDFs					
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10	10
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4,6-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4,6,9-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10	10
Octachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-A10-CS5	CS5	200 µl
DF-A10-CS6	CS6	200 µl
DF-A10-CS7	CS7	200 µl
DF-A10-CS8	CS8	200 µl
DF-A10-CS9	CS9	200 µl
DF-A10-CS10	CS10	200 µl
DF-A10-CS11	CS11	200 µl
DF-A10-CSH	CSH Extended Calibration/High Level	200 µl

DF-A10-CS5 (ng/ml)	DF-A10-CS6 (ng/ml)	DF-A10-CS7 (ng/ml)	DF-A10-CS8 (ng/ml)	DF-A10-CS9 (ng/ml)	DF-A10-CS10 (ng/ml)	DF-A10-CS11 (ng/ml)	DF-A10-CSH (ng/ml)
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
4	10	20	40	100	200	400	2000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
2	5	10	20	50	100	200	1000
4	10	20	40	100	200	400	2000
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
20	20	20	20	20	20	20	20
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
20	20	20	20	20	20	20	20

DF-CVS-B10

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-CVS-B10-Set 1	CS1/CS3/CS5/CS7/CS9	1 kit (5 x 200 µl ampoules)
DF-CVS-B10-Set 2	CS2/CS4/CS6/CS8/CS10	1 kit (5 x 200 µl ampoules)
DF-CVS-B10-Set 3	CS3/CS5/CS7/CS9/CS11	1 kit (5 x 200 µl ampoules)
DF-B10-CS1	CS1	200 µl
DF-B10-CS2	CS2	200 µl
DF-B10-CS3	CS3	200 µl
DF-B10-CS4	CS4	200 µl

	DF-B10-CS1 (ng/ml)	DF-B10-CS2 (ng/ml)	DF-B10-CS3 (ng/ml)	DF-B10-CS4 (ng/ml)
NATIVE PCDDs & PCDFs				
1,3,6,8-Tetrachlorodibenzo-p-dioxin	0.1	0.2	0.5	1
1,3,7,9-Tetrachlorodibenzo-p-dioxin	0.1	0.2	0.5	1
1,2,8,9-Tetrachlorodibenzo-p-dioxin	0.1	0.2	0.5	1
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1	0.2	0.5	1
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.1	0.2	0.5	1
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.2	0.4	1	2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.2	0.4	1	2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.2	0.4	1	2
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.2	0.4	1	2
Octachlorodibenzo-p-dioxin	0.5	1	2.5	5
1,3,6,8-Tetrachlorodibenzofuran	0.1	0.2	0.5	1
1,2,7,8-Tetrachlorodibenzofuran	0.1	0.2	0.5	1
1,2,8,9-Tetrachlorodibenzofuran	0.1	0.2	0.5	1
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.2	0.5	1
1,2,3,7,8-Pentachlorodibenzofuran	0.1	0.2	0.5	1
2,3,4,7,8-Pentachlorodibenzofuran	0.1	0.2	0.5	1
1,2,3,4,7,8-Hexachlorodibenzofuran	0.2	0.4	1	2
1,2,3,6,7,8-Hexachlorodibenzofuran	0.2	0.4	1	2
1,2,3,7,8,9-Hexachlorodibenzofuran	0.2	0.4	1	2
2,3,4,6,7,8-Hexachlorodibenzofuran	0.2	0.4	1	2
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.2	0.4	1	2
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.2	0.4	1	2
Octachlorodibenzofuran	0.5	1	2.5	5
MASS-LABELLED PCDDs & PCDFs				
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,6-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,6,9-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
Octachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-B10-CS5	CS5	200 µl
DF-B10-CS6	CS6	200 µl
DF-B10-CS7	CS7	200 µl
DF-B10-CS8	CS8	200 µl
DF-B10-CS9	CS9	200 µl
DF-B10-CS10	CS10	200 µl
DF-B10-CS11	CS11	200 µl

DF-B10-CS5 (ng/ml)	DF-B10-CS6 (ng/ml)	DF-B10-CS7 (ng/ml)	DF-B10-CS8 (ng/ml)	DF-B10-CS9 (ng/ml)	DF-B10-CS10 (ng/ml)	DF-B10-CS11 (ng/ml)
2	5	10	20	50	100	200
2	5	10	20	50	100	200
2	5	10	20	50	100	200
2	5	10	20	50	100	200
2	5	10	20	50	100	200
4	10	20	40	100	200	400
4	10	20	40	100	200	400
4	10	20	40	100	200	400
4	10	20	40	100	200	400
10	25	50	100	250	500	1000
2	5	10	20	50	100	200
2	5	10	20	50	100	200
2	5	10	20	50	100	200
2	5	10	20	50	100	200
2	5	10	20	50	100	200
4	10	20	40	100	200	400
4	10	20	40	100	200	400
4	10	20	40	100	200	400
4	10	20	40	100	200	400
4	10	20	40	100	200	400
4	10	20	40	100	200	400
10	25	50	100	250	500	1000
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
10	10	10	10	10	10	10
20	20	20	20	20	20	20

DF-CVS-C10

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-CVS-C10	PCDD & PCDF Calibration Solutions CS1 / CS2 / CS3 / CS4 / CS5 / CS6 / CS7	1 kit (7 x 200 µl ampoules)
DF-C10-CS1	CS1	200 µl
DF-C10-CS2	CS2	200 µl
DF-C10-CS3	CS3	200 µl

	DF-C10-CS1 (ng/ml)	DF-C10-CS2 (ng/ml)	DF-C10-CS3 (ng/ml)
NATIVE PCDDs & PCDFs			
1,3,6,8-Tetrachlorodibenzo-p-dioxin	0.1	0.5	2
1,2,8,9-Tetrachlorodibenzo-p-dioxin	0.1	0.5	2
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1	0.5	2
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.1	0.5	2
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.2	1	4
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.2	1	4
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.2	1	4
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.2	1	4
Octachlorodibenzo-p-dioxin	0.5	2.5	10
1,3,6,8-Tetrachlorodibenzofuran	0.1	0.5	2
1,2,8,9-Tetrachlorodibenzofuran	0.1	0.5	2
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.5	2
1,2,3,7,8-Pentachlorodibenzofuran	0.1	0.5	2
2,3,4,7,8-Pentachlorodibenzofuran	0.1	0.5	2
1,2,3,4,7,8-Hexachlorodibenzofuran	0.2	1	4
1,2,3,6,7,8-Hexachlorodibenzofuran	0.2	1	4
1,2,3,7,8,9-Hexachlorodibenzofuran	0.2	1	4
2,3,4,6,7,8-Hexachlorodibenzofuran	0.2	1	4
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.2	1	4
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.2	1	4
Octachlorodibenzofuran	0.5	2.5	10
EXTRACTION SPIKE: LABELLED PCDDs & PCDFs			
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10
Octachloro[¹³ C ₁₂]dibenzofuran	20	20	20
SYRINGE SPIKE: LABELLED PCDDs			
1,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,4,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,4,6,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
1,2,3,4,6,7,9-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10
SAMPLING SPIKE			
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-C10-CS4	CS4	200 µl
DF-C10-CS5	CS5	200 µl
DF-C10-CS6	CS6	200 µl
DF-C10-CS7	CS7	200 µl

*FOR SUPPORT SOLUTIONS, see DF-ST-C, DF-LCS-B, DF-IS-J, and DF-SS-A (and their dilutions).

	DF-C10-CS4 (ng/ml)	DF-C10-CS5 (ng/ml)	DF-C10-CS6 (ng/ml)	DF-C10-CS7 (ng/ml)
NATIVE PCDDs & PCDFs				
1,3,6,8-Tetrachlorodibenzo-p-dioxin	10	50	200	500
1,2,8,9-Tetrachlorodibenzo-p-dioxin	10	50	200	500
2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	50	200	500
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	10	50	200	500
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	20	100	400	1000
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	20	100	400	1000
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	20	100	400	1000
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	20	100	400	1000
Octachlorodibenzo-p-dioxin	50	250	1000	2500
1,3,6,8-Tetrachlorodibenzofuran	10	50	200	500
1,2,8,9-Tetrachlorodibenzofuran	10	50	200	500
2,3,7,8-Tetrachlorodibenzofuran	10	50	200	500
1,2,3,7,8-Pentachlorodibenzofuran	10	50	200	500
2,3,4,7,8-Pentachlorodibenzofuran	10	50	200	500
1,2,3,4,7,8-Hexachlorodibenzofuran	20	100	400	1000
1,2,3,6,7,8-Hexachlorodibenzofuran	20	100	400	1000
1,2,3,7,8,9-Hexachlorodibenzofuran	20	100	400	1000
2,3,4,6,7,8-Hexachlorodibenzofuran	20	100	400	1000
1,2,3,4,6,7,8-Heptachlorodibenzofuran	20	100	400	1000
1,2,3,4,7,8,9-Heptachlorodibenzofuran	20	100	400	1000
Octachlorodibenzofuran	50	250	1000	2500
EXTRACTION SPIKE: LABELLED PCDDs & PCDFs				
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	10	10	10	10
Octachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20
SYRINGE SPIKE: LABELLED PCDDs				
1,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,4,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,7,9-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10
SAMPLING SPIKE				
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10	10	10	10

DFP-CVS-B10

Catalogue Number	Product (nonane solution)	Qty/Conc
DFP-CVS-B10	PCDD/PCDF/PCB Calibration Solutions CS1 / CS2 / CS3 / CS4 / CS5 / CS6 / CS7	1 kit (7 x 200 µl ampoules)
DFP-B10-CS1	CS1	200 µl
DFP-B10-CS2	CS2	200 µl
DFP-B10-CS3	CS3	200 µl

	DFP-B10-CS1 (ng/ml)	DFP-B10-CS2 (ng/ml)	DFP-B10-CS3 (ng/ml)
NATIVE PCDDs & PCDFs			
1,3,6,8-Tetrachlorodibenzo-p-dioxin	0.1	0.5	2
1,2,8,9-Tetrachlorodibenzo-p-dioxin	0.1	0.5	2
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1	0.5	2
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.1	0.5	2
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.2	1	4
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.2	1	4
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.2	1	4
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.2	1	4
Octachlorodibenzo-p-dioxin	0.5	2.5	10
1,3,6,8-Tetrachlorodibenzofuran	0.1	0.5	2
1,2,8,9-Tetrachlorodibenzofuran	0.1	0.5	2
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.5	2
1,2,3,7,8-Pentachlorodibenzofuran	0.1	0.5	2
2,3,4,7,8-Pentachlorodibenzofuran	0.1	0.5	2
1,2,3,4,7,8-Hexachlorodibenzofuran	0.2	1	4
1,2,3,6,7,8-Hexachlorodibenzofuran	0.2	1	4
1,2,3,7,8,9-Hexachlorodibenzofuran	0.2	1	4
2,3,4,6,7,8-Hexachlorodibenzofuran	0.2	1	4
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.2	1	4
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.2	1	4
Octachlorodibenzofuran	0.5	2.5	10
NATIVE PCBs			
	IUPAC		
3,3',4,4'-Tetrachlorobiphenyl	77	0.2	1
3,4,4',5-Tetrachlorobiphenyl	81	0.2	1
2,3,3',4,4'-Pentachlorobiphenyl	105	0.2	1
2,3,4,4',5-Pentachlorobiphenyl	114	0.2	1
2,3',4,4',5-Pentachlorobiphenyl	118	0.2	1
2',3,4,4',5-Pentachlorobiphenyl	123	0.2	1
3,3',4,4',5-Pentachlorobiphenyl	126	0.2	1
2,3,3',4,4',5-Hexachlorobiphenyl	156	0.2	1
2,3,3',4,4',5'-Hexachlorobiphenyl	157	0.2	1
2,3',4,4',5,5'-Hexachlorobiphenyl	167	0.2	1
3,3',4,4',5,5'-Hexachlorobiphenyl	169	0.2	1
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	0.2	1
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	0.2	1
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	0.2	1
EXTRACTION SPIKE: 13C PCDDs/PCDFs/PCBs			
1,3,6,8-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
2,3,7,8-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,7,8-Pentachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
Octachloro[¹³ C] ₁₂ dibenzo-p-dioxin	20	20	20
2,3,7,8-Tetrachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
1,2,3,7,8-Pentachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
2,3,4,7,8-Pentachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
2,3,4,6,7,8-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
1,2,3,4,7,8,9-Heptachloro[¹³ C] ₁₂ dibenzofuran	10	10	10
Octachloro[¹³ C] ₁₂ dibenzofuran	20	20	20
3,3',4,4'-Tetrachloro[¹³ C] ₁₂ biphenyl	77L	10	10
3,4,4',5-Tetrachloro[¹³ C] ₁₂ biphenyl	81L	10	10
2,3,3',4,4'-Pentachloro[¹³ C] ₁₂ biphenyl	105L	10	10
2,3,4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	114L	10	10
2,3',4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	118L	10	10
2',3,4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	123L	10	10
3,3',4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	126L	10	10
2,3,3',4,4',5-Hexachloro[¹³ C] ₁₂ biphenyl	156L	10	10
2,3,3',4,4',5'-Hexachloro[¹³ C] ₁₂ biphenyl	157L	10	10
2,3',4,4',5,5'-Hexachloro[¹³ C] ₁₂ biphenyl	167L	10	10
3,3',4,4',5,5'-Hexachloro[¹³ C] ₁₂ biphenyl	169L	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C] ₁₂ biphenyl	170L	10	10
2,2',3,4,4',5,5'-Heptachloro[¹³ C] ₁₂ biphenyl	180L	10	10
2,3,3',4,4',5,5'-Heptachloro[¹³ C] ₁₂ biphenyl	189L	10	10
SYRINGE SPIKE: 13C PCDDs & PCBs			
1,3,7,8-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,4,7,8-Pentachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,4,6,8-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
1,2,3,4,6,7,9-Heptachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
2,3',4',5-Tetrachloro[¹³ C] ₁₂ biphenyl	70L	10	10
2,3,3',5,5'-Pentachloro[¹³ C] ₁₂ biphenyl	111L	10	10
2,2',3,4,4',5'-Hexachloro[¹³ C] ₁₂ biphenyl	138L	10	10
2,2',3,3',5,5',6-Heptachloro[¹³ C] ₁₂ biphenyl	178L	10	10
SAMPLING SPIKE			
1,2,3,4-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10
3,3',4,5'-Tetrachloro[¹³ C] ₁₂ biphenyl	79L	10	10

Catalogue Number	Product (nonane solution)	Qty/Conc		
DFP-B10-CS4	CS4	200 µl		
DFP-B10-CS5	CS5	200 µl		
DFP-B10-CS6	CS6	200 µl		
DFP-B10-CS7	CS7	200 µl		
*FOR PCDD/PCDF/PCB SUPPORT SOLUTIONS, see DFP-LCS-B (page 59), DFP-IS-B10 (page 61), and DFP-SS-A10 (page 61).				
*FOR PCDD/PCDF SUPPORT SOLUTIONS, see DF-ST-C, DF-LCS-B, DF-IS-J, and DF-SS-A.				
*FOR NATIVE AND MASS-LABELLED PCB SUPPORT SOLUTIONS, see pages 92 and 94.				
	DFP-B10-CS4 (ng/ml)	DFP-B10-CS5 (ng/ml)	DFP-B10-CS6 (ng/ml)	DFP-B10-CS7 (ng/ml)
NATIVE PCDDs & PCDFs				
1,3,6,8-Tetrachlorodibenzo-p-dioxin	10	50	200	500
1,2,8,9-Tetrachlorodibenzo-p-dioxin	10	50	200	500
2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	50	200	500
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	10	50	200	500
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	20	100	400	1000
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	20	100	400	1000
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	20	100	400	1000
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	20	100	400	1000
Octachlorodibenzo-p-dioxin	50	250	1000	2500
1,3,6,8-Tetrachlorodibenzofuran	10	50	200	500
1,2,8,9-Tetrachlorodibenzofuran	10	50	200	500
2,3,7,8-Tetrachlorodibenzofuran	10	50	200	500
1,2,3,7,8-Pentachlorodibenzofuran	10	50	200	500
2,3,4,7,8-Pentachlorodibenzofuran	10	50	200	500
1,2,3,4,7,8-Hexachlorodibenzofuran	20	100	400	1000
1,2,3,6,7,8-Hexachlorodibenzofuran	20	100	400	1000
1,2,3,7,8,9-Hexachlorodibenzofuran	20	100	400	1000
2,3,4,6,7,8-Hexachlorodibenzofuran	20	100	400	1000
1,2,3,4,6,7,8-Heptachlorodibenzofuran	20	100	400	1000
1,2,3,4,7,8,9-Heptachlorodibenzofuran	20	100	400	1000
Octachlorodibenzofuran	50	250	1000	2500
NATIVE PCBs				
	IUPAC			
3,3',4,4'-Tetrachlorobiphenyl	77	20	400	1000
3,4,4',5-Tetrachlorobiphenyl	81	20	400	1000
2,3,3',4,4'-Pentachlorobiphenyl	105	20	400	1000
2,3,4,4',5-Pentachlorobiphenyl	114	20	400	1000
2,3',4,4',5-Pentachlorobiphenyl	118	20	400	1000
2',3,4,4',5-Pentachlorobiphenyl	123	20	400	1000
3,3',4,4',5-Pentachlorobiphenyl	126	20	400	1000
2,3,3',4,4',5-Hexachlorobiphenyl	156	20	400	1000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	20	400	1000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	20	400	1000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	20	400	1000
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	20	400	1000
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	20	400	1000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	20	400	1000
EXTRACTION SPIKE: 13C PCDDs/PCDFs/PCBs				
1,3,6,8-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
2,3,7,8-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
Octachloro[¹³ C] ₁₂ dibenzo-p-dioxin	20	20	20	20
2,3,7,8-Tetrachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
1,2,3,7,8-Pentachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
2,3,4,7,8-Pentachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
1,2,3,4,7,8-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
1,2,3,6,7,8-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
1,2,3,7,8,9-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
2,3,4,6,7,8-Hexachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
1,2,3,4,6,7,8-Heptachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
1,2,3,4,7,8,9-Heptachloro[¹³ C] ₁₂ dibenzofuran	10	10	10	10
Octachloro[¹³ C] ₁₂ dibenzofuran	20	20	20	20
3,3',4,4'-Tetrachloro[¹³ C] ₁₂ biphenyl	77L	10	10	10
3,4,4',5-Tetrachloro[¹³ C] ₁₂ biphenyl	81L	10	10	10
2,3,3',4,4'-Pentachloro[¹³ C] ₁₂ biphenyl	105L	10	10	10
2,3,4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	114L	10	10	10
2,3',4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	118L	10	10	10
2',3,4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	123L	10	10	10
3,3',4,4',5-Pentachloro[¹³ C] ₁₂ biphenyl	126L	10	10	10
2,3,3',4,4',5-Hexachloro[¹³ C] ₁₂ biphenyl	156L	10	10	10
2,3,3',4,4',5'-Hexachloro[¹³ C] ₁₂ biphenyl	157L	10	10	10
2,3',4,4',5,5'-Hexachloro[¹³ C] ₁₂ biphenyl	167L	10	10	10
3,3',4,4',5,5'-Hexachloro[¹³ C] ₁₂ biphenyl	169L	10	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C] ₁₂ biphenyl	170L	10	10	10
2,2',3,4,4',5,5'-Heptachloro[¹³ C] ₁₂ biphenyl	180L	10	10	10
2,3,3',4,4',5,5'-Heptachloro[¹³ C] ₁₂ biphenyl	189L	10	10	10
SYRINGE SPIKE: 13C PCDDs & PCBs				
1,3,7,8-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,4,7,8-Pentachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,8-Hexachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
1,2,3,4,6,7,9-Heptachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
2,3',4',5-Tetrachloro[¹³ C] ₁₂ biphenyl	70L	10	10	10
2,3,3',5,5'-Pentachloro[¹³ C] ₁₂ biphenyl	111L	10	10	10
2,2',3,4,4',5'-Hexachloro[¹³ C] ₁₂ biphenyl	138L	10	10	10
2,2',3,3',5,5',6-Heptachloro[¹³ C] ₁₂ biphenyl	178L	10	10	10
SAMPLING SPIKE				
1,2,3,4-Tetrachloro[¹³ C] ₁₂ dibenzo-p-dioxin	10	10	10	10
3,3',4,5'-Tetrachloro[¹³ C] ₁₂ biphenyl	79L	10	10	10

NK-CVS-J

Catalogue Number	Product (nonane solution)	Qty/Conc
NK-CVS-J	PCDD & PCDF Calibration Solutions CS1-J, CS2-J, CS3-J, CS4-J, CS5-J and CS6-J	1 kit (6 ampoules)
NK-CS1-J	CS1-J	200 µl
NK-CS2-J	CS2-J	200 µl
NK-CS3-J	CS3-J	200 µl
NK-CS4-J	CS4-J	200 µl
NK-CS5-J	CS5-J	200 µl
NK-CS6-J	CS6-J	200 µl

	NK-CS1-J (ng/ml)	NK-CS2-J (ng/ml)	NK-CS3-J (ng/ml)	NK-CS4-J (ng/ml)	NK-CS5-J (ng/ml)	NK-CS6-J (ng/ml)
NATIVE PCDDs & PCDFs						
1,3,6,8-Tetrachlorodibenzo-p-dioxin	0.1	0.4	2	10	50	100
1,3,7,9-Tetrachlorodibenzo-p-dioxin	0.1	0.4	2	10	50	100
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1	0.4	2	10	50	100
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.1	0.4	2	10	50	100
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.2	0.8	4	20	100	200
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.2	0.8	4	20	100	200
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.2	0.8	4	20	100	200
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.2	0.8	4	20	100	200
Octachlorodibenzo-p-dioxin	0.5	2.0	10	50	250	500
1,2,7,8-Tetrachlorodibenzofuran	0.1	0.4	2	10	50	100
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.4	2	10	50	100
1,2,3,7,8-Pentachlorodibenzofuran	0.1	0.4	2	10	50	100
2,3,4,7,8-Pentachlorodibenzofuran	0.1	0.4	2	10	50	100
1,2,3,4,7,8-Hexachlorodibenzofuran	0.2	0.8	4	20	100	200
1,2,3,6,7,8-Hexachlorodibenzofuran	0.2	0.8	4	20	100	200
1,2,3,7,8,9-Hexachlorodibenzofuran	0.2	0.8	4	20	100	200
2,3,4,6,7,8-Hexachlorodibenzofuran	0.2	0.8	4	20	100	200
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.2	0.8	4	20	100	200
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.2	0.8	4	20	100	200
Octachlorodibenzofuran	0.5	2.0	10	50	250	500
MASS-LABELLED PCDDs & PCDFs*						
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	40	40	40	40	40	40
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
Octachloro[¹³ C ₁₂]dibenzofuran	40	40	40	40	40	40
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	20	20	20	20	20	20
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	20	20	20	20	20	20

* Support Solutions for **NK-CVS-J** see: **NK-LCS-T**, **NK-IS-J4** and **NK-IS-J5**.

Support solutions for **DF-CVS-A10** and **DF-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-LCS-A	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
DF-LCS-A200	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
DF-LCS-A40	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml

	DF-LCS-A (ng/ml)	DF-LCS-A200 (ng/ml)	DF-LCS-A40 (ng/ml)
MASS-LABELLED PCDDs			
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	2000	400	80
MASS-LABELLED PCDFs			
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
Octachloro[¹³ C ₁₂]dibenzofuran	2000	400	80

DF-LCS-B

Support solutions for **DF-CVS-A10**, **DF-CVS-B10**, **DF-CVS-C10**, and **DFP-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-LCS-B	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
DF-LCS-B200	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
DF-LCS-B40	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml

	DF-LCS-B (ng/ml)	DF-LCS-B200 (ng/ml)	DF-LCS-B40 (ng/ml)
MASS-LABELLED PCDDs			
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	2000	400	80
MASS-LABELLED PCDFs			
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
Octachloro[¹³ C ₁₂]dibenzofuran	2000	400	80

Support solutions for **DF-CVS-A10**, **DF-CVS-B10**, **DF-CVS-C10**, and **DFP-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-LCS-C	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
DF-LCS-C200	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
DF-LCS-C40	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml

	DF-LCS-C (ng/ml)	DF-LCS-C200 (ng/ml)	DF-LCS-C40 (ng/ml)
MASS-LABELLED PCDDs			
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	1000	200	40
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	2000	400	80
MASS-LABELLED PCDFs			
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	1000	200	40
Octachloro[¹³ C ₁₂]dibenzofuran	2000	400	80

MASS-LABELLED PCDDs & PCDFs: SOLUTION/MIXTURES

NOTE CONCENTRATIONS: DS-1000 and FS-1000 = µg/ml
NK-LCS-O and NK-LCS-T = ng/ml

Catalogue Number	Product (nonane solution)	Qty/Conc
DS-1000	Mass-Labelled PCDD Solution/Mixture	1.2 ml
FS-1000	Mass-Labelled PCDF Solution/Mixture	1.2 ml
NK-LCS-O	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml
NK-LCS-T	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml

	DS-1000 (µg/ml)	FS-1000 (µg/ml)	NK-LCS-O (ng/ml)	NK-LCS-T (ng/ml)
MASS-LABELLED PCDDs				
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	1.0	—	100	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	1.0	—	100	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1.0	—	100	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	1.0	—	100	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	—	—	—
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	1.0	—	100	40
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin	2.0	—	200	80
MASS-LABELLED PCDFs				
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	—
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	—
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	—	1.0	100	40
Octachloro[¹³ C ₁₂]dibenzofuran	—	—	200	80

MASS-LABELLED PCDDs & PCDFs: SOLUTION/MIXTURES

Support solutions for **DF-CVS-A10** and **DF-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc		
DF-IS-A	Mass-Labelled PCDD Internal Standard Solution	1.2 ml		
DF-IS-A200	Mass-Labelled PCDD Internal Standard Solution	1.2 ml		
DF-IS-A40	Mass-Labelled PCDD Internal Standard Solution	1.2 ml		
		DF-IS-A	DF-IS-A200	DF-IS-A40
MASS-LABELLED PCDD		(µg/ml)	(ng/ml)	(ng/ml)
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0	200	40
DF-IS-B	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
DF-IS-B200	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
DF-IS-B40	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
		DF-IS-B	DF-IS-B200	DF-IS-B40
MASS-LABELLED PCDD/PCDF		(µg/ml)	(ng/ml)	(ng/ml)
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0	200	40
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40
DF-IS-C	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
DF-IS-C200	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
DF-IS-C40	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
		DF-IS-C	DF-IS-C200	DF-IS-C40
MASS-LABELLED PCDD/PCDF		(µg/ml)	(ng/ml)	(ng/ml)
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0	200	40
1,2,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40

MASS-LABELLED PCDDs & PCDFs: SOLUTION/MIXTURES

Support solutions for **DF-CVS-A10** and **DF-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc		
DF-IS-D	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
DF-IS-D200	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
DF-IS-D40	Mass-Labelled PCDD/PCDF Internal Standard Solution	1.2 ml		
		DF-IS-D	DF-IS-D200	DF-IS-D40
MASS-LABELLED PCDD/PCDF		(µg/ml)	(ng/ml)	(ng/ml)
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0	200	40
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40
DF-IS-E	Mass-Labelled PCDF Internal Standard Solution	1.2 ml		
DF-IS-E200	Mass-Labelled PCDF Internal Standard Solution	1.2 ml		
DF-IS-E40	Mass-Labelled PCDF Internal Standard Solution	1.2 ml		
		DF-IS-E	DF-IS-E200	DF-IS-E40
MASS-LABELLED PCDFs		(µg/ml)	(ng/ml)	(ng/ml)
1,3,6,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40
DF-IS-F	Mass-Labelled PCDF Internal Standard Solution	1.2 ml		
DF-IS-F200	Mass-Labelled PCDF Internal Standard Solution	1.2 ml		
DF-IS-F40	Mass-Labelled PCDF Internal Standard Solution	1.2 ml		
		DF-IS-F	DF-IS-F200	DF-IS-F40
MASS-LABELLED PCDFs		(µg/ml)	(ng/ml)	(ng/ml)
1,2,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran		1.0	200	40

MASS-LABELLED PCDDs & PCDFs: SOLUTION/MIXTURES

Support solutions for **DF-CVS-A10** and **DF-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc	
DF-IS-G	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
DF-IS-G200	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
DF-IS-G40	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
	DF-IS-G	DF-IS-G200	DF-IS-G40
MASS-LABELLED PCDFs	(µg/ml)	(ng/ml)	(ng/ml)
1,2,3,4,6-Pentachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
DF-IS-H	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
DF-IS-H200	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
DF-IS-H40	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
	DF-IS-H	DF-IS-H200	DF-IS-H40
MASS-LABELLED PCDFs	(µg/ml)	(ng/ml)	(ng/ml)
1,2,3,4,6,9-Hexachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
DF-IS-I	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
DF-IS-I200	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
DF-IS-I40	Mass-Labelled PCDF Internal Standard Solution	1.2 ml	
	DF-IS-I	DF-IS-I200	DF-IS-I40
MASS-LABELLED PCDFs	(µg/ml)	(ng/ml)	(ng/ml)
1,2,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
1,2,3,4,6-Pentachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
1,2,3,4,6,9-Hexachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	1.0	200	40

MASS-LABELLED PCDDs & PCDFs: SOLUTION/MIXTURES

Support solutions for **DFP-CVS-B10** and **DF-CVS-C10**

Catalogue Number	Product (nonane solution)	Qty/Conc		
DF-IS-J	Mass-Labelled PCDD Internal Standard Solution	1.2 ml		
DF-IS-J100	Mass-Labelled PCDD Internal Standard Solution	1.2 ml		
DF-IS-J20	Mass-Labelled PCDD Internal Standard Solution	1.2 ml		
		DF-IS-J	DF-IS-J100	DF-IS-J20
MASS-LABELLED PCDDs		(ng/ml)	(ng/ml)	(ng/ml)
1,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		1000	100	20
1,2,4,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin		1000	100	20
1,2,3,4,6,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin		1000	100	20
1,2,3,4,6,7,9-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin		1000	100	20
		DF-SS-A	DF-SS-A100	DF-SS-A20
MASS-LABELLED PCDD		(ng/ml)	(ng/ml)	(ng/ml)
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		1000	100	20
DF-SS-A	Mass-Labelled PCDD Sampling Spike Solution	1.2 ml		
DF-SS-A100	Mass-Labelled PCDD Sampling Spike Solution	1.2 ml		
DF-SS-A20	Mass-Labelled PCDD Sampling Spike Solution	1.2 ml		

Catalogue Number	Product (nonane solution)	Qty/Conc
MDF-1278-1		1.2 ml
1,2,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		1 µg/ml
MDF-12346-1		1.2 ml
1,2,3,4,6-Pentachloro[¹³ C ₁₂]dibenzofuran		1 µg/ml
MDF-123469-1		1.2 ml
1,2,3,4,6,9-Hexachloro[¹³ C ₁₂]dibenzofuran		1 µg/ml
MDF-1234689-1		1.2 ml
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran		1 µg/ml
NK-IS-J4	Internal Standard Solution	1.2 ml
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		40 ng/ml
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin		40 ng/ml
NK-IS-J5	Internal Standard Solution	1.2 ml
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran		40 ng/ml
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran		40 ng/ml

MASS-LABELLED PCDDs/PCDFs/PCBs: SOLUTION/MIXTURES

Support solutions for **DFP-CVS-B10**, **DF-CVS-C10**, and **PCB-CVS-B10** (see page 90)

Catalogue Number	Product (nonane solution)	Qty/Conc		
DFP-LCS-B	Mass-Labelled PCDDs/PCDFs/PCBs Solution/Mixture	1.2 ml		
DFP-LCS-B100	Mass-Labelled PCDDs/PCDFs/PCBs Solution/Mixture	1.2 ml		
DFP-LCS-B20	Mass-Labelled PCDDs/PCDFs/PCBs Solution/Mixture	1.2 ml		
		DFP-LCS-B	DFP-LCS-B100	DFP-LCS-B20
MASS-LABELLED PCDDs & PCDFs		(ng/ml)	(ng/ml)	(ng/ml)
1,3,6,8-Tetrachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
2,3,7,8-Tetrachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
1,2,3,7,8-Pentachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
1,2,3,4,7,8-Hexachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
1,2,3,6,7,8-Hexachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
1,2,3,7,8,9-Hexachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
1,2,3,4,6,7,8-Heptachloro ^[13C₁₂] dibenzo-p-dioxin		1000	100	20
Octachloro ^[13C₁₂] dibenzo-p-dioxin		2000	200	40
2,3,7,8-Tetrachloro ^[13C₁₂] dibenzofuran		1000	100	20
1,2,3,7,8-Pentachloro ^[13C₁₂] dibenzofuran		1000	100	20
2,3,4,7,8-Pentachloro ^[13C₁₂] dibenzofuran		1000	100	20
1,2,3,4,7,8-Hexachloro ^[13C₁₂] dibenzofuran		1000	100	20
1,2,3,6,7,8-Hexachloro ^[13C₁₂] dibenzofuran		1000	100	20
1,2,3,7,8,9-Hexachloro ^[13C₁₂] dibenzofuran		1000	100	20
2,3,4,6,7,8-Hexachloro ^[13C₁₂] dibenzofuran		1000	100	20
1,2,3,4,6,7,8-Heptachloro ^[13C₁₂] dibenzofuran		1000	100	20
1,2,3,4,7,8,9-Heptachloro ^[13C₁₂] dibenzofuran		1000	100	20
Octachloro ^[13C₁₂] dibenzofuran		2000	200	40
MASS-LABELLED PCBs	IUPAC			
3,3',4,4'-Tetrachloro ^[13C₁₂] biphenyl	77L	1000	100	20
3,4,4',5-Tetrachloro ^[13C₁₂] biphenyl	81L	1000	100	20
2,3,3',4,4'-Pentachloro ^[13C₁₂] biphenyl	105L	1000	100	20
2,3,4,4',5-Pentachloro ^[13C₁₂] biphenyl	114L	1000	100	20
2,3',4,4',5-Pentachloro ^[13C₁₂] biphenyl	118L	1000	100	20
2',3,4,4',5-Pentachloro ^[13C₁₂] biphenyl	123L	1000	100	20
3,3',4,4',5-Pentachloro ^[13C₁₂] biphenyl	126L	1000	100	20
2,3,3',4,4',5-Hexachloro ^[13C₁₂] biphenyl	156L	1000	100	20
2,3,3',4,4',5'-Hexachloro ^[13C₁₂] biphenyl	157L	1000	100	20
2,3',4,4',5,5'-Hexachloro ^[13C₁₂] biphenyl	167L	1000	100	20
3,3',4,4',5,5'-Hexachloro ^[13C₁₂] biphenyl	169L	1000	100	20
2,2',3,3',4,4',5-Heptachloro ^[13C₁₂] biphenyl	170L	1000	100	20
2,2',3,4,4',5,5'-Heptachloro ^[13C₁₂] biphenyl	180L	1000	100	20
2,3,3',4,4',5,5'-Heptachloro ^[13C₁₂] biphenyl	189L	1000	100	20

MASS-LABELLED PCDDs/PCDFs/PCBs: SOLUTION/MIXTURES

These three solutions were designed and prepared as support solutions to be used with the following calibration sets:

DF-CVS-A10

DF-CVS-B10

as well as:

PCB-CVS-A10 (see Page 88)

Catalogue Number	Product (nonane solution)	Qty/Conc
DFP-LCS-A	Mass-Labelled PCDD/PCDF/PCB Solution/Mixture	1.2 ml
MASS-LABELLED PCDDs		
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin		10 ng/ml
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin		10 ng/ml
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin		10 ng/ml
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin		10 ng/ml
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin		10 ng/ml
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin		10 ng/ml
Octachloro[¹³ C ₁₂]dibenzo-p-dioxin		20 ng/ml
MASS-LABELLED PCDFs		
2,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
1,2,3,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
2,3,4,7,8-Pentachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
1,2,3,4,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
1,2,3,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
1,2,3,7,8,9-Hexachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
2,3,4,6,7,8-Hexachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
1,2,3,4,6,7,8-Heptachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
1,2,3,4,7,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran		10 ng/ml
Octachloro[¹³ C ₁₂]dibenzofuran		20 ng/ml
MASS-LABELLED PCBs		
	IUPAC	
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	10 ng/ml
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	10 ng/ml
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	10 ng/ml
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	10 ng/ml
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	10 ng/ml
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	10 ng/ml
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	10 ng/ml
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	10 ng/ml
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	10 ng/ml
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	10 ng/ml
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	10 ng/ml
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	10 ng/ml
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	10 ng/ml
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	10 ng/ml
DFP-IS-A	Mass-Labelled PCDF/PCB Syringe Spike	1.2 ml
	IUPAC	
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	10 ng/ml
1,2,3,4,6,9-Hexachloro[¹³ C ₁₂]dibenzofuran	—	10 ng/ml
1,2,3,4,6,8,9-Heptachloro[¹³ C ₁₂]dibenzofuran	—	10 ng/ml
DFP-SS-A	Mass-Labelled PCDD/PCB Sampling Spike	1.2 ml
	IUPAC	
3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	50 ng/ml
1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	—	50 ng/ml

MASS-LABELLED PCDDs & PCBs: SOLUTION/MIXTURES

Support solutions for **DFP-CVS-B10**, **DF-CVS-C10**, and **PCB-CVS-B10** (page 90)

Catalogue Number	Product (nonane solution)	Qty/Conc
DFP-IS-B10	Mass-Labelled PCDD & PCB Internal Standard Solution	1.2 ml
MASS-LABELLED PCDDs		
	1,3,7,8-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	10 ng/ml
	1,2,4,7,8-Pentachloro[¹³ C ₁₂]dibenzo-p-dioxin	10 ng/ml
	1,2,3,4,6,8-Hexachloro[¹³ C ₁₂]dibenzo-p-dioxin	10 ng/ml
	1,2,3,4,6,7,9-Heptachloro[¹³ C ₁₂]dibenzo-p-dioxin	10 ng/ml
MASS-LABELLED PCBs		
	IUPAC	
	2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L
	2,3,3',5,5-Pentachloro[¹³ C ₁₂]biphenyl	111L
	2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L
	2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L
		10 ng/ml
		10 ng/ml
		10 ng/ml
		10 ng/ml
DFP-SS-A10	Mass-Labelled PCDD & PCB Sampling Spike Solution	1.2 ml
MASS-LABELLED PCDD & PCB		
	IUPAC	
	1,2,3,4-Tetrachloro[¹³ C ₁₂]dibenzo-p-dioxin	—
	3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L
		10 ng/ml
		10 ng/ml

NATIVE PCDDs & PCDFs: SOLUTION/MIXTURES

(*) Support solutions for **DF-CVS-A10** and **DF-CVS-B10**

(**) Support solution for **DF-CVS-C10** and **DFP-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc
DF-ST-A*	Native PCDD/PCDF Solution/Mixture	1.2 ml
DF-ST-B*	Native PCDD/PCDF Solution/Mixture	1.2 ml
DF-ST-C**	Native PCDD/PCDF Solution/Mixture	1.2 ml

	DF-ST-A*	DF-ST-B*	DF-ST-C**
NATIVE PCDDs	(µg/ml)	(µg/ml)	(µg/ml)
1,2,8,9-Tetrachlorodibenzo-p-dioxin	1.0	1.0	1.0
1,3,6,8-Tetrachlorodibenzo-p-dioxin	1.0	1.0	1.0
1,3,7,9-Tetrachlorodibenzo-p-dioxin	1.0	1.0	—
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.0	1.0	1.0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1.0	1.0	1.0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	1.0	2.0	2.0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	1.0	2.0	2.0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	1.0	2.0	2.0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.0	2.0	2.0
Octachlorodibenzo-p-dioxin	2.0	5.0	5.0
NATIVE PCDFs			
1,2,7,8-Tetrachlorodibenzofuran	1.0	1.0	—
1,2,8,9-Tetrachlorodibenzofuran	1.0	1.0	1.0
1,3,6,8-Tetrachlorodibenzofuran	1.0	1.0	1.0
2,3,7,8-Tetrachlorodibenzofuran	1.0	1.0	1.0
1,2,3,7,8-Pentachlorodibenzofuran	1.0	1.0	1.0
2,3,4,7,8-Pentachlorodibenzofuran	1.0	1.0	1.0
1,2,3,4,7,8-Hexachlorodibenzofuran	1.0	2.0	2.0
1,2,3,6,7,8-Hexachlorodibenzofuran	1.0	2.0	2.0
1,2,3,7,8,9-Hexachlorodibenzofuran	1.0	2.0	2.0
2,3,4,6,7,8-Hexachlorodibenzofuran	1.0	2.0	2.0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.0	2.0	2.0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.0	2.0	2.0
Octachlorodibenzofuran	2.0	5.0	5.0

NATIVE PCDDs & PCDFs: SOLUTION/MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
NK-ST-A	Native PCDD/PCDF Solution/Mixture	1.2 ml
NK-ST-A4	Native PCDD/PCDF Solution/Mixture	1.2 ml
NK-ST-B2	Native PCDD/PCDF Solution/Mixture	1.2 ml
NK-ST-B4	Native PCDD/PCDF Solution/Mixture	1.2 ml

	NK-ST-A (µg/ml)	NK-ST-A4 (ng/ml)	NK-ST-B2 (ng/ml)	NK-ST-B4 (µg/ml)
NATIVE PCDDs				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	2.0	2.0	100	1.0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	2.0	2.0	100	1.0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.0	2.0	200	2.0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.0	2.0	200	2.0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.0	2.0	200	2.0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.0	2.0	200	2.0
Octachlorodibenzo-p-dioxin	4.0	4.0	400	5.0
NATIVE PCDFs				
2,3,7,8-Tetrachlorodibenzofuran	2.0	2.0	100	1.0
1,2,3,7,8-Pentachlorodibenzofuran	2.0	2.0	100	1.0
2,3,4,7,8-Pentachlorodibenzofuran	2.0	2.0	100	1.0
1,2,3,4,7,8-Hexachlorodibenzofuran	2.0	2.0	200	2.0
1,2,3,6,7,8-Hexachlorodibenzofuran	2.0	2.0	200	2.0
1,2,3,7,8,9-Hexachlorodibenzofuran	2.0	2.0	200	2.0
2,3,4,6,7,8-Hexachlorodibenzofuran	2.0	2.0	200	2.0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	2.0	2.0	200	2.0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.0	2.0	200	2.0
Octachlorodibenzofuran	4.0	4.0	400	5.0

PCDDs & PCDFs: SOLUTION/MIXTURES

Catalogue Number	Product (nonane/toluene solution)	Qty/Conc
DDF-MDT	Native PCDD/PCDF Solution/Mixture	1.2 ml
MDDF-MDT	Mass-Labelled PCDD/PCDF Solution/Mixture	1.2 ml

NATIVE PCDDs & PCDFs		DDF-MDT (µg/ml)
Dibenzo-p-dioxin		1.0
2-Chlorodibenzo-p-dioxin		1.0
2,3-Dichlorodibenzo-p-dioxin		1.0
2,3,7-Trichlorodibenzo-p-dioxin		1.0
Dibenzofuran		1.0
2-Chlorodibenzofuran		1.0
2,3-Dichlorodibenzofuran		1.0
2,3,8-Trichlorodibenzofuran		1.0

MASS-LABELLED PCDDs & PCDFs		MDDF-MDT (µg/ml)
[¹³ C ₁₂]Dibenzo-p-dioxin		1.0
2-Chloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0
2,3-Dichloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0
2,3,7-Trichloro[¹³ C ₁₂]dibenzo-p-dioxin		1.0
[¹³ C ₁₂]Dibenzofuran		1.0
2-Chloro[¹³ C ₁₂]dibenzofuran		1.0
2,3-Dichloro[¹³ C ₁₂]dibenzofuran		1.0
2,3,8-Trichloro[¹³ C ₁₂]dibenzofuran		1.0

PCBs: ANALYTICAL METHOD SOLUTIONS

The electrophilic chlorination of biphenyl leads to complex mixtures of chlorobiphenyl (PCB) congeners ranging from monochloro- up to decachloro-biphenyl. Although 209 PCB congeners are theoretically possible, only about 150 are found in industrial mixtures and have ended up in the environment.

Certain PCB congeners are considered more toxic than others and are termed 'dioxin-like'. For this reason there are analytical methods that target only these 'dioxin-like' PCBs, while other methods focus on the major PCB congeners in the industrial mixtures. In addition, there are methods that address both groups of PCB congeners.

Wellington has designed, prepared, and offers a number of sets of calibration kits and support solutions for the analysis of individual PCB congeners.

WP-CVS

This set of solutions is to be used for the analysis of the 12 dioxin-like PCB congeners by HRGC/HRMS.

EPA Method 1668C

This series of calibration solutions, and corresponding support solutions, were prepared to be used according to U.S. EPA Method 1668, Revision C.

EPA Method 1668

This calibration kit and support solutions were designed and prepared to be used with the Draft version (March, 1997) of U.S. EPA Method 1668 which is still popular with some laboratories.

EC-9605-CVS

Environment Canada Method 1/RM/31 is a HRGC/LRMS method for PCB analysis and these solutions were prepared to be used with this method.

P48-W-CVS and P48-M-CVS

European Standard Method EN 1948-4 is to be used for analysis of the 12 'dioxin-like' PCB congeners and the 6 'marker' PCB congeners in stationary source emissions. These two calibration kits, and their support solutions, were prepared for this method.

WM48-CVS

This calibration set is a combination of P48-W-CVS and P48-M-CVS.



WP-CVS STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
WP-CVS	Dioxin-Like PCBs Calibration and Verification Solutions CS1-CS7	1 kit (7 ampoules)
WP-CS1	CS1	500 µl
WP-CS2	CS2	500 µl
WP-CS3	CS3	500 µl
WP-CS4	CS4	500 µl
WP-CS5	CS5	500 µl
WP-CS6	CS6	500 µl
WP-CS7	CS7	500 µl

NATIVE PCBs	IUPAC	WP-CS1	WP-CS2	WP-CS3	WP-CS4	WP-CS5	WP-CS6	WP-CS7
		(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	0.1	0.5	2.0	10	40	200	800
3,4,4',5-Tetrachlorobiphenyl	81	0.1	0.5	2.0	10	40	200	800
2,3,3',4,4'-Pentachlorobiphenyl	105	0.1	0.5	2.0	10	40	200	800
2,3,4,4',5-Pentachlorobiphenyl	114	0.1	0.5	2.0	10	40	200	800
2,3',4,4',5-Pentachlorobiphenyl	118	0.1	0.5	2.0	10	40	200	800
2',3,4,4',5-Pentachlorobiphenyl	123	0.1	0.5	2.0	10	40	200	800
3,3',4,4',5-Pentachlorobiphenyl	126	0.1	0.5	2.0	10	40	200	800
2,3,3',4,4',5-Hexachlorobiphenyl	156	0.1	0.5	2.0	10	40	200	800
2,3,3',4,4',5'-Hexachlorobiphenyl	157	0.1	0.5	2.0	10	40	200	800
2,3',4,4',5,5'-Hexachlorobiphenyl	167	0.1	0.5	2.0	10	40	200	800
3,3',4,4',5,5'-Hexachlorobiphenyl	169	0.1	0.5	2.0	10	40	200	800
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	0.1	0.5	2.0	10	40	200	800
MASS-LABELLED PCBs								
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	50	50	50	50	50	50	50
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	50	50	50	50	50	50	50
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	50	50	50	50	50	50	50
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	50	50	50	50	50	50	50
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	50	50	50	50	50	50	50
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	50	50	50	50	50	50	50
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	50	50	50	50	50	50	50
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	50	50	50	50	50	50	50
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	50	50	50	50	50	50	50
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	50	50	50	50	50	50	50
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	50	50	50	50	50	50	50
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	50	50	50	50	50	50	50
INTERNAL STANDARDS: MASS-LABELLED PCBs								
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	50	50	50	50	50	50	50
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	50	50	50	50	50	50	50
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	50	50	50	50	50	50	50
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	50	50	50	50	50	50	50

WP-CVS STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
WP-LCS	Surrogate Spiking Solution	1.2 ml
WP-ISS	Internal Standard Solution	1.2 ml
WP-STK	Native PCB Solution	1.2 ml

NATIVE PCBs	IUPAC	WP-LCS (ng/ml)	WP-ISS (ng/ml)	WP-STK (ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	—	—	2000
3,4,4',5-Tetrachlorobiphenyl	81	—	—	2000
2,3,3',4,4'-Pentachlorobiphenyl	105	—	—	2000
2,3,4,4',5-Pentachlorobiphenyl	114	—	—	2000
2,3',4,4',5-Pentachlorobiphenyl	118	—	—	2000
2',3,4,4',5-Pentachlorobiphenyl	123	—	—	2000
3,3',4,4',5-Pentachlorobiphenyl	126	—	—	2000
2,3,3',4,4',5-Hexachlorobiphenyl	156	—	—	2000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	—	—	2000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	—	—	2000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	—	—	2000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	—	—	2000
MASS-LABELLED PCBs				
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	1000	—	—
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	1000	—	—
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	1000	—	—
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	1000	—	—
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	1000	—	—
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	1000	—	—
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	1000	—	—
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	1000	—	—
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	1000	—	—
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	1000	—	—
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	1000	—	—
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	1000	—	—
INTERNAL STANDARDS: MASS-LABELLED PCBs				
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	—	1000	—
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	—	1000	—
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	—	1000	—
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	—	1000	—

EPA METHOD 1668C STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
68C-CV5	EPA Method 1668C Calibration and Verification Solutions CS0.2-CS5	1 kit (6 ampoules)
68C-CS0.2	CS0.2 High Sensitivity	200 µl
68C-CS1	CS1	200 µl
68C-CS2	CS2	200 µl
68C-CS3	CS3 Calibration Verification	500 µl
68C-CS4	CS4	200 µl
68C-CS5	CS5	200 µl

NOTE: The above product codes were updated to reflect the change of EPA Method 1668B to 1668C in April of 2010.

Native Toxics/LOC	IUPAC	68C-CS0.2 (ng/ml)	68C-CS1 (ng/ml)	68C-CS2 (ng/ml)	68C-CS3 (ng/ml)	68C-CS4 (ng/ml)	68C-CS5 (ng/ml)
2-Chlorobiphenyl	1	0.2	1.0	5.0	50	400	2000
4-Chlorobiphenyl	3	0.2	1.0	5.0	50	400	2000
2,2'-Dichlorobiphenyl	4	0.2	1.0	5.0	50	400	2000
4,4'-Dichlorobiphenyl	15	0.2	1.0	5.0	50	400	2000
2,2',6-Trichlorobiphenyl	19	0.2	1.0	5.0	50	400	2000
3,4,4'-Trichlorobiphenyl	37	0.2	1.0	5.0	50	400	2000
2,2',6,6'-Tetrachlorobiphenyl	54	0.2	1.0	5.0	50	400	2000
3,3',4,4'-Tetrachlorobiphenyl	77	0.2	1.0	5.0	50	400	2000
3,4,4',5-Tetrachlorobiphenyl	81	0.2	1.0	5.0	50	400	2000
2,2',4,6,6'-Pentachlorobiphenyl	104	0.2	1.0	5.0	50	400	2000
2,3,3',4,4'-Pentachlorobiphenyl	105	0.2	1.0	5.0	50	400	2000
2,3,4,4',5-Pentachlorobiphenyl	114	0.2	1.0	5.0	50	400	2000
2,3',4,4',5-Pentachlorobiphenyl	118	0.2	1.0	5.0	50	400	2000
2',3,4,4',5-Pentachlorobiphenyl	123	0.2	1.0	5.0	50	400	2000
3,3',4,4',5-Pentachlorobiphenyl	126	0.2	1.0	5.0	50	400	2000
2,2',4,4',6,6'-Hexachlorobiphenyl	155	0.2	1.0	5.0	50	400	2000
2,3,3',4,4',5-Hexachlorobiphenyl	156	0.2	1.0	5.0	50	400	2000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	0.2	1.0	5.0	50	400	2000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	0.2	1.0	5.0	50	400	2000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	0.2	1.0	5.0	50	400	2000
2,2',3,4',5,6,6'-Heptachlorobiphenyl	188	0.2	1.0	5.0	50	400	2000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	0.2	1.0	5.0	50	400	2000
2,2',3,3',5,5',6,6'-Octachlorobiphenyl	202	0.2	1.0	5.0	50	400	2000
2,3,3',4,4',5,5',6-Octachlorobiphenyl	205	0.2	1.0	5.0	50	400	2000
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	206	0.2	1.0	5.0	50	400	2000
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	208	0.2	1.0	5.0	50	400	2000
Decachlorobiphenyl	209	0.2	1.0	5.0	50	400	2000
Labelled Toxics/LOC/Window-Defining (68C-LCS)							
2-Chloro[¹³ C ₁₂]biphenyl	1L	100	100	100	100	100	100
4-Chloro[¹³ C ₁₂]biphenyl	3L	100	100	100	100	100	100
2,2'-Dichloro[¹³ C ₁₂]biphenyl	4L	100	100	100	100	100	100
4,4'-Dichloro[¹³ C ₁₂]biphenyl	15L	100	100	100	100	100	100
2,2',6-Trichloro[¹³ C ₁₂]biphenyl	19L	100	100	100	100	100	100
3,4,4'-Trichloro[¹³ C ₁₂]biphenyl	37L	100	100	100	100	100	100
2,2',6,6'-Tetrachloro[¹³ C ₁₂]biphenyl	54L	100	100	100	100	100	100
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	100	100	100	100	100	100
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	100	100	100	100	100	100
2,2',4,6,6'-Pentachloro[¹³ C ₁₂]biphenyl	104L	100	100	100	100	100	100
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	100	100	100	100	100	100
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	100	100	100	100	100	100
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	100	100	100	100	100	100
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	100	100	100	100	100	100
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	100	100	100	100	100	100
2,2',4,4',6,6'-Hexachloro[¹³ C ₁₂]biphenyl	155L	100	100	100	100	100	100
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	100	100	100	100	100	100
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	100	100	100	100	100	100
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	100	100	100	100	100	100
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	100	100	100	100	100	100
2,2',3,4',5,6,6'-Heptachloro[¹³ C ₁₂]biphenyl	188L	100	100	100	100	100	100
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	100	100	100	100	100	100
2,2',3,3',5,5',6,6'-Octachloro[¹³ C ₁₂]biphenyl	202L	100	100	100	100	100	100
2,3,3',4,4',5,5',6-Octachloro[¹³ C ₁₂]biphenyl	205L	100	100	100	100	100	100
2,2',3,3',4,4',5,5',6-Nonachloro[¹³ C ₁₂]biphenyl	206L	100	100	100	100	100	100
2,2',3,3',4,5,5',6,6'-Nonachloro[¹³ C ₁₂]biphenyl	208L	100	100	100	100	100	100
Decachloro[¹³ C ₁₂]biphenyl	209L	100	100	100	100	100	100
Labelled Clean-Up (68C-CS)							
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	100	100	100	100	100	100
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	100	100	100	100	100	100
2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	100	100	100	100	100	100
Labelled Injection/Internal (68C-IS)							
2,5-Dichloro[¹³ C ₁₂]biphenyl	9L	100	100	100	100	100	100
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	100	100	100	100	100	100
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	100	100	100	100	100	100
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	100	100	100	100	100	100
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	100	100	100	100	100	100

EPA METHOD 1668C STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
68C-LCS	Labelled Toxics/LOC/Window Defining Stock Solution	1.2 ml
68C-CS	Labelled Cleanup Stock Solution	1.2 ml
68C-IS	Labelled Injection/Internal Standard Stock Solution	1.2 ml
68C-PAR	Native Toxics/LOC Stock Solution	1.2 ml

NOTE: The above product codes were updated to reflect the change of EPA Method 1668B to 1668C in April of 2010.

Native Toxics/LOC	IUPAC	68C-LCS (ng/ml)	68C-CS (ng/ml)	68C-IS (ng/ml)	68C-PAR (ng/ml)
2-Chlorobiphenyl	1	—	—	—	2000
4-Chlorobiphenyl	3	—	—	—	2000
2,2'-Dichlorobiphenyl	4	—	—	—	2000
4,4'-Dichlorobiphenyl	15	—	—	—	2000
2,2',6-Trichlorobiphenyl	19	—	—	—	2000
3,4,4'-Trichlorobiphenyl	37	—	—	—	2000
2,2',6,6'-Tetrachlorobiphenyl	54	—	—	—	2000
3,3',4,4'-Tetrachlorobiphenyl	77	—	—	—	2000
3,4,4',5-Tetrachlorobiphenyl	81	—	—	—	2000
2,2',4,6,6'-Pentachlorobiphenyl	104	—	—	—	2000
2,3,3',4,4'-Pentachlorobiphenyl	105	—	—	—	2000
2,3,4,4',5-Pentachlorobiphenyl	114	—	—	—	2000
2,3',4,4',5-Pentachlorobiphenyl	118	—	—	—	2000
2',3,4,4',5-Pentachlorobiphenyl	123	—	—	—	2000
3,3',4,4',5-Pentachlorobiphenyl	126	—	—	—	2000
2,2',4,4',6,6'-Hexachlorobiphenyl	155	—	—	—	2000
2,3,3',4,4',5-Hexachlorobiphenyl	156	—	—	—	2000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	—	—	—	2000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	—	—	—	2000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	—	—	—	2000
2,2',3,4',5,6,6'-Heptachlorobiphenyl	188	—	—	—	2000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	—	—	—	2000
2,2',3,3',5,5',6,6'-Octachlorobiphenyl	202	—	—	—	2000
2,3,3',4,4',5,5',6-Octachlorobiphenyl	205	—	—	—	2000
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	206	—	—	—	2000
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	208	—	—	—	2000
Decachlorobiphenyl	209	—	—	—	2000
Labelled Toxics/LOC/Window-Defining (68C-LCS)					
2-Chloro[¹³ C ₁₂]biphenyl	1L	1000	—	—	—
4-Chloro[¹³ C ₁₂]biphenyl	3L	1000	—	—	—
2,2'-Dichloro[¹³ C ₁₂]biphenyl	4L	1000	—	—	—
4,4'-Dichloro[¹³ C ₁₂]biphenyl	15L	1000	—	—	—
2,2',6-Trichloro[¹³ C ₁₂]biphenyl	19L	1000	—	—	—
3,4,4'-Trichloro[¹³ C ₁₂]biphenyl	37L	1000	—	—	—
2,2',6,6'-Tetrachloro[¹³ C ₁₂]biphenyl	54L	1000	—	—	—
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	1000	—	—	—
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	1000	—	—	—
2,2',4,6,6'-Pentachloro[¹³ C ₁₂]biphenyl	104L	1000	—	—	—
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	1000	—	—	—
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	1000	—	—	—
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	1000	—	—	—
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	1000	—	—	—
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	1000	—	—	—
2,2',4,4',6,6'-Hexachloro[¹³ C ₁₂]biphenyl	155L	1000	—	—	—
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	1000	—	—	—
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	1000	—	—	—
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	1000	—	—	—
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	1000	—	—	—
2,2',3,4',5,6,6'-Heptachloro[¹³ C ₁₂]biphenyl	188L	1000	—	—	—
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	1000	—	—	—
2,2',3,3',5,5',6,6'-Octachloro[¹³ C ₁₂]biphenyl	202L	1000	—	—	—
2,3,3',4,4',5,5',6-Octachloro[¹³ C ₁₂]biphenyl	205L	1000	—	—	—
2,2',3,3',4,4',5,5',6-Nonachloro[¹³ C ₁₂]biphenyl	206L	1000	—	—	—
2,2',3,3',4,5,5',6,6'-Nonachloro[¹³ C ₁₂]biphenyl	208L	1000	—	—	—
Decachloro[¹³ C ₁₂]biphenyl	209L	1000	—	—	—
Labelled Clean-Up (68C-CS)					
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	—	1000	—	—
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	—	1000	—	—
2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	—	1000	—	—
Labelled Injection/Internal (68C-IS)					
2,5-Dichloro[¹³ C ₁₂]biphenyl	9L	—	—	5000	—
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	—	—	5000	—
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	—	—	5000	—
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	—	—	5000	—
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	—	—	5000	—

EPA METHOD 1668 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-1668CVS	EPA Method 1668 Calibration and Verification Solutions CS1-CS5	1 kit (5 ampoules)
EPA-1668CS1	CS1	200 µl
EPA-1668CS2	CS2	200 µl
EPA-1668CS3	CS3 Calibration Verification	500 µl
EPA-1668CS4	CS4	200 µl
EPA-1668CS5	CS5	200 µl

NATIVE PCBs	IUPAC	1668CS1 (ng/ml)	1668CS2 (ng/ml)	1668CS3 (ng/ml)	1668CS4 (ng/ml)	1668CS5 (ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	0.5	2.0	10	40	200
2,3,3',4,4'-Pentachlorobiphenyl	105	2.5	10	50	200	1000
2,3,4,4',5-Pentachlorobiphenyl	114	2.5	10	50	200	1000
2,3',4,4',5-Pentachlorobiphenyl	118	2.5	10	50	200	1000
2',3,4,4',5-Pentachlorobiphenyl	123	2.5	10	50	200	1000
3,3',4,4',5-Pentachlorobiphenyl	126	2.5	10	50	200	1000
2,3,3',4,4',5-Hexachlorobiphenyl	156	5.0	20	100	400	2000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	5.0	20	100	400	2000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	5.0	20	100	400	2000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	5.0	20	100	400	2000
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	5.0	20	100	400	2000
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	5.0	20	100	400	2000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	5.0	20	100	400	2000
MASS-LABELLED PCBs						
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	100	100	100	100	100
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	100	100	100	100	100
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	100	100	100	100	100
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	100	100	100	100	100
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	100	100	100	100	100
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	100	100	100	100	100
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	100	100	100	100	100
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	100	100	100	100	100
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	100	100	100	100	100
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	100	100	100	100	100
Decachloro[¹³ C ₁₂]biphenyl	209L	200	200	200	200	200
CLEANUP STANDARDS						
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	0.5	2.0	10	40	200
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	2.5	10	50	200	1000
INTERNAL STANDARDS						
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	100	100	100	100	100
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	100	100	100	100	100
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	100	100	100	100	100
2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	100	100	100	100	100

EPA METHOD 1668 STANDARD SOLUTIONS

Catalogue Number	Product (nonane solution)	Qty/Conc
EPA-1668LCS	Labelled Compound Stock Solution	1.2 ml
EPA-1668CS	Cleanup Standard Solution	1.2 ml
EPA-1668IS	Internal Standard Stock Solution	1.2 ml
EPA-1668PAR	Precision and Recovery Solution	1.2 ml

NATIVE PCBs	IUPAC	1668LCS (ng/ml)	1668CS (ng/ml)	1668IS (ng/ml)	1668PAR (ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	—	—	—	20
2,3,3',4,4'-Pentachlorobiphenyl	105	—	—	—	1000
2,3,4,4',5-Pentachlorobiphenyl	114	—	—	—	1000
2,3',4,4',5-Pentachlorobiphenyl	118	—	—	—	1000
2',3,4,4',5-Pentachlorobiphenyl	123	—	—	—	1000
3,3',4,4',5-Pentachlorobiphenyl	126	—	—	—	100
2,3,3',4,4',5-Hexachlorobiphenyl	156	—	—	—	1000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	—	—	—	1000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	—	—	—	1000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	—	—	—	200
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	—	—	—	200
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	—	—	—	1000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	—	—	—	200
MASS-LABELLED PCBs					
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	1000	—	—	—
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	1000	—	—	—
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	1000	—	—	—
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	1000	—	—	—
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	1000	—	—	—
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	1000	—	—	—
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	1000	—	—	—
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	1000	—	—	—
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	1000	—	—	—
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	1000	—	—	—
Decachloro[¹³ C ₁₂]biphenyl	209L	2000	—	—	—
CLEANUP STANDARDS					
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	—	200	—	—
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	—	1000	—	—
INTERNAL STANDARDS					
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	—	—	1000	—
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	—	—	1000	—
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	—	—	1000	—
2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	—	—	1000	—

ENVIRONMENT CANADA METHOD 1/RM/31 STANDARD SOLUTIONS

Catalogue Number	Product (isooctane solution)	Qty/Conc
EC9605-CVS	PCB Calibration Solutions for GC/MS Calibration and Verification Solutions CS1-CS5	1 kit (5 ampoules)
ECPCS1	CS1	500 µl
ECPCS2	CS2	500 µl
ECPCS3	CS3	500 µl
ECPCS4	CS4	500 µl
ECPCS5	CS5	500 µl

NATIVE PCBs*	IUPAC	ECPCS1 (ng/ml)	ECPCS2 (ng/ml)	ECPCS3 (ng/ml)	ECPCS4 (ng/ml)	ECPCS5 (ng/ml)
2,2',5-Trichlorobiphenyl	18	20	50	200	800	2000
2,4,4'-Trichlorobiphenyl	28	20	50	200	800	2000
2',3,4-Trichlorobiphenyl	33	20	50	200	800	2000
2,2',5,5'-Tetrachlorobiphenyl	52	20	50	200	800	2000
2,2',3,5'-Tetrachlorobiphenyl	44	20	50	200	800	2000
2,3',4',5-Tetrachlorobiphenyl	70	20	50	200	800	2000
2,2',4,5,5'-Pentachlorobiphenyl	101	20	50	200	800	2000
2,3',4,4',5-Pentachlorobiphenyl	118	20	50	200	800	2000
2,3,3',4,4'-Pentachlorobiphenyl	105	20	50	200	800	2000
2,2',4,4',5,5'-Hexachlorobiphenyl	153	20	50	200	800	2000
2,2',3,4,4',5'-Hexachlorobiphenyl	138	20	50	200	800	2000
2,2',3,3',4,4'-Hexachlorobiphenyl	128	20	50	200	800	2000
2,2',3,4',5,5',6-Heptachlorobiphenyl	187	20	50	200	800	2000
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	20	50	200	800	2000
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	20	50	200	800	2000
2,2',3,3',4,5,5',6'-Octachlorobiphenyl	199	20	50	200	800	2000
2,2',3,3',4,4',5,6-Octachlorobiphenyl	195	20	50	200	800	2000
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	194	20	50	200	800	2000
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	206	20	50	200	800	2000
Decachlorobiphenyl	209	20	50	200	800	2000
MASS-LABELLED PCBs*						
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	400	400	400	400	400
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	400	400	400	400	400
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	400	400	400	400	400
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	400	400	400	400	400
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	400	400	400	400	400
2,2',3,3',5,5',6,6'-Octachloro[¹³ C ₁₂]biphenyl	202L	400	400	400	400	400
2,2',3,3',4,4',5,5',6-Nonachloro[¹³ C ₁₂]biphenyl	206L	400	400	400	400	400
Decachloro[¹³ C ₁₂]biphenyl	209L	400	400	400	400	400
MASS-LABELLED RECOVERY STANDARDS*						
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	400	400	400	400	400
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	400	400	400	400	400

* In order of elution on a 60m DB-5 column.

ENVIRONMENT CANADA METHOD 1/RM/31 STANDARD SOLUTIONS

Catalogue Number	Product (isooctane solution)	Qty/Conc
EC9605-RS	Recovery Standard Solution	1.2 ml
EC9605-SS	Surrogate Solution	1.2 ml
EC9605-PAR	Precision and Recovery Solution	1.2 ml

NATIVE PCBs	IUPAC	EC9605-RS (µg/ml)	EC9605-SS (µg/ml)	EC9605-PAR (ng/ml)
2,2',5-Trichlorobiphenyl	18	—	—	100
2,4,4'-Trichlorobiphenyl	28	—	—	100
2',3,4-Trichlorobiphenyl	33	—	—	100
2,2',5,5'-Tetrachlorobiphenyl	52	—	—	100
2,2',3,5'-Tetrachlorobiphenyl	44	—	—	100
2,3',4',5-Tetrachlorobiphenyl	70	—	—	100
2,2',4,5,5'-Pentachlorobiphenyl	101	—	—	100
2,3',4,4',5-Pentachlorobiphenyl	118	—	—	100
2,3,3',4,4'-Pentachlorobiphenyl	105	—	—	100
2,2',4,4',5,5'-Hexachlorobiphenyl	153	—	—	100
2,2',3,4,4',5'-Hexachlorobiphenyl	138	—	—	100
2,2',3,3',4,4'-Hexachlorobiphenyl	128	—	—	100
2,2',3,4',5,5',6-Heptachlorobiphenyl	187	—	—	100
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	—	—	100
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	—	—	100
2,2',3,3',4,5,5',6'-Octachlorobiphenyl	199	—	—	100
2,2',3,3',4,4',5,6-Octachlorobiphenyl	195	—	—	100
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	194	—	—	100
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	206	—	—	100
Decachlorobiphenyl	209	—	—	100
MASS-LABELLED PCBs				
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	—	2.0	—
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	—	2.0	—
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	—	2.0	—
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	—	2.0	—
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	—	2.0	—
2,2',3,3',5,5',6,6'-Octachloro[¹³ C ₁₂]biphenyl	202L	—	2.0	—
2,2',3,3',4,4',5,5',6-Nonachloro[¹³ C ₁₂]biphenyl	206L	—	2.0	—
Decachloro[¹³ C ₁₂]biphenyl	209L	—	2.0	—
MASS-LABELLED RECOVERY STANDARDS				
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	2.0	—	—
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	2.0	—	—

P48-W-CVS

Catalogue Number	Product (nonane solution)	Qty/Conc
P48-W-CVS	P48-W-CVS; EN 1948-4:2010 HRGC/HRMS Calibration Solutions for the Dioxin-like PCBs	1 kit (6 ampoules)
P48-W-CS1	CS1	500 µl
P48-W-CS2	CS2	500 µl
P48-W-CS3	CS3	500 µl
P48-W-CS4	CS4	500 µl
P48-W-CS5	CS5	500 µl
P48-W-CS6	CS6	500 µl

NATIVE DIOXIN-LIKE PCB CONGENERS	IUPAC	P48-W-CS1 (pg/µl)	P48-W-CS2 (pg/µl)	P48-W-CS3 (pg/µl)	P48-W-CS4 (pg/µl)	P48-W-CS5 (pg/µl)	P48-W-CS6 (pg/µl)
3,3',4,4'-Tetrachlorobiphenyl	77	0.1	1.0	10	50	200	800
3,4,4',5-Tetrachlorobiphenyl	81	0.1	1.0	10	50	200	800
2,3,3',4,4'-Pentachlorobiphenyl	105	0.1	1.0	10	50	200	800
2,3,4,4',5-Pentachlorobiphenyl	114	0.1	1.0	10	50	200	800
2,3',4,4',5-Pentachlorobiphenyl	118	0.6	6.0	60	300	1200	4800
2',3,4,4',5-Pentachlorobiphenyl	123	0.1	1.0	10	50	200	800
3,3',4,4',5-Pentachlorobiphenyl	126	0.1	1.0	10	50	200	800
2,3,3',4,4',5-Hexachlorobiphenyl	156	0.1	1.0	10	50	200	800
2,3,3',4,4',5'-Hexachlorobiphenyl	157	0.1	1.0	10	50	200	800
2,3',4,4',5,5'-Hexachlorobiphenyl	167	0.1	1.0	10	50	200	800
3,3',4,4',5,5'-Hexachlorobiphenyl	169	0.1	1.0	10	50	200	800
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	0.1	1.0	10	50	200	800

WHO PCB EXTRACTION SPIKE (P48-W-ES)

3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	10	10	10	10	10	10
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	10	10	10	10	10	10
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	10	10	10	10	10	10
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	10	10	10	10	10	10
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	10	10	10	10	10	10
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	10	10	10	10	10	10
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	10	10	10	10	10	10
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	10	10	10	10	10	10
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	10	10	10	10	10	10
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	10	10	10	10	10	10
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	10	10	10	10	10	10
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	10	10	10	10	10	10

SAMPLING SPIKE (P48-SS)

2,3,4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	60L	10	10	10	10	10	10
3,3',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	127L	10	10	10	10	10	10
2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	159L	10	10	10	10	10	10

RECOVERY SPIKE (P48-RS)

2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	10	10	10	10	10	10
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	10	10	10	10	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	10	10	10	10	10	10

Catalogue Number	Product (nonane solution)	Qty/Conc
P48-M-CVS	P48-M-CVS; EN 1948-4:2010 HRGC/HRMS Calibration Solutions for the Marker PCBs	1 kit (6 ampoules)
P48-M-CS0.1	CS0.1	500 µl
P48-M-CS1	CS1	500 µl
P48-M-CS2	CS2	500 µl
P48-M-CS3	CS3	500 µl
P48-M-CS4	CS4	500 µl
P48-M-CS5	CS5	500 µl

NATIVE MARKER PCB CONGENERS	IUPAC	P48-M-CS0.1 (pg/µl)	P48-M-CS1 (pg/µl)	P48-M-CS2 (pg/µl)	P48-M-CS3 (pg/µl)	P48-M-CS4 (pg/µl)	P48-M-CS5 (pg/µl)
2,4,4'-Trichlorobiphenyl	28	0.1	1.0	10	100	500	5000
2,2',5,5'-Tetrachlorobiphenyl	52	0.1	1.0	10	100	500	5000
2,2',4,5,5'-Pentachlorobiphenyl	101	0.1	1.0	10	100	500	5000
2,2',3,4,4',5'-Hexachlorobiphenyl	138	0.1	1.0	10	100	500	5000
2,2',4,4',5,5'-Hexachlorobiphenyl	153	0.1	1.0	10	100	500	5000
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	0.1	1.0	10	100	500	5000
MARKER PCB EXTRACTION SPIKE (P48-M-ES)							
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	100	100	100	100	100	100
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	100	100	100	100	100	100
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	100	100	100	100	100	100
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	100	100	100	100	100	100
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	100	100	100	100	100	100
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	100	100	100	100	100	100
SAMPLING SPIKE (P48-SS)							
2,3,4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	60L	10	10	10	10	10	10
3,3',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	127L	10	10	10	10	10	10
2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	159L	10	10	10	10	10	10
RECOVERY SPIKE (P48-RS)							
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	10	10	10	10	10	10
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	10	10	10	10	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	10	10	10	10	10	10

WM48-CVS

Catalogue Number	Product (nonane solution)	Qty/Conc
WM48-CVS	WM48-CVS; EN 1948-4:2010 HRGC/HRMS Calibration Solutions for the Dioxin-like and Marker PCBs	1 kit (6 ampoules)
WM48-CS1	CS1	500 µl
WM48-CS2	CS2	500 µl
WM48-CS3	CS3	500 µl
WM48-CS4	CS4	500 µl
WM48-CS5	CS5	500 µl
WM48-CS6	CS6	500 µl

		WM48- CS1 (pg/µl)	WM48- CS2 (pg/µl)	WM48- CS3 (pg/µl)	WM48- CS4 (pg/µl)	WM48- CS5 (pg/µl)	WM48- CS6 (pg/µl)
NATIVE DIOXIN-LIKE PCB CONGENERS	IUPAC						
	3,3',4,4'-Tetrachlorobiphenyl	0.1	0.5	2	10	40	200
	3,4,4',5-Tetrachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3,3',4,4'-Pentachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3,4,4',5-Pentachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3',4,4',5-Pentachlorobiphenyl	0.5	2.5	10	50	200	1000
	2',3,4,4',5-Pentachlorobiphenyl	0.1	0.5	2	10	40	200
	3,3',4,4',5-Pentachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3,3',4,4',5-Hexachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3,3',4,4',5'-Hexachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3',4,4',5,5'-Hexachlorobiphenyl	0.1	0.5	2	10	40	200
	3,3',4,4',5,5'-Hexachlorobiphenyl	0.1	0.5	2	10	40	200
	2,3,3',4,4',5,5'-Heptachlorobiphenyl	0.1	0.5	2	10	40	200
NATIVE MARKER PCB CONGENERS							
	2,4,4'-Trichlorobiphenyl	0.5	2.5	10	50	200	1000
	2,2',5,5'-Tetrachlorobiphenyl	0.5	2.5	10	50	200	1000
	2,2',4,5,5'-Pentachlorobiphenyl	0.5	2.5	10	50	200	1000
	2,2',3,4,4',5'-Hexachlorobiphenyl	0.5	2.5	10	50	200	1000
	2,2',4,4',5,5'-Hexachlorobiphenyl	0.5	2.5	10	50	200	1000
	2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.5	2.5	10	50	200	1000
EXTRACTION SPIKE							
	3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
SAMPLING SPIKE							
	2,3,4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	3,3',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
RECOVERY SPIKE							
	2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10
	2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	10	10	10	10	10	10

P48-W-PAR: Native Dioxin-Like (WHO) PCB Solution

Catalogue Number	Product (nonane solution)	Qty/Conc
P48-W-PAR	P48-W-PAR; EN 1948-4:2010	1.2 ml
NATIVE DIOXIN-LIKE (WHO) PCB CONGENERS	IUPAC	P48-W-PAR (pg/μl)
3,3',4,4'-Tetrachlorobiphenyl	77	250
3,4,4',5-Tetrachlorobiphenyl	81	250
2,3,3',4,4'-Pentachlorobiphenyl	105	250
2,3,4,4',5-Pentachlorobiphenyl	114	250
2,3',4,4',5-Pentachlorobiphenyl	118	1500
2',3,4,4',5-Pentachlorobiphenyl	123	250
3,3',4,4',5-Pentachlorobiphenyl	126	250
2,3,3',4,4',5-Hexachlorobiphenyl	156	250
2,3,3',4,4',5'-Hexachlorobiphenyl	157	250
2,3',4,4',5,5'-Hexachlorobiphenyl	167	250
3,3',4,4',5,5'-Hexachlorobiphenyl	169	250
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	250

P48-M-PAR: Native Marker PCB Solution

Catalogue Number	Product (nonane solution)	Qty/Conc
P48-M-PAR	P48-M-PAR; EN 1948-4:2010	1.2 ml
NATIVE MARKER PCB CONGENERS	IUPAC	P48-M-PAR (pg/μl)
2,4,4'-Trichlorobiphenyl	28	250
2,2',5,5'-Tetrachlorobiphenyl	52	250
2,2',4,5,5'-Pentachlorobiphenyl	101	250
2,2',3,4,4',5'-Hexachlorobiphenyl	138	250
2,2',4,4',5,5'-Hexachlorobiphenyl	153	250
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	250

SUPPORT SOLUTIONS FOR EN 1948-4:2010

Catalogue Number	Product (nonane solution)	Qty/Conc
P48-W-ES	Dioxin-like (WHO) PCB Extraction Standard	1.2 ml
P48-M-ES	Marker PCB Extraction Standard	1.2 ml
P48-SS	Mass-Labelled PCB Sampling Standard	1.2 ml
P48-RS	Mass-Labelled PCB Recovery Standard	1.2 ml

DIOXIN-LIKE PCB EXTRACTION STANDARD	IUPAC	P48-W-ES (pg/µl)	P48-M-ES (pg/µl)	P48-SS (pg/µl)	P48-RS (pg/ul)
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	100	—	—	—
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	100	—	—	—
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	100	—	—	—
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	100	—	—	—
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	100	—	—	—
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	100	—	—	—
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	100	—	—	—
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	100	—	—	—
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	100	—	—	—
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	100	—	—	—
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	100	—	—	—
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	100	—	—	—
MARKER PCB EXTRACTION STANDARD					
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	—	1000	—	—
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	—	1000	—	—
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	—	1000	—	—
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	—	1000	—	—
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	—	1000	—	—
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	—	1000	—	—
MASS-LABELLED PCB SAMPLING STANDARD					
2,3,4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	60L	—	—	100	—
3,3',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	127L	—	—	100	—
2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	159L	—	—	100	—
MASS-LABELLED PCB RECOVERY STANDARD					
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	—	—	—	100
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	—	—	—	100
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	—	—	—	100

PCBs: MASS-LABELLED CONGENERES

Wellington has prepared a very comprehensive collection of fully labelled ($^{13}\text{C}_{12}$) individual PCB congeners including the 12 'dioxin-like' PCBs and the more prominent congeners found in commercial mixtures and the environment.

All of the ^{13}C -PCBs in the following pages were prepared using one-product, unambiguous routes and purified using a variety of methods. Their structures and chemical and isotopic purities were confirmed using various instruments and this data is included in the Certificates of Analysis.

Additional ^{13}C -PCBs may be added in the future, so please continue to visit our website for updates or contact **Wellington** or your local distributor if you have any specific requests.



MASS-LABELLED CHLORINATED BIPHENYLS

Catalogue Number	Product
MBP-1	 <p>2-Chloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-3	 <p>4-Chloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-4	 <p>2,2'-Dichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-5	 <p>2,3-Dichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-8	 <p>2,4'-Dichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-9	 <p>2,5-Dichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-11	 <p>3,3'-Dichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-15	 <p>4,4'-Dichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-19	 <p>2,2',6-Trichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-28	 <p>2,4,4'-Trichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

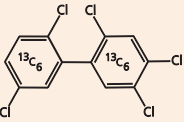
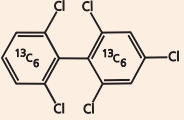
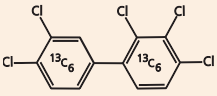
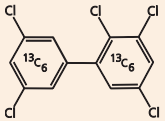
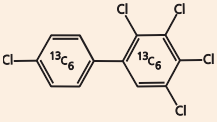
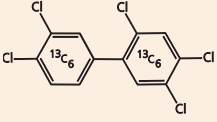
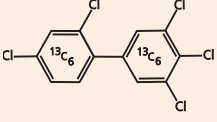
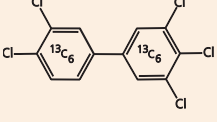
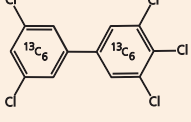
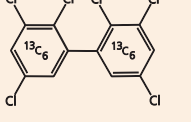
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED BIPHENYLS

Catalogue Number	Product
MBP-31	 <p>2,4',5-Trichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-37	 <p>3,4,4'-Trichloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-52	 <p>2,2',5,5'-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-54	 <p>2,2',6,6'-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-60	 <p>2,3,4,4'-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-70	 <p>2,3',4',5-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-77	 <p>3,3',4,4'-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-79	 <p>3,3',4,5'-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-81	 <p>3,4,4',5-Tetrachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-95	 <p>2,2',3,5',6-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED BIPHENYLS

Catalogue Number	Product
MBP-101	 <p>2,2',4,5,5'-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-104	 <p>2,2',4,6,6'-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-105	 <p>2,3,3',4,4'-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-111	 <p>2,3,3',5,5'-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-114	 <p>2,3,4,4',5-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-118	 <p>2,3',4,4',5-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-123	 <p>2',3,4,4',5-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-126	 <p>3,3',4,4',5-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-127	 <p>3,3',4,5,5'-Pentachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-133	 <p>2,2',3,3',5,5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

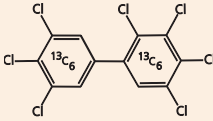
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED BIPHENYLS

Catalogue Number	Product
MBP-138	 <p>2,2',3,4,4',5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-153	 <p>2,2',4,4',5,5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-155	 <p>2,2',4,4',6,6'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-156	 <p>2,3,3',4,4',5-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-157	 <p>2,3,3',4,4',5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-159	 <p>2,3,3',4,5,5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-162	 <p>2,3,3',4',5,5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-167	 <p>2,3',4,4',5,5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-169	 <p>3,3',4,4',5,5'-Hexachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-170	 <p>2,2',3,3',4,4',5-Heptachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED CHLORINATED BIPHENYLS

Catalogue Number	Product
MBP-178	 <p>2,2',3,3',5,5',6-Heptachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-180	 <p>2,2',3,4,4',5,5'-Heptachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-188	 <p>2,2',3,4',5,6,6'-Heptachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-189	 <p>2,3,3',4,4',5,5'-Heptachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-194	 <p>2,2',3,3',4,4',5,5'-Octachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-202	 <p>2,2',3,3',5,5',6,6'-Octachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-205	 <p>2,3,3',4,4',5,5',6-Octachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-206	 <p>2,2',3,3',4,4',5,5',6-Nonachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-208	 <p>2,2',3,3',4,5,5',6,6'-Nonachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBP-209	 <p>Decachloro[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

PCBs: SPECIALTY SOLUTION/MIXTURES

A number of additional PCB calibration sets and other solution/mixtures have been prepared and are presented in this section.

PCB-CVS-A10 and PCB-CVS-B10, and their support solutions, were designed and prepared to be used to satisfy the requirements of the Japanese Industrial Standards **JIS K 0311:2005** and **JIS K 0312:2005**. Note that PCB congeners 170 and 180, and their ¹³C analogues, have been added to the 12 dioxin-like PCBs.

Calibration sets and mixes containing a larger number of PCB congeners, such as PCB-CVS-H, are also offered.

All of the solutions from this section are accompanied by detailed CofAs that include HRGC/LRMS and/or HRGC/HRMS data as appropriate, along with RRF summaries for the calibration sets.



PCB-CVS-H

Catalogue Number	Product (nonane solution)	Qty/Conc
PCB-CVS-H	Calibration Solutions for HRGC/HRMS Analysis of Polychlorinated Biphenyls (PCBs)	1 kit (6 x 200 µl ampoules)
PCB-CS1-H	CS1	200 µl
PCB-CS2-H	CS2	200 µl
PCB-CS3-H	CS3	200 µl
PCB-CS4-H	CS4	200 µl
PCB-CS5-H	CS5	200 µl
PCB-CS6-H	CS6	200 µl

	PCB-CS1-H (ng/ml)	PCB-CS2-H (ng/ml)	PCB-CS3-H (ng/ml)	PCB-CS4-H (ng/ml)	PCB-CS5-H (ng/ml)	PCB-CS6-H (ng/ml)
NATIVE CHLORINATED BIPHENYLS (IUPAC)						
CHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
1, 3						
DICHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
4, 6, 8, 10, 15						
TRICHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
16, 18, 19, 22, 28, 31, 33, 37						
TETRACHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
40, 41, 44, 49, 52, 54, 60, 66, 70, 74, 77, 81						
PENTACHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
84, 85, 87, 90, 95, 97, 99, 101, 104, 105, 110, 114, 118, 119, 123, 126						
HEXACHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
128, 129, 135, 137, 138, 141, 149, 151, 153, 155, 156, 157, 158, 167, 168, 169						
HEPTACHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
170, 171, 174, 177, 178, 180, 183, 187, 188, 189, 191, 193						
OCTACHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
194, 199, 200, 201, 202, 203, 205						
NONACHLOROBIPHENYLS	0.1	0.5	2.0	10	40	200
206, 207, 208						
DECACHLOROBIPHENYL	0.1	0.5	2.0	10	40	200
209						
MASS-LABELLED CHLORINATED BIPHENYLS	IUPAC					
EXTRACTION STANDARDS						
2-Chloro[¹³ C ₁₂]biphenyl	1L	50	50	50	50	50
4-Chloro[¹³ C ₁₂]biphenyl	3L	50	50	50	50	50
2,2'-Dichloro[¹³ C ₁₂]biphenyl	4L	50	50	50	50	50
2,4'-Dichloro[¹³ C ₁₂]biphenyl	8L	50	50	50	50	50
4,4'-Dichloro[¹³ C ₁₂]biphenyl	15L	50	50	50	50	50
2,2',6'-Trichloro[¹³ C ₁₂]biphenyl	19L	50	50	50	50	50
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	50	50	50	50	50
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	50	50	50	50	50
2,2',6,6'-Tetrachloro[¹³ C ₁₂]biphenyl	54L	50	50	50	50	50
2,3',4',5'-Tetrachloro[¹³ C ₁₂]biphenyl	70L	50	50	50	50	50
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	50	50	50	50	50
3,4,4',5'-Tetrachloro[¹³ C ₁₂]biphenyl	81L	50	50	50	50	50
2,2',3,5',6'-Pentachloro[¹³ C ₁₂]biphenyl	95L	50	50	50	50	50
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	50	50	50	50	50
2,2',4,6,6'-Pentachloro[¹³ C ₁₂]biphenyl	104L	50	50	50	50	50
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	50	50	50	50	50
2,3,4,4',5'-Pentachloro[¹³ C ₁₂]biphenyl	114L	50	50	50	50	50
2,3',4,4',5'-Pentachloro[¹³ C ₁₂]biphenyl	118L	50	50	50	50	50
2',3,4,4',5'-Pentachloro[¹³ C ₁₂]biphenyl	123L	50	50	50	50	50
3,3',4,4',5'-Pentachloro[¹³ C ₁₂]biphenyl	126L	50	50	50	50	50
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	50	50	50	50	50
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	50	50	50	50	50
2,2',4,4',6,6'-Hexachloro[¹³ C ₁₂]biphenyl	155L	50	50	50	50	50
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	156L	50	50	50	50	50
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	50	50	50	50	50
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	50	50	50	50	50
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	50	50	50	50	50
2,2',3,3',4,4',5'-Heptachloro[¹³ C ₁₂]biphenyl	170L	50	50	50	50	50
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	50	50	50	50	50
2,2',3,4',5,6,6'-Heptachloro[¹³ C ₁₂]biphenyl	188L	50	50	50	50	50
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	50	50	50	50	50
2,2',3,3',5,5',6,6'-Octachloro[¹³ C ₁₂]biphenyl	202L	50	50	50	50	50
2,3,3',4,4',5,5',6'-Octachloro[¹³ C ₁₂]biphenyl	205L	50	50	50	50	50
2,2',3,3',4,4',5,5',6,6'-Nonachloro[¹³ C ₁₂]biphenyl	208L	50	50	50	50	50
Decachloro[¹³ C ₁₂]biphenyl	209L	50	50	50	50	50
RECOVERY/INTERNAL STANDARDS						
2,5-Dichloro[¹³ C ₁₂]biphenyl	9L	50	50	50	50	50
3,4,4'-Trichloro[¹³ C ₁₂]biphenyl	37L	50	50	50	50	50
3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	50	50	50	50	50
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	50	50	50	50	50
2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	162L	50	50	50	50	50
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	50	50	50	50	50
2,2',3,3',4,4',5,5',6'-Nonachloro[¹³ C ₁₂]biphenyl	206L	50	50	50	50	50
SAMPLING/CLEANUP STANDARDS						
2,3,4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	60L	50	50	50	50	50
2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	159L	50	50	50	50	50

SUPPORT SOLUTIONS FOR PCB-CVS-H

Catalogue Number	Product (nonane solution)	Qty/Conc
PCB-LCS-H	Mass-Labelled PCB Extraction Standards	1.2 ml
PCB-ISS-H	Mass-Labelled PCB Internal/Recovery Standards	1.2 ml
PCB-SCS-H	Mass-Labelled PCB Cleanup/Sampling Standards	1.2 ml
PCB-PAR-H	Native PCB Solution	1.2 ml

NATIVE CHLORINATED BIPHENYLS (IUPAC)	PCB-LCS-H (ng/ml)	PCB-ISS-H (ng/ml)	PCB-SCS-H (ng/ml)	PCB-PAR-H (ng/ml)
CHLOROBIPHENYLS	—	—	—	500
1, 3				
DICHLOROBIPHENYLS	—	—	—	500
4, 6, 8, 10, 15				
TRICHLOROBIPHENYLS	—	—	—	500
16, 18, 19, 22, 28, 31, 33, 37				
TETRACHLOROBIPHENYLS	—	—	—	500
40, 41, 44, 49, 52, 54, 60, 66, 70, 74, 77, 81				
PENTACHLOROBIPHENYLS	—	—	—	500
84, 85, 87, 90, 95, 97, 99, 101, 104, 105, 110, 114, 118, 119, 123, 126				
HEXACHLOROBIPHENYLS	—	—	—	500
128, 129, 135, 137, 138, 141, 149, 151, 153, 155, 156, 157, 158, 167, 168, 169				
HEPTACHLOROBIPHENYLS	—	—	—	500
170, 171, 174, 177, 178, 180, 183, 187, 188, 189, 191, 193				
OCTACHLOROBIPHENYLS	—	—	—	500
194, 199, 200, 201, 202, 203, 205				
NONACHLOROBIPHENYLS	—	—	—	500
206, 207, 208				
DECACHLOROBIPHENYL	—	—	—	500
209				
MASS-LABELLED CHLORINATED BIPHENYLS EXTRACTION STANDARDS	IUPAC			
2-Chloro[¹³ C ₁₂]biphenyl	1L	1000	—	—
4-Chloro[¹³ C ₁₂]biphenyl	3L	1000	—	—
2,2'-Dichloro[¹³ C ₁₂]biphenyl	4L	1000	—	—
2,4'-Dichloro[¹³ C ₁₂]biphenyl	8L	1000	—	—
4,4'-Dichloro[¹³ C ₁₂]biphenyl	15L	1000	—	—
2,2',6-Trichloro[¹³ C ₁₂]biphenyl	19L	1000	—	—
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	1000	—	—
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	1000	—	—
2,2',6,6'-Tetrachloro[¹³ C ₁₂]biphenyl	54L	1000	—	—
2,3',4',5'-Tetrachloro[¹³ C ₁₂]biphenyl	70L	1000	—	—
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	1000	—	—
3,4,4',5'-Tetrachloro[¹³ C ₁₂]biphenyl	81L	1000	—	—
2,2',3,5',6-Pentachloro[¹³ C ₁₂]biphenyl	95L	1000	—	—
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	1000	—	—
2,2',4,6,6'-Pentachloro[¹³ C ₁₂]biphenyl	104L	1000	—	—
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	1000	—	—
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	1000	—	—
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	1000	—	—
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	1000	—	—
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	1000	—	—
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	1000	—	—
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	1000	—	—
2,2',4,4',6,6'-Hexachloro[¹³ C ₁₂]biphenyl	155L	1000	—	—
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	1000	—	—
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	1000	—	—
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	1000	—	—
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	1000	—	—
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	1000	—	—
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	1000	—	—
2,2',3,4',5,6,6'-Heptachloro[¹³ C ₁₂]biphenyl	188L	1000	—	—
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	1000	—	—
2,2',3,3',5,5',6,6'-Octachloro[¹³ C ₁₂]biphenyl	202L	1000	—	—
2,2',3,3',4,4',5,5',6-Octachloro[¹³ C ₁₂]biphenyl	205L	1000	—	—
2,2',3,3',4,4',5,5',6'-Nonachloro[¹³ C ₁₂]biphenyl	208L	1000	—	—
Decachloro[¹³ C ₁₂]biphenyl	209L	1000	—	—
RECOVERY/INTERNAL STANDARDS				
2,5-Dichloro[¹³ C ₁₂]biphenyl	9L	—	1000	—
3,4,4'-Trichloro[¹³ C ₁₂]biphenyl	37L	—	1000	—
3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	—	1000	—
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	—	1000	—
2,3,3',4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	162L	—	1000	—
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	—	1000	—
2,2',3,3',4,4',5,5',6-Nonachloro[¹³ C ₁₂]biphenyl	206L	—	1000	—
SAMPLING/CLEANUP STANDARDS				
2,3,4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	60L	—	1000	—
2,3,3',4,5,5'-Hexachloro[¹³ C ₁₂]biphenyl	159L	—	1000	—

PCB-CVS-A10

Catalogue Number	Product (nonane solution)	Qty/Conc
PCB-CVS-A10-Set1	CS1/CS3/CS5/CS7/CS9	1 kit (5 x 200 µl ampoules)
PCB-CVS-A10-Set2	CS2/CS4/CS6/CS8/CS10	1 kit (5 x 200 µl ampoules)
PCB-CVS-A10-Set3	CS3/CS5/CS7/CS9/CS11	1 kit (5 x 200 µl ampoules)
PCB-A10-CSL	CSL Extended Calibration/Low Level	200 µl
PCB-A10-CS1	CS1	200 µl
PCB-A10-CS2	CS2	200 µl
PCB-A10-CS3	CS3	200 µl
PCB-A10-CS4	CS4	200 µl

NATIVE PCB CONGENERS	IUPAC	PCB-A10-	PCB-A10-	PCB-A10-	PCB-A10-	PCB-A10-
		CSL	CS1	CS2	CS3	CS4
		(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)	(ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	0.05	0.1	0.2	0.5	1
3,4,4',5-Tetrachlorobiphenyl	81	0.05	0.1	0.2	0.5	1
2,3,3',4,4'-Pentachlorobiphenyl	105	0.05	0.1	0.2	0.5	1
2,3,4,4',5-Pentachlorobiphenyl	114	0.05	0.1	0.2	0.5	1
2,3',4,4',5-Pentachlorobiphenyl	118	0.05	0.1	0.2	0.5	1
2',3,4,4',5-Pentachlorobiphenyl	123	0.05	0.1	0.2	0.5	1
3,3',4,4',5-Pentachlorobiphenyl	126	0.05	0.1	0.2	0.5	1
2,3,3',4,4',5-Hexachlorobiphenyl	156	0.05	0.1	0.2	0.5	1
2,3,3',4,4',5'-Hexachlorobiphenyl	157	0.05	0.1	0.2	0.5	1
2,3',4,4',5,5'-Hexachlorobiphenyl	167	0.05	0.1	0.2	0.5	1
3,3',4,4',5,5'-Hexachlorobiphenyl	169	0.05	0.1	0.2	0.5	1
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	0.05	0.1	0.2	0.5	1
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	0.05	0.1	0.2	0.5	1
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	0.05	0.1	0.2	0.5	1

MASS-LABELLED PCB CONGENERS

Sampling and Syringe Spikes

* 3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	10	10	10	10	10
** 2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	10	10	10	10	10
** 2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	10	10	10	10	10
** 2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	10	10	10	10	10

Surrogates/Extraction Spikes

3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	10	10	10	10	10
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	10	10	10	10	10
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	10	10	10	10	10
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	10	10	10	10	10
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	10	10	10	10	10
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	10	10	10	10	10
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	10	10	10	10	10
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	10	10	10	10	10
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	10	10	10	10	10
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	10	10	10	10	10
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	10	10	10	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	10	10	10	10	10
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	10	10	10	10	10
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	10	10	10	10	10

* for pre-sampling spike

** for syringe spike / recovery standard

PCB-CVS-B10

Catalogue Number	Product (nonane solution)	Qty/Conc
PCB-CVS-B10-Set1	CS1/CS2/CS3/CS4/CS5	1 kit (5 x 200 µl ampoules)
PCB-CVS-B10-Set2	CS2/CS3/CS4/CS5/CS6	1 kit (5 x 200 µl ampoules)
PCB-B10-CS1	CS1	200 µl
PCB-B10-CS2	CS2	200 µl
PCB-B10-CS3	CS3	200 µl

NATIVE PCB CONGENERS	IUPAC	PCB-B10-CS1 (ng/ml)	PCB-B10-CS2 (ng/ml)	PCB-B10-CS3 (ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	0.2	1	4
3,4,4',5-Tetrachlorobiphenyl	81	0.2	1	4
2,3,3',4,4'-Pentachlorobiphenyl	105	0.2	1	4
2,3,4,4',5-Pentachlorobiphenyl	114	0.2	1	4
2,3',4,4',5-Pentachlorobiphenyl	118	0.2	1	4
2',3,4,4',5-Pentachlorobiphenyl	123	0.2	1	4
3,3',4,4',5-Pentachlorobiphenyl	126	0.2	1	4
2,3,3',4,4',5-Hexachlorobiphenyl	156	0.2	1	4
2,3,3',4,4',5'-Hexachlorobiphenyl	157	0.2	1	4
2,3',4,4',5,5'-Hexachlorobiphenyl	167	0.2	1	4
3,3',4,4',5,5'-Hexachlorobiphenyl	169	0.2	1	4
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	0.2	1	4
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	0.2	1	4
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	0.2	1	4
MASS-LABELLED PCB CONGENERS				
Sampling and Syringe Spikes				
* 3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	10	10	10
**2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	10	10	10
**2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	10	10	10
**2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	10	10	10
**2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	10	10	10
Surrogate/Extraction Spikes				
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	10	10	10
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	10	10	10
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	10	10	10
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	10	10	10
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	10	10	10
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	10	10	10
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	10	10	10
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	10	10	10
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	10	10	10
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	10	10	10
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	10	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	10	10	10
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	10	10	10
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	10	10	10

* for sampling spike

** for syringe spike

Catalogue Number	Product (nonane solution)	Qty/Conc
PCB-B10-CS4	CS4	200 µl
PCB-B10-CS5	CS5	200 µl
PCB-B10-CS6	CS6	200 µl
PCB-B10-CS7	CS7	200 µl

		PCB-B10- CS4 (ng/ml)	PCB-B10- CS5 (ng/ml)	PCB-B10- CS6 (ng/ml)	PCB-B10- CS7 (ng/ml)
NATIVE PCB CONGENERS					
	IUPAC				
3,3',4,4'-Tetrachlorobiphenyl	77	20	100	400	1000
3,4,4',5-Tetrachlorobiphenyl	81	20	100	400	1000
2,3,3',4,4'-Pentachlorobiphenyl	105	20	100	400	1000
2,3,4,4',5-Pentachlorobiphenyl	114	20	100	400	1000
2,3',4,4',5-Pentachlorobiphenyl	118	20	100	400	1000
2',3,4,4',5-Pentachlorobiphenyl	123	20	100	400	1000
3,3',4,4',5-Pentachlorobiphenyl	126	20	100	400	1000
2,3,3',4,4',5-Hexachlorobiphenyl	156	20	100	400	1000
2,3,3',4,4',5'-Hexachlorobiphenyl	157	20	100	400	1000
2,3',4,4',5,5'-Hexachlorobiphenyl	167	20	100	400	1000
3,3',4,4',5,5'-Hexachlorobiphenyl	169	20	100	400	1000
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	20	100	400	1000
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	20	100	400	1000
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	20	100	400	1000
MASS-LABELLED PCB CONGENERS					
Sampling and Syringe Spikes					
* 3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	10	10	10	10
**2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	10	10	10	10
**2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	10	10	10	10
**2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	10	10	10	10
**2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	10	10	10	10
Surrogate/Extraction Spikes					
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	10	10	10	10
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	10	10	10	10
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	10	10	10	10
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	10	10	10	10
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	10	10	10	10
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	10	10	10	10
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	10	10	10	10
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	10	10	10	10
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	10	10	10	10
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	10	10	10	10
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	10	10	10	10
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	10	10	10	10
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	10	10	10	10
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	10	10	10	10

* for sampling spike

** for syringe spike

MASS-LABELLED PCBs: SOLUTION/MIXTURES

Support solutions for **PCB-CVS-A10**, **PCB-CVS-B10**, and **DFP-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc		
PCB-LCS-A1	Mass-Labelled PCB Solution/Mixture	1.2 ml		
PCB-LCS-A100	Mass-Labelled PCB Solution/Mixture	1.2 ml		
PCB-LCS-A20	Mass-Labelled PCB Solution/Mixture	1.2 ml		
		PCB-LCS-A1	PCB-LCS-A100	PCB-LCS-A20
MASS-LABELLED PCB CONGENERS	IUPAC	(ng/ml)	(ng/ml)	(ng/ml)
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	1000	100	20
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	1000	100	20
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	1000	100	20
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	1000	100	20
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	1000	100	20
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	1000	100	20
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	1000	100	20
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	1000	100	20
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	1000	100	20
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	1000	100	20
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	1000	100	20
2,2',3,3',4,4',5-Heptachloro[¹³ C ₁₂]biphenyl	170L	1000	100	20
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	1000	100	20
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	1000	100	20
PCB-IS-A	Mass-Labelled PCB Solution	1.2 ml		
PCB-IS-A100	Mass-Labelled PCB Solution	1.2 ml		
PCB-IS-A20	Mass-Labelled PCB Solution	1.2 ml		
		PCB-IS-A	PCB-IS-A100	PCB-IS-A20
MASS-LABELLED PCB CONGENER	IUPAC	(ng/ml)	(ng/ml)	(ng/ml)
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	1000	100	20
PCB-IS-B	Mass-Labelled PCB Solution/Mixture	1.2 ml		
PCB-IS-B100	Mass-Labelled PCB Solution/Mixture	1.2 ml		
PCB-IS-B20	Mass-Labelled PCB Solution/Mixture	1.2 ml		
		PCB-IS-B	PCB-IS-B100	PCB-IS-B20
MASS-LABELLED PCB CONGENERS	IUPAC	(ng/ml)	(ng/ml)	(ng/ml)
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	1000	100	20
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	1000	100	20
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	1000	100	20
PCB-IS-C	Mass-Labelled PCB Syringe Spike Solution	1.2 ml		
PCB-IS-C100	Mass-Labelled PCB Syringe Spike Solution	1.2 ml		
PCB-IS-C20	Mass-Labelled PCB Syringe Spike Solution	1.2 ml		
		PCB-IS-C	PCB-IS-C100	PCB-IS-C20
MASS-LABELLED PCB CONGENERS	IUPAC	(ng/ml)	(ng/ml)	(ng/ml)
2,3',4',5-Tetrachloro[¹³ C ₁₂]biphenyl	70L	1000	100	20
2,3,3',5,5'-Pentachloro[¹³ C ₁₂]biphenyl	111L	1000	100	20
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	1000	100	20
2,2',3,3',5,5',6-Heptachloro[¹³ C ₁₂]biphenyl	178L	1000	100	20
PCB-SS-A	Mass-Labelled PCB Solution	1.2 ml		
PCB-SS-A100	Mass-Labelled PCB Solution	1.2 ml		
PCB-SS-A20	Mass-Labelled PCB Solution	1.2 ml		
		PCB-SS-A	PCB-SS-A100	PCB-SS-A20
MASS-LABELLED PCB CONGENER	IUPAC	(ng/ml)	(ng/ml)	(ng/ml)
3,3',4,5'-Tetrachloro[¹³ C ₁₂]biphenyl	79L	1000	100	20

MASS-LABELLED PCBs: SOLUTION/MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
MBP-CP	Mass-Labelled Coplanar PCB Solution/Mixture	1.2 ml
	IUPAC	
3,3',4,4'-Tetrachloro[¹³ C ₁₂]biphenyl	77L	10 µg/ml
3,4,4',5-Tetrachloro[¹³ C ₁₂]biphenyl	81L	10 µg/ml
3,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	126L	10 µg/ml
3,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	169L	10 µg/ml
MBP-MO	Mass-Labelled Mono-ortho PCB Solution/Mixture	1.2 ml
	IUPAC	
2,3,3',4,4'-Pentachloro[¹³ C ₁₂]biphenyl	105L	5 µg/ml
2,3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	114L	5 µg/ml
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	5 µg/ml
2',3,4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	123L	5 µg/ml
2,3,3',4,4',5-Hexachloro[¹³ C ₁₂]biphenyl	156L	5 µg/ml
2,3,3',4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	157L	5 µg/ml
2,3',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	167L	5 µg/ml
2,3,3',4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	189L	5 µg/ml
MBP-CG	Mass-Labelled Mono To Decachloro PCB Solution/Mixture	1.2 ml
	IUPAC	
4-Chloro[¹³ C ₁₂]biphenyl	3L	5 µg/ml
4,4'-Dichloro[¹³ C ₁₂]biphenyl	15L	5 µg/ml
2,4',5-Trichloro[¹³ C ₁₂]biphenyl	31L	5 µg/ml
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	5 µg/ml
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	5 µg/ml
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	5 µg/ml
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	5 µg/ml
2,2',3,3',4,4',5,5'-Octachloro[¹³ C ₁₂]biphenyl	194L	5 µg/ml
2,2',3,3',4,4',5,5',6-Nonachloro[¹³ C ₁₂]biphenyl	206L	5 µg/ml
Decachloro[¹³ C ₁₂]biphenyl	209L	5 µg/ml
MBP-MXE	Mass-Labelled PCB Solution/Mixture	1.2 ml
	IUPAC	
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	5 µg/ml
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	5 µg/ml
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	5 µg/ml
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	5 µg/ml
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	5 µg/ml
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	5 µg/ml
Decachloro[¹³ C ₁₂]biphenyl	209L	5 µg/ml

NATIVE PCBs: SOLUTION/MIXTURES

(*) Support solutions for **PCB-CVS-A10**, **PCB-CVS-B10**, and **DFP-CVS-B10**

Catalogue Number	Product (nonane solution)	Qty/Conc		
PCB-ST-A*	Native PCB Stock Solution	1.2 ml		
PCB-ST-A10*	Native PCB Stock Solution	1.2 ml		
PCB-ST-A2*	Native PCB Stock Solution	1.2 ml		
NATIVE PCB CONGENERS	IUPAC	PCB-ST-A* (ng/ml)	PCB-ST-A10* (ng/ml)	PCB-ST-A2* (ng/ml)
3,3',4,4'-Tetrachlorobiphenyl	77	2000	10	2
3,4,4',5-Tetrachlorobiphenyl	81	2000	10	2
2,3,3',4,4'-Pentachlorobiphenyl	105	2000	10	2
2,3,4,4',5-Pentachlorobiphenyl	114	2000	10	2
2,3',4,4',5-Pentachlorobiphenyl	118	2000	10	2
2',3,4,4',5-Pentachlorobiphenyl	123	2000	10	2
3,3',4,4',5-Pentachlorobiphenyl	126	2000	10	2
2,3,3',4,4',5-Hexachlorobiphenyl	156	2000	10	2
2,3,3',4,4',5'-Hexachlorobiphenyl	157	2000	10	2
2,3',4,4',5,5'-Hexachlorobiphenyl	167	2000	10	2
3,3',4,4',5,5'-Hexachlorobiphenyl	169	2000	10	2
2,2',3,3',4,4',5-Heptachlorobiphenyl	170	2000	10	2
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	2000	10	2
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	2000	10	2

BP-CP81

Catalogue Number	Product (nonane solution)	Qty/Conc
BP-CP81	Native Coplanar PCB Solution/Mixture	1.2 ml
NATIVE PCB CONGENERS	IUPAC	
3,3',4,4'-Tetrachlorobiphenyl	77	10 µg/ml
3,4,4',5-Tetrachlorobiphenyl	81	10 µg/ml
3,3',4,4',5-Pentachlorobiphenyl	126	10 µg/ml
3,3',4,4',5,5'-Hexachlorobiphenyl	169	10 µg/ml

Catalogue Number	Product (nonane solution)	Qty/Conc
BP-WD	Native PCB Window Defining Solution/Mixture for DB-5 or Equivalent Column	1.2 ml
NATIVE PCB CONGENERS	IUPAC	
Biphenyl	—	2.5 µg/ml
2-Chlorobiphenyl	1	2.5 µg/ml
4-Chlorobiphenyl	3	2.5 µg/ml
2,6-Dichlorobiphenyl	10	2.5 µg/ml
4,4'-Dichlorobiphenyl	15	2.5 µg/ml
2,2',6-Trichlorobiphenyl	19	2.5 µg/ml
3,4,4'-Trichlorobiphenyl	37	2.5 µg/ml
2,2',6,6'-Tetrachlorobiphenyl	54	2.5 µg/ml
3,3',4,4'-Tetrachlorobiphenyl	77	2.5 µg/ml
2,2',4,6,6'-Pentachlorobiphenyl	104	2.5 µg/ml
3,3',4,4',5-Pentachlorobiphenyl	126	2.5 µg/ml
2,2',4,4',6,6'-Hexachlorobiphenyl	155	2.5 µg/ml
3,3',4,4',5,5'-Hexachlorobiphenyl	169	2.5 µg/ml
2,2',3,4',5,6,6'-Heptachlorobiphenyl	188	2.5 µg/ml
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	2.5 µg/ml
2,2',3,3',5,5',6,6'-Octachlorobiphenyl	202	2.5 µg/ml
2,3,3',4,4',5,5',6-Octachlorobiphenyl	205	2.5 µg/ml
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	206	2.5 µg/ml
2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	208	2.5 µg/ml
Decachlorobiphenyl	209	2.5 µg/ml

BP-MO

Catalogue Number	Product (nonane solution)	Qty/Conc
BP-MO	Solution/Mixture of Native Mono-ortho PCBs	1.2 ml
NATIVE PCB CONGENERS	IUPAC	
2,3,3',4,4'-Pentachlorobiphenyl	105	10 µg/ml
2,3,4,4',5-Pentachlorobiphenyl	114	10 µg/ml
2,3',4,4',5-Pentachlorobiphenyl	118	10 µg/ml
2',3,4,4',5-Pentachlorobiphenyl	123	10 µg/ml
2,3,3',4,4',5-Hexachlorobiphenyl	156	10 µg/ml
2,3,3',4,4',5'-Hexachlorobiphenyl	157	10 µg/ml
2,3',4,4',5,5'-Hexachlorobiphenyl	167	10 µg/ml
2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	10 µg/ml

BP-MS

BP-MS-PL1, **BP-MS-PL2**, and **BP-MS-PL3** were prepared to be used in the identification/confirmation of the PCB congeners in **BP-MS**. Although DB-5 data is provided with **BP-MS**, there can be changes in the elution order on "equivalent capillary columns".

Catalogue Number	Product (nonane solution)	Qty/Conc				
BP-MS	Native PCB Solution/Mixture for MS Detection	1.2 ml				
BP-MS2	Native PCB Solution/Mixture for MS Detection	1.2 ml				
BP-MS-PL1	Native PCB Solution/Mixture for MS Detection	1.2 ml				
BP-MS-PL2	Native PCB Solution/Mixture for MS Detection	1.2 ml				
BP-MS-PL3	Native PCB Solution/Mixture for MS Detection	1.2 ml				

PCB CONGENERS	IUPAC	BP-MS (µg/ml)	BP-MS2 (µg/ml)	BP-MS- PL1 (µg/ml)	BP-MS- PL2 (µg/ml)	BP-MS- PL3 (µg/ml)
2-Chlorobiphenyl	1	2.0	—	—	—	—
4-Chlorobiphenyl	3	2.0	—	—	—	—
2,2'-Dichlorobiphenyl	4	2.0	—	—	—	—
2,4'-Dichlorobiphenyl	8	2.0	—	—	—	—
2,6-Dichlorobiphenyl	10	2.0	—	—	—	—
*4,4'-Dichlorobiphenyl	15	2.0	—	—	—	—
*2,2',5-Trichlorobiphenyl	18	2.0	—	—	—	—
2,2',6-Trichlorobiphenyl	19	2.0	—	—	—	—
2,3,4'-Trichlorobiphenyl	22	2.0	—	—	—	—
2,4,4'-Trichlorobiphenyl	28	2.0	—	—	—	—
2',3,4-Trichlorobiphenyl	33	2.0	—	—	—	—
3,4,4'-Trichlorobiphenyl	37	2.0	—	—	—	—
2,2',3,3'-Tetrachlorobiphenyl	40	—	2.0	—	—	—
2,2',3,4-Tetrachlorobiphenyl	41	—	2.0	—	—	—
*2,2',3,5'-Tetrachlorobiphenyl	44	2.0	—	—	—	—
*2,2',4,5'-Tetrachlorobiphenyl	49	2.0	—	—	2.0	—
*2,2',5,5'-Tetrachlorobiphenyl	52	2.0	—	2.0	—	—
*2,2',6,6'-Tetrachlorobiphenyl	54	2.0	—	—	—	—
2,3,4,4'-Tetrachlorobiphenyl	60	—	2.0	—	—	—
2,3',4,4'-Tetrachlorobiphenyl	66	—	2.0	—	—	—
2,3',4',5-Tetrachlorobiphenyl	70	2.0	—	2.0	—	—
2,4,4',5-Tetrachlorobiphenyl	74	2.0	—	—	2.0	—
*3,3',4,4'-Tetrachlorobiphenyl	77	2.0	—	—	—	2.0
3,4,4',5-Tetrachlorobiphenyl	81	2.0	—	—	—	—
*2,2',3,4,5'-Pentachlorobiphenyl	87	2.0	—	2.0	—	—
2,2',3,4',5-Pentachlorobiphenyl	90	—	2.0	—	—	—
2,2',3,5',6-Pentachlorobiphenyl	95	2.0	—	—	2.0	—
2,2',4,4',5-Pentachlorobiphenyl	99	2.0	—	—	2.0	—
*2,2',4,5,5'-Pentachlorobiphenyl	101	2.0	—	2.0	—	—
2,2',4,6,6'-Pentachlorobiphenyl	104	2.0	—	—	—	—
*2,3,3',4,4'-Pentachlorobiphenyl	105	2.0	—	—	—	—
2,3,3',4',6-Pentachlorobiphenyl	110	2.0	—	2.0	—	—
*2,3,4,4',5-Pentachlorobiphenyl	114	2.0	—	—	—	—
*2,3',4,4',5-Pentachlorobiphenyl	118	2.0	—	—	—	—
2,3',4,4',6-Pentachlorobiphenyl	119	2.0	—	—	—	—
2',3,4,4',5-Pentachlorobiphenyl	123	2.0	—	—	—	—
3,3',4,4',5-Pentachlorobiphenyl	126	2.0	—	—	—	—
*2,2',3,3',4,4'-Hexachlorobiphenyl	128	2.0	—	—	—	2.0
2,2',3,3',4,5-Hexachlorobiphenyl	129	—	2.0	—	—	—
2,2',3,4,4',5-Hexachlorobiphenyl	137	—	2.0	—	—	—
*2,2',3,4,4',5'-Hexachlorobiphenyl	138	2.0	—	2.0	—	—
2,2',3,4,5,5'-Hexachlorobiphenyl	141	—	2.0	—	—	—
2,2',3,4',5,6-Hexachlorobiphenyl	149	2.0	—	—	2.0	—
*2,2',3,5,5',6-Hexachlorobiphenyl	151	2.0	—	—	2.0	—
*2,2',4,4',5,5'-Hexachlorobiphenyl	153	2.0	—	2.0	—	—
2,2',4,4',6,6'-Hexachlorobiphenyl	155	2.0	—	2.0	—	—
*2,3,3',4,4',5-Hexachlorobiphenyl	156	2.0	—	—	—	—
2,3,3',4,4',5'-Hexachlorobiphenyl	157	2.0	—	—	—	—
2,3,3',4,4',6-Hexachlorobiphenyl	158	2.0	—	—	2.0	—
2,3',4,4',5,5'-Hexachlorobiphenyl	167	2.0	—	—	—	—
2,3',4,4',5',6-Hexachlorobiphenyl	168	2.0	—	—	2.0	—
3,3',4,4',5,5'-Hexachlorobiphenyl	169	2.0	—	—	—	—
*2,2',3,3',4,4',5-Heptachlorobiphenyl	170	2.0	—	—	—	—
*2,2',3,3',4,4',6-Heptachlorobiphenyl	171	2.0	—	—	2.0	—
2,2',3,3',4',5,6-Heptachlorobiphenyl	177	2.0	—	2.0	—	—
2,2',3,3',5,5',6-Heptachlorobiphenyl	178	2.0	—	—	—	2.0
*2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	2.0	—	2.0	—	—
*2,2',3,4,4',5',6-Heptachlorobiphenyl	183	2.0	—	—	—	—
*2,2',3,4',5,5',6-Heptachlorobiphenyl	187	2.0	—	—	—	—
2,2',3,4',5,6,6'-Heptachlorobiphenyl	188	2.0	—	2.0	—	—
*2,3,3',4,4',5,5'-Heptachlorobiphenyl	189	2.0	—	—	—	—
*2,3,3',4,4',5',6-Heptachlorobiphenyl	191	2.0	—	—	—	—
2,3,3',4',5,5',6-Heptachlorobiphenyl	193	—	2.0	—	—	—
*2,2',3,3',4,4',5,5'-Octachlorobiphenyl	194	2.0	—	—	—	—
*2,2',3,3',4,5,5',6'-Octachlorobiphenyl	199	2.0	—	—	—	—
*2,2',3,3',4,5',6,6'-Octachlorobiphenyl	201	2.0	—	2.0	—	—
*2,2',3,3',5,5',6,6'-Octachlorobiphenyl	202	2.0	—	—	—	2.0
2,2',3,4,4',5,5',6-Octachlorobiphenyl	203	—	2.0	—	—	—
*2,3,3',4,4',5,5',6-Octachlorobiphenyl	205	2.0	—	—	—	—
*2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	206	2.0	—	—	—	—
*2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	208	2.0	—	—	—	—
*Decachlorobiphenyl	209	2.0	—	—	—	—

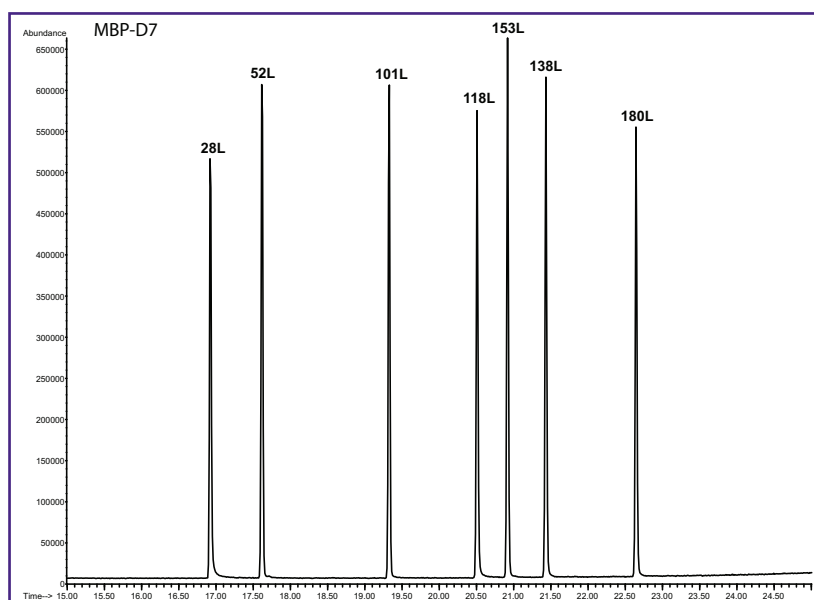
Congeners marked with an asterisk (*) are concentration-certified by direct comparison to the NRCC CLB-1 solutions.

Solution/Mixtures for the analysis of the Dutch 7 PCB Congeners.

Catalogue Number	Product (nonane solution)	Qty/Conc
BP-D7	Native PCB Congener Solution/Mixture	1.2 ml
MBP-D7	Mass-Labelled PCB Congener Solution/Mixture	1.2 ml

NATIVE PCB CONGENERS	IUPAC	BP-D7 (µg/ml)
2,4,4'-Trichlorobiphenyl	28	10
2,2',5,5'-Tetrachlorobiphenyl	52	10
2,2',4,5,5'-Pentachlorobiphenyl	101	10
2,3',4,4',5-Pentachlorobiphenyl	118	10
2,2',3,4,4',5'-Hexachlorobiphenyl	138	10
2,2',4,4',5,5'-Hexachlorobiphenyl	153	10
2,2',3,4,4',5,5'-Heptachlorobiphenyl	180	10

MASS-LABELLED PCB CONGENERS	IUPAC	MBP-D7 (µg/ml)
2,4,4'-Trichloro[¹³ C ₁₂]biphenyl	28L	5.0
2,2',5,5'-Tetrachloro[¹³ C ₁₂]biphenyl	52L	5.0
2,2',4,5,5'-Pentachloro[¹³ C ₁₂]biphenyl	101L	5.0
2,3',4,4',5-Pentachloro[¹³ C ₁₂]biphenyl	118L	5.0
2,2',3,4,4',5'-Hexachloro[¹³ C ₁₂]biphenyl	138L	5.0
2,2',4,4',5,5'-Hexachloro[¹³ C ₁₂]biphenyl	153L	5.0
2,2',3,4,4',5,5'-Heptachloro[¹³ C ₁₂]biphenyl	180L	5.0



HRGC/LRMS Data: MBP-D7 on a 30m DB-5 column.

MASS-LABELLED PCDDs/PCDFs/PCBs: SOLUTION/MIXTURES

These three solutions were designed and prepared as support solutions to be used with the following calibration sets:

DF-CVS-A10 (see Page 42)

DF-CVS-B10 (see Page 44)

as well as:

PCB-CVS-A10

Catalogue Number	Product (nonane solution)	Qty/Conc
DFP-LCS-A	Mass-Labelled PCDD/PCDF/PCB Solution/Mixture	1.2 ml
MASS-LABELLED PCDDs		
2,3,7,8-Tetrachloro ^[13C] dibenzo-p-dioxin		10 ng/ml
1,2,3,7,8-Pentachloro ^[13C] dibenzo-p-dioxin		10 ng/ml
1,2,3,4,7,8-Hexachloro ^[13C] dibenzo-p-dioxin		10 ng/ml
1,2,3,6,7,8-Hexachloro ^[13C] dibenzo-p-dioxin		10 ng/ml
1,2,3,7,8,9-Hexachloro ^[13C] dibenzo-p-dioxin		10 ng/ml
1,2,3,4,6,7,8-Heptachloro ^[13C] dibenzo-p-dioxin		10 ng/ml
Octachloro ^[13C] dibenzo-p-dioxin		20 ng/ml
MASS-LABELLED PCDFs		
2,3,7,8-Tetrachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,7,8-Pentachloro ^[13C] dibenzofuran		10 ng/ml
2,3,4,7,8-Pentachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,4,7,8-Hexachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,6,7,8-Hexachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,7,8,9-Hexachloro ^[13C] dibenzofuran		10 ng/ml
2,3,4,6,7,8-Hexachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,4,6,7,8-Heptachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,4,7,8,9-Heptachloro ^[13C] dibenzofuran		10 ng/ml
Octachloro ^[13C] dibenzofuran		20 ng/ml
MASS-LABELLED PCBs		
	IUPAC	
3,3',4,4'-Tetrachloro ^[13C] biphenyl	77L	10 ng/ml
3,4,4',5-Tetrachloro ^[13C] biphenyl	81L	10 ng/ml
2,3,3',4,4'-Pentachloro ^[13C] biphenyl	105L	10 ng/ml
2,3,4,4',5-Pentachloro ^[13C] biphenyl	114L	10 ng/ml
2,3',4,4',5-Pentachloro ^[13C] biphenyl	118L	10 ng/ml
2',3,4,4',5-Pentachloro ^[13C] biphenyl	123L	10 ng/ml
3,3',4,4',5-Pentachloro ^[13C] biphenyl	126L	10 ng/ml
2,3,3',4,4',5-Hexachloro ^[13C] biphenyl	156L	10 ng/ml
2,3,3',4,4',5'-Hexachloro ^[13C] biphenyl	157L	10 ng/ml
2,3',4,4',5,5'-Hexachloro ^[13C] biphenyl	167L	10 ng/ml
3,3',4,4',5,5'-Hexachloro ^[13C] biphenyl	169L	10 ng/ml
2,2',3,3',4,4',5-Heptachloro ^[13C] biphenyl	170L	10 ng/ml
2,2',3,4,4',5,5'-Heptachloro ^[13C] biphenyl	180L	10 ng/ml
2,3,3',4,4',5,5'-Heptachloro ^[13C] biphenyl	189L	10 ng/ml
DFP-IS-A	Mass-Labelled PCDF/PCB Syringe Spike	1.2 ml
	IUPAC	
2,3',4,5-Tetrachloro ^[13C] biphenyl	70L	10 ng/ml
1,2,3,4,6,9-Hexachloro ^[13C] dibenzofuran		10 ng/ml
1,2,3,4,6,8,9-Heptachloro ^[13C] dibenzofuran		10 ng/ml
DFP-SS-A	Mass-Labelled PCDD/PCB Sampling Spike	1.2 ml
	IUPAC	
3,3',4,5'-Tetrachloro ^[13C] biphenyl	79L	50 ng/ml
1,2,3,4-Tetrachloro ^[13C] dibenzo-p-dioxin		50 ng/ml

PBDEs & PBBs: POLYBROMINATED DIPHENYL ETHERS (PBDES) & POLYBROMINATED BIPHENYLS (PBBs)

This section is devoted to polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyls (PBBs) and contains the PBDE calibration solutions listed below:

BFR-CVS calibration set and support solutions
BDE-CVS-F calibration set and support solutions
BDE-CVS-G calibration set and support solutions

Also included in this section are individual native and mass-labelled PBDEs and PBBs as well as selected technical mixtures and individual PBDE metabolites:

Native and mass-labelled PBDEs
Mass-labelled hydroxy-PBDEs
Native and mass-labelled methoxy-PBDEs
Native and mass-labelled PBBs



BFR-CVS

Catalogue Number	Product (toluene solution)	Qty/Conc				
BFR-CVS	Polybrominated Diphenyl Ethers/Brominated Flame Retardants	1 kit				
	Calibration Solutions CS1-CS5	(5 ampoules)				
BFR-CS1, BFR-CS2, BFR-CS3, BFR-CS4, BFR-CS5	Individual Calibration Solutions	200 µl each				
		BFR-CS1 (ng/ml)	BFR-CS2 (ng/ml)	BFR-CS3 (ng/ml)	BFR-CS4 (ng/ml)	BFR-CS5 (ng/ml)
NATIVE PBDEs/BFRs						
2-Bromodiphenyl ether	BDE-1	0.25	1.0	5.0	20	100
3-Bromodiphenyl ether	BDE-2	0.25	1.0	5.0	20	100
4-Bromodiphenyl ether	BDE-3	0.25	1.0	5.0	20	100
2,4-Dibromodiphenyl ether	BDE-7	0.25	1.0	5.0	20	100
2,6-Dibromodiphenyl ether	BDE-10	0.25	1.0	5.0	20	100
4,4'-Dibromodiphenyl ether	BDE-15	0.25	1.0	5.0	20	100
2,2',4-Tribromodiphenyl ether	BDE-17 (>96%)	0.24	0.96	4.8	19	96
2,4,4'-Tribromodiphenyl ether	BDE-28	0.25	1.0	5.0	20	100
2,4,6-Tribromodiphenyl ether	BDE-30	0.25	1.0	5.0	20	100
Pentabromoethylbenzene	PBEB	0.25	1.0	5.0	20	100
Hexabromobenzene	HBBZ	0.25	1.0	5.0	20	100
2,2',4,4'-Tetrabromodiphenyl ether	BDE-47	0.5	2.0	10	40	200
2,2',4,5'-Tetrabromodiphenyl ether	BDE-49	0.5	2.0	10	40	200
2,3',4,4'-Tetrabromodiphenyl ether	BDE-66	0.5	2.0	10	40	200
2,3',4',6-Tetrabromodiphenyl ether	BDE-71	0.5	2.0	10	40	200
3,3',4,4'-Tetrabromodiphenyl ether	BDE-77	0.5	2.0	10	40	200
2,2',3,4,4'-Pentabromodiphenyl ether	BDE-85	0.5	2.0	10	40	200
2,2',4,4',5-Pentabromodiphenyl ether	BDE-99	0.5	2.0	10	40	200
2,2',4,4',6-Pentabromodiphenyl ether	BDE-100	0.5	2.0	10	40	200
2,3',4,4',6-Pentabromodiphenyl ether	BDE-119	0.5	2.0	10	40	200
3,3',4,4',5-Pentabromodiphenyl ether	BDE-126	0.5	2.0	10	40	200
2,2',3,4,4',5'-Hexabromodiphenyl ether	BDE-138	0.5	2.0	10	40	200
2,2',3,4,4',6-Hexabromodiphenyl ether	BDE-139	0.5	2.0	10	40	200
2,2',3,4,4',6'-Hexabromodiphenyl ether	BDE-140	0.5	2.0	10	40	200
2,2',4,4',5,5'-Hexabromodiphenyl ether	BDE-153	0.5	2.0	10	40	200
2,2',4,4',5,6'-Hexabromodiphenyl ether	BDE-154	0.5	2.0	10	40	200
2,3,3',4,4',5-Hexabromodiphenyl ether	BDE-156	0.5	2.0	10	40	200
3,3',4,4',5,5'-Hexabromodiphenyl ether	BDE-169	0.5	2.0	10	40	200
2,2',4,4',5,5'-Hexabromobiphenyl	BB-153	0.5	2.0	10	40	200
1,2-Bis(2,4,6-tribromophenoxy)ethane	BTBPE	0.5	2.0	10	40	200
2,2',3,3',4,4',6-Heptabromodiphenyl ether	BDE-171	1.0	4.0	20	80	400
2,2',3,4,4',5,5'-Heptabromodiphenyl ether	BDE-180	1.0	4.0	20	80	400
2,2',3,4,4',5',6-Heptabromodiphenyl ether	BDE-183	1.0	4.0	20	80	400
2,2',3,4,4',6,6'-Heptabromodiphenyl ether	BDE-184	1.0	4.0	20	80	400
2,3,3',4,4',5',6-Heptabromodiphenyl ether	BDE-191	1.0	4.0	20	80	400
2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	BDE-196	1.0	4.0	20	80	400
2,2',3,3',4,4',6,6'-Octabromodiphenyl ether	BDE-197	1.0	4.0	20	80	400
2,2',3,3',4,5',6,6'-Octabromodiphenyl ether	BDE-201	1.0	4.0	20	80	400
2,2',3,4,4',5,5',6-Octabromodiphenyl ether	BDE-203	1.0	4.0	20	80	400
2,2',3,4,4',5,6,6'-Octabromodiphenyl ether	BDE-204	1.0	4.0	20	80	400
2,3,3',4,4',5,5',6-Octabromodiphenyl ether	BDE-205	1.0	4.0	20	80	400
2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	BDE-206	2.5	10	50	200	1000
2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	BDE-207	2.5	10	50	200	1000
2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether	BDE-208	2.5	10	50	200	1000
Decabromodiphenyl ether	BDE-209	2.5	10	50	200	1000
Decabromodiphenylethane	DBDPE	5.0	20	100	400	2000
BFR-LCS						
4-Bromo[¹³ C ₁₂]diphenyl ether	MBDE-3	25	25	25	25	25
4,4'-Dibromo[¹³ C ₁₂]diphenyl ether	MBDE-15	25	25	25	25	25
2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	MBDE-28	25	25	25	25	25
Hexabromo[¹³ C ₁₂]benzene	MHBBZ	25	25	25	25	25
2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	MBDE-47	50	50	50	50	50
3,3',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	MBDE-77	50	50	50	50	50
2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	MBDE-99	50	50	50	50	50
2,2',4,4',6-Pentabromo[¹³ C ₁₂]diphenyl ether	MBDE-100	50	50	50	50	50
3,3',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	MBDE-126	50	50	50	50	50
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	MBDE-153	50	50	50	50	50
2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	MBDE-154	50	50	50	50	50
3,3',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	MBDE-169	50	50	50	50	50
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]biphenyl	MBB-153	50	50	50	50	50
1,2-Bis(2,4,6-tribromo[¹³ C ₁₂]phenoxy)ethane	MBTBPE	50	50	50	50	50
2,2',3,4,4',5',6-Heptabromo[¹³ C ₁₂]diphenyl ether	MBDE-183	100	100	100	100	100
2,2',3,3',4,4',6,6'-Octabromo[¹³ C ₁₂]diphenyl ether	MBDE-197	100	100	100	100	100
2,3,3',4,4',5,5',6-Octabromo[¹³ C ₁₂]diphenyl ether	MBDE-205	100	100	100	100	100
2,2',3,3',4,4',5,6,6'-Nonabromo[¹³ C ₁₂]diphenyl ether	MBDE-207	250	250	250	250	250
Decabromo[¹³ C ₁₂]diphenyl ether	MBDE-209	250	250	250	250	250
Decabromo[¹³ C ₁₂]diphenylethane	MDBDPE	500	500	500	500	500
BFR-ISS						
3,3',4,5'-Tetrabromo[¹³ C ₁₂]diphenyl ether	MBDE-79	50	50	50	50	50
2,2',3,4,4',6-Hexabromo[¹³ C ₁₂]diphenyl ether	MBDE-139	50	50	50	50	50
2,2',3,4,4',5,5'-Heptabromo[¹³ C ₁₂]diphenyl ether	MBDE-180	100	100	100	100	100
2,2',3,3',4,4',5,5',6-Nonabromo[¹³ C ₁₂]diphenyl ether	MBDE-206	250	250	250	250	250
BFR-SCS						
2,2',3,4,4',5'-Hexabromo[¹³ C ₁₂]diphenyl ether	MBDE-138	50	50	50	50	50

Catalogue Number	Product (toluene solution)	Qty/Conc			
BFR-LCS	Labelled Compounds Stock Solution	1.2 ml			
BFR-ISS	Internal/Injection Standards	1.2 ml			
BFR-SCS	Sampling/Cleanup Standard	1.2 ml			
BFR-PAR	Native Compounds Stock Solution (nonane/toluene solution)	1.2 ml			
		BFR-LCS (ng/ml)	BFR-ISS (ng/ml)	BFR-SCS (ng/ml)	BFR-PAR (ng/ml)
NATIVE PBDEs/BFRs					
2-Bromodiphenyl ether	BDE-1	—	—	—	200
3-Bromodiphenyl ether	BDE-2	—	—	—	200
4-Bromodiphenyl ether	BDE-3	—	—	—	200
2,4-Dibromodiphenyl ether	BDE-7	—	—	—	200
2,6-Dibromodiphenyl ether	BDE-10	—	—	—	200
4,4'-Dibromodiphenyl ether	BDE-15	—	—	—	200
2,2',4-Tribromodiphenyl ether	BDE-17 (>96%)	—	—	—	192
2,4,4'-Tribromodiphenyl ether	BDE-28	—	—	—	200
2,4,6-Tribromodiphenyl ether	BDE-30	—	—	—	200
Pentabromoethylbenzene	PBEB	—	—	—	200
Hexabromobenzene	HBBZ	—	—	—	200
2,2',4,4'-Tetrabromodiphenyl ether	BDE-47	—	—	—	400
2,2',4,5'-Tetrabromodiphenyl ether	BDE-49	—	—	—	400
2,3',4,4'-Tetrabromodiphenyl ether	BDE-66	—	—	—	400
2,3',4',6-Tetrabromodiphenyl ether	BDE-71	—	—	—	400
3,3',4,4'-Tetrabromodiphenyl ether	BDE-77	—	—	—	400
2,2',3,4,4'-Pentabromodiphenyl ether	BDE-85	—	—	—	400
2,2',4,4',5-Pentabromodiphenyl ether	BDE-99	—	—	—	400
2,2',4,4',6-Pentabromodiphenyl ether	BDE-100	—	—	—	400
2,3',4,4',6-Pentabromodiphenyl ether	BDE-119	—	—	—	400
3,3',4,4',5-Pentabromodiphenyl ether	BDE-126	—	—	—	400
2,2',3,4,4',5'-Hexabromodiphenyl ether	BDE-138	—	—	—	400
2,2',3,4,4',6-Hexabromodiphenyl ether	BDE-139	—	—	—	400
2,2',3,4,4',6'-Hexabromodiphenyl ether	BDE-140	—	—	—	400
2,2',4,4',5,5'-Hexabromodiphenyl ether	BDE-153	—	—	—	400
2,2',4,4',5,6'-Hexabromodiphenyl ether	BDE-154	—	—	—	400
2,3,3',4,4',5-Hexabromodiphenyl ether	BDE-156	—	—	—	400
3,3',4,4',5,5'-Hexabromodiphenyl ether	BDE-169	—	—	—	400
2,2',4,4',5,5'-Hexabromobiphenyl	BB-153	—	—	—	400
1,2-Bis(2,4,6-tribromophenoxy)ethane	BTBPE	—	—	—	400
2,2',3,3',4,4',6-Heptabromodiphenyl ether	BDE-171	—	—	—	800
2,2',3,4,4',5,5'-Heptabromodiphenyl ether	BDE-180	—	—	—	800
2,2',3,4,4',5',6-Heptabromodiphenyl ether	BDE-183	—	—	—	800
2,2',3,4,4',6,6'-Heptabromodiphenyl ether	BDE-184	—	—	—	800
2,3,3',4,4',5',6-Heptabromodiphenyl ether	BDE-191	—	—	—	800
2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	BDE-196	—	—	—	800
2,2',3,3',4,4',6,6'-Octabromodiphenyl ether	BDE-197	—	—	—	800
2,2',3,3',4,5',6,6'-Octabromodiphenyl ether	BDE-201	—	—	—	800
2,2',3,4,4',5,5',6-Octabromodiphenyl ether	BDE-203	—	—	—	800
2,2',3,4,4',5,6,6'-Octabromodiphenyl ether	BDE-204	—	—	—	800
2,3,3',4,4',5,5',6-Octabromodiphenyl ether	BDE-205	—	—	—	800
2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	BDE-206	—	—	—	2000
2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	BDE-207	—	—	—	2000
2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether	BDE-208	—	—	—	2000
Decabromodiphenyl ether	BDE-209	—	—	—	2000
Decabromodiphenylethane	DBDPE	—	—	—	4000
BFR-LCS					
4-Bromo[¹³ C] ₁₂ diphenyl ether	MBDE-3	100	—	—	—
4,4'-Dibromo[¹³ C] ₁₂ diphenyl ether	MBDE-15	100	—	—	—
2,4,4'-Tribromo[¹³ C] ₁₂ diphenyl ether	MBDE-28	100	—	—	—
Hexabromo[¹³ C] ₁₂ benzene	MHBBZ	100	—	—	—
2,2',4,4'-Tetrabromo[¹³ C] ₁₂ diphenyl ether	MBDE-47	200	—	—	—
3,3',4,4'-Tetrabromo[¹³ C] ₁₂ diphenyl ether	MBDE-77	200	—	—	—
2,2',4,4',5-Pentabromo[¹³ C] ₁₂ diphenyl ether	MBDE-99	200	—	—	—
2,2',4,4',6-Pentabromo[¹³ C] ₁₂ diphenyl ether	MBDE-100	200	—	—	—
3,3',4,4',5-Pentabromo[¹³ C] ₁₂ diphenyl ether	MBDE-126	200	—	—	—
2,2',4,4',5,5'-Hexabromo[¹³ C] ₁₂ diphenyl ether	MBDE-153	200	—	—	—
2,2',4,4',5,6'-Hexabromo[¹³ C] ₁₂ diphenyl ether	MBDE-154	200	—	—	—
3,3',4,4',5,5'-Hexabromo[¹³ C] ₁₂ diphenyl ether	MBDE-169	200	—	—	—
2,2',4,4',5,5'-Hexabromo[¹³ C] ₁₂ biphenyl	MBB-153	200	—	—	—
1,2-Bis(2,4,6-tribromo[¹³ C] ₁₂ phenoxy)ethane	MBTBPPE	200	—	—	—
2,2',3,4,4',5',6-Heptabromo[¹³ C] ₁₂ diphenyl ether	MBDE-183	400	—	—	—
2,2',3,3',4,4',6,6'-Octabromo[¹³ C] ₁₂ diphenyl ether	MBDE-197	400	—	—	—
2,3,3',4,4',5,5',6-Octabromo[¹³ C] ₁₂ diphenyl ether	MBDE-205	400	—	—	—
2,2',3,3',4,4',5,6,6'-Nonabromo[¹³ C] ₁₂ diphenyl ether	MBDE-207	1000	—	—	—
Decabromo[¹³ C] ₁₂ diphenyl ether	MBDE-209	1000	—	—	—
Decabromo[¹³ C] ₁₂ diphenylethane	MDBDPE	2000	—	—	—
BFR-ISS					
3,3',4,5'-Tetrabromo[¹³ C] ₁₂ diphenyl ether	MBDE-79	—	200	—	—
2,2',3,4,4',6-Hexabromo[¹³ C] ₁₂ diphenyl ether	MBDE-139	—	200	—	—
2,2',3,4,4',5,5'-Heptabromo[¹³ C] ₁₂ diphenyl ether	MBDE-180	—	400	—	—
2,2',3,3',4,4',5,5',6-Nonabromo[¹³ C] ₁₂ diphenyl ether	MBDE-206	—	1000	—	—
BFR-SCS					
2,2',3,4,4',5'-Hexabromo[¹³ C] ₁₂ diphenyl ether	MBDE-138	—	—	400	—

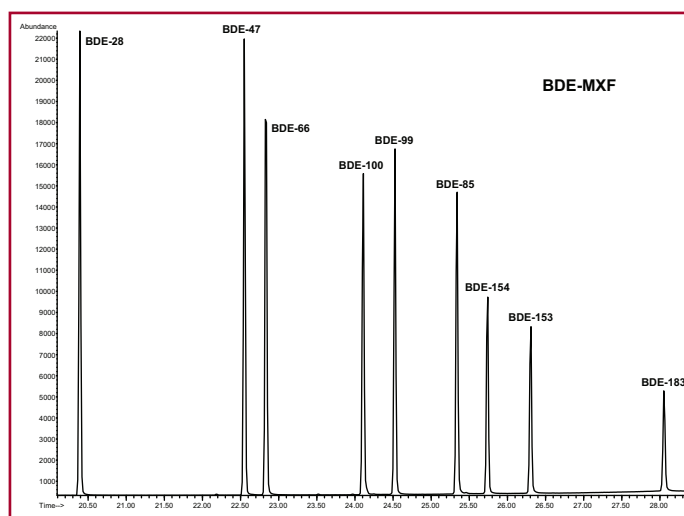
BDE-CVS-F

Catalogue Number	Product (toluene solution)	Qty/Conc
BDE-CVS-F	BDE-CVS-F Calibration Solutions CS1-CS5	1 kit (5 ampoules)
BDE-CS1-F	CS1	200 µl
BDE-CS2-F	CS2	200 µl
BDE-CS3-F	CS3	200 µl
BDE-CS4-F	CS4	200 µl
BDE-CS5-F	CS5	200 µl

NATIVE PBDE CONGENERS	IUPAC	BDE- CS1-F (ng/ml)	BDE- CS2-F (ng/ml)	BDE- CS3-F (ng/ml)	BDE- CS4-F (ng/ml)	BDE- CS5-F (ng/ml)
2,4,4'-Tribromodiphenyl ether	28	1.0	5.0	25	100	500
2,2',4,4'-Tetrabromodiphenyl ether	47	1.0	5.0	25	100	500
2,3',4,4'-Tetrabromodiphenyl ether	66	1.0	5.0	25	100	500
2,2',3,4,4'-Pentabromodiphenyl ether	85	1.0	5.0	25	100	500
2,2',4,4',5-Pentabromodiphenyl ether	99	1.0	5.0	25	100	500
2,2',4,4',6-Pentabromodiphenyl ether	100	1.0	5.0	25	100	500
2,2',4,4',5,5'-Hexabromodiphenyl ether	153	1.0	5.0	25	100	500
2,2',4,4',5,6'-Hexabromodiphenyl ether	154	1.0	5.0	25	100	500
2,2',3,4,4',5,6'-Heptabromodiphenyl ether	183	1.0	5.0	25	100	500

MASS-LABELLED PBDE SURROGATE STANDARDS	IUPAC	BDE- CS1-F (ng/ml)	BDE- CS2-F (ng/ml)	BDE- CS3-F (ng/ml)	BDE- CS4-F (ng/ml)	BDE- CS5-F (ng/ml)
2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	28L	20	20	20	20	20
2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	47L	20	20	20	20	20
2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	99L	20	20	20	20	20
2,2',4,4',6-Pentabromo[¹³ C ₁₂]diphenyl ether	100L	20	20	20	20	20
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	153L	20	20	20	20	20
2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	154L	20	20	20	20	20
2,2',3,4,4',5,6'-Heptabromo[¹³ C ₁₂]diphenyl ether	183L	20	20	20	20	20

MASS-LABELLED PBDE RECOVERY STANDARDS	IUPAC	BDE- CS1-F (ng/ml)	BDE- CS2-F (ng/ml)	BDE- CS3-F (ng/ml)	BDE- CS4-F (ng/ml)	BDE- CS5-F (ng/ml)
3,3',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	77L	20	20	20	20	20
2,2',3,4,4',5'-Hexabromo[¹³ C ₁₂]diphenyl ether	138L	20	20	20	20	20



BDE-MXF; HRGC/LRMS TIC Chromatogram

Catalogue Number	Product (toluene solution)	Qty/Conc
MBDE-MXFS	Mass-Labelled PBDE Surrogate Stock	1.2 ml
MBDE-MXFR	Mass-Labelled PBDE Recovery Stock	1.2 ml
BDE-MXF	Native PBDE Stock	1.2 ml

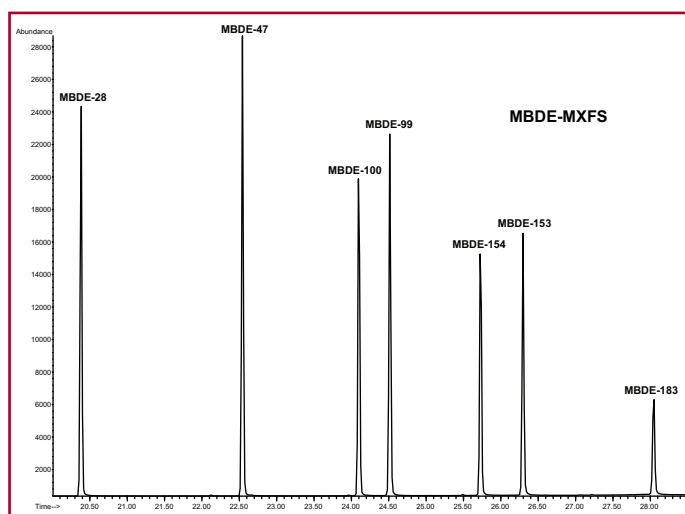
NATIVE PBDE CONGENERS	IUPAC	MBDE-MXFS (ng/ml)	MBDE-MXFR (ng/ml)	BDE-MXF (ng/ml)
2,4,4'-Tribromodiphenyl ether	28	—	—	2000
2,2',4,4'-Tetrabromodiphenyl ether	47	—	—	2000
2,3',4,4'-Tetrabromodiphenyl ether	66	—	—	2000
2,2',3,4,4'-Pentabromodiphenyl ether	85	—	—	2000
2,2',4,4',5-Pentabromodiphenyl ether	99	—	—	2000
2,2',4,4',6-Pentabromodiphenyl ether	100	—	—	2000
2,2',4,4',5,5'-Hexabromodiphenyl ether	153	—	—	2000
2,2',4,4',5,6'-Hexabromodiphenyl ether	154	—	—	2000
2,2',3,4,4',5',6-Heptabromodiphenyl ether	183	—	—	2000

MASS-LABELLED PBDE SURROGATE STANDARDS

2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	28L	2000	—	—
2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	47L	2000	—	—
2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	99L	2000	—	—
2,2',4,4',6-Pentabromo[¹³ C ₁₂]diphenyl ether	100L	2000	—	—
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	153L	2000	—	—
2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	154L	2000	—	—
2,2',3,4,4',5',6-Heptabromo[¹³ C ₁₂]diphenyl ether	183L	2000	—	—

MASS-LABELLED PBDE RECOVERY STANDARDS

3,3',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	77L	—	2000	—
2,2',3,4,4',5'-Hexabromo[¹³ C ₁₂]diphenyl ether	138L	—	2000	—



MBDE-MXFS; HRGC/LRMS TIC Chromatogram

BDE-CVS-G

Catalogue Number	Product (nonane/toluene solution)	Qty/Conc
BDE-CVS-G	BDE-CVS-G Calibration Solutions CS1-CS5	1 kit (5 ampoules)
BDE-CS1-G	CS1	200 µl
BDE-CS2-G	CS2	200 µl
BDE-CS3-G	CS3	200 µl
BDE-CS4-G	CS4	200 µl
BDE-CS5-G	CS5	200 µl

NOTE: This set of calibration solutions were designed to be used with BDE-MXE as the native PBDE stock solution.

NATIVE PBDE CONGENERS	IUPAC	BDE- CS1-G (ng/ml)	BDE- CS2-G (ng/ml)	BDE- CS3-G (ng/ml)	BDE- CS4-G (ng/ml)	BDE- CS5-G (ng/ml)
4-Bromodiphenyl ether	3	1.0	5.0	20	100	400
2,4-Dibromodiphenyl ether	7	1.0	5.0	20	100	400
4,4'-Dibromodiphenyl ether	15	1.0	5.0	20	100	400
2,2',4-Tribromodiphenyl ether (>96%)	17	0.96	4.8	19.2	96	384
2,4,4'-Tribromodiphenyl ether	28	1.0	5.0	20	100	400
2,2',4,4'-Tetrabromodiphenyl ether	47	1.0	5.0	20	100	400
2,2',4,5'-Tetrabromodiphenyl ether	49	1.0	5.0	20	100	400
2,3',4,4'-Tetrabromodiphenyl ether	66	1.0	5.0	20	100	400
2,3',4',6-Tetrabromodiphenyl ether	71	1.0	5.0	20	100	400
3,3',4,4'-Tetrabromodiphenyl ether	77	1.0	5.0	20	100	400
2,2',3,4,4'-Pentabromodiphenyl ether	85	1.0	5.0	20	100	400
2,2',4,4',5-Pentabromodiphenyl ether	99	1.0	5.0	20	100	400
2,2',4,4',6-Pentabromodiphenyl ether	100	1.0	5.0	20	100	400
2,3',4,4',6-Pentabromodiphenyl ether	119	1.0	5.0	20	100	400
3,3',4,4',5-Pentabromodiphenyl ether	126	1.0	5.0	20	100	400
2,2',3,4,4',5'-Hexabromodiphenyl ether	138	2.0	10	40	200	800
2,2',4,4',5,5'-Hexabromodiphenyl ether	153	2.0	10	40	200	800
2,2',4,4',5,6'-Hexabromodiphenyl ether	154	2.0	10	40	200	800
2,3,3',4,4',5-Hexabromodiphenyl ether	156	2.0	10	40	200	800
2,2',3,4,4',5,6'-Heptabromodiphenyl ether	183	2.0	10	40	200	800
2,2',3,4,4',6,6'-Heptabromodiphenyl ether	184	2.0	10	40	200	800
2,3,3',4,4',5,6'-Heptabromodiphenyl ether	191	2.0	10	40	200	800
2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	196	2.0	10	40	200	800
2,2',3,3',4,4',6,6'-Octabromodiphenyl ether	197	2.0	10	40	200	800
2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	206	5.0	25	100	500	2000
2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	207	5.0	25	100	500	2000
Decabromodiphenyl ether	209	5.0	25	100	500	2000
MASS-LABELLED PBDE CONGENERS						
4-Bromo[¹³ C ₁₂]diphenyl ether	3L	100	100	100	100	100
4,4'-Dibromo[¹³ C ₁₂]diphenyl ether	15L	100	100	100	100	100
2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	28L	100	100	100	100	100
2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	47L	100	100	100	100	100
2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	99L	100	100	100	100	100
2,2',4,4',6-Pentabromo[¹³ C ₁₂]diphenyl ether	100L	100	100	100	100	100
3,3',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	126L	100	100	100	100	100
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	153L	200	200	200	200	200
2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	154L	200	200	200	200	200
2,2',3,4,4',5,6'-Heptabromo[¹³ C ₁₂]diphenyl ether	183L	200	200	200	200	200
2,2',3,3',4,4',6,6'-Octabromo[¹³ C ₁₂]diphenyl ether	197L	200	200	200	200	200
2,2',3,3',4,4',5,6,6'-Nonabromo[¹³ C ₁₂]diphenyl ether	207L	500	500	500	500	500
Decabromo[¹³ C ₁₂]diphenyl ether	209L	500	500	500	500	500
MASS-LABELLED PBDE INTERNAL STANDARD						
3,3',4,5'-Tetrabromo[¹³ C ₁₂]diphenyl ether	79L	100	100	100	100	100
2,2',3,4,4',5'-Hexabromo[¹³ C ₁₂]diphenyl ether	138L	200	200	200	200	200
2,2',3,3',4,4',5,5'-Nonabromo[¹³ C ₁₂]diphenyl ether	206L	500	500	500	500	500

Catalogue Number	Product (nonane/toluene solution)	Qty/Conc
MBDE-MXG	Mass-Labelled PBDE Solution/Mixture	1.2 ml
MBDE-ISS-G	Mass-Labelled PBDE Internal Standard Solution	1.2 ml
BDE-MXE	Native PBDE Solution/Mixture	1.2 ml

NATIVE PBDE CONGENERS	IUPAC	MBDE-MXG (ng/ml)	MBDE-ISS-G (ng/ml)	BDE-MXE (ng/ml)
4-Bromodiphenyl ether	3	—	—	1000
2,4-Dibromodiphenyl ether	7	—	—	1000
4,4'-Dibromodiphenyl ether	15	—	—	1000
2,2',4'-Tribromodiphenyl ether	17	—	—	1000
2,4,4'-Tribromodiphenyl ether	28	—	—	1000
2,2',4,4'-Tetrabromodiphenyl ether	47	—	—	1000
2,2',4,5'-Tetrabromodiphenyl ether	49	—	—	1000
2,3',4,4'-Tetrabromodiphenyl ether	66	—	—	1000
2,3',4',6-Tetrabromodiphenyl ether	71	—	—	1000
3,3',4,4'-Tetrabromodiphenyl ether	77	—	—	1000
2,2',3,4,4'-Pentabromodiphenyl ether	85	—	—	1000
2,2',4,4',5-Pentabromodiphenyl ether	99	—	—	1000
2,2',4,4',6-Pentabromodiphenyl ether	100	—	—	1000
2,3',4,4',6-Pentabromodiphenyl ether	119	—	—	1000
3,3',4,4',5-Pentabromodiphenyl ether	126	—	—	1000
2,2',3,4,4',5'-Hexabromodiphenyl ether	138	—	—	2000
2,2',4,4',5,5'-Hexabromodiphenyl ether	153	—	—	2000
2,2',4,4',5,6'-Hexabromodiphenyl ether	154	—	—	2000
2,3,3',4,4',5-Hexabromodiphenyl ether	156	—	—	2000
2,2',3,4,4',5',6-Heptabromodiphenyl ether	183	—	—	2000
2,2',3,4,4',6,6'-Heptabromodiphenyl ether	184	—	—	2000
2,3,3',4,4',5',6-Heptabromodiphenyl ether	191	—	—	2000
2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	196	—	—	2000
2,2',3,3',4,4',6,6'-Octabromodiphenyl ether	197	—	—	2000
2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	206	—	—	5000
2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	207	—	—	5000
Decabromodiphenyl ether	209	—	—	5000

MASS-LABELLED PBDE CONGENERS

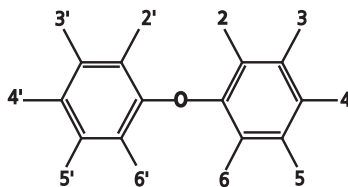
4-Bromo[¹³ C ₁₂]diphenyl ether	3L	100	—	—
4,4'-Dibromo[¹³ C ₁₂]diphenyl ether	15L	100	—	—
2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	28L	100	—	—
2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	47L	100	—	—
2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	99L	100	—	—
2,2',4,4',6-Pentabromo[¹³ C ₁₂]diphenyl ether	100L	100	—	—
3,3',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	126L	100	—	—
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	153L	200	—	—
2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	154L	200	—	—
2,2',3,4,4',5',6-Heptabromo[¹³ C ₁₂]diphenyl ether	183L	200	—	—
2,2',3,3',4,4',6,6'-Octabromo[¹³ C ₁₂]diphenyl ether	197L	200	—	—
2,2',3,3',4,4',5,6,6'-Nonabromo[¹³ C ₁₂]diphenyl ether	207L	500	—	—
Decabromo[¹³ C ₁₂]diphenyl ether	209L	500	—	—

MASS-LABELLED PBDE INTERNAL STANDARD

3,3',4,5'-Tetrabromo[¹³ C ₁₂]diphenyl ether	79L	—	100	—
2,2',3,4,4',5'-Hexabromo[¹³ C ₁₂]diphenyl ether	138L	—	200	—
2,2',3,3',4,4',5,5',6-Nonabromo[¹³ C ₁₂]diphenyl ether	206L	—	500	—

NATIVE BROMINATED DIPHENYL ETHERS (PBDEs)

Catalogue Number	Product (nonane solution)	Qty/Conc
BDE-1	2-Bromodiphenyl ether	1.2 ml 50 µg/ml
BDE-2	3-Bromodiphenyl ether	1.2 ml 50 µg/ml
BDE-3	4-Bromodiphenyl ether	1.2 ml 50 µg/ml
BDE-7	2,4-Dibromodiphenyl ether	1.2 ml 50 µg/ml
BDE-10	2,6-Dibromodiphenyl ether	1.2 ml 50 µg/ml
BDE-15	4,4'-Dibromodiphenyl ether	1.2 ml 50 µg/ml
BDE-17	2,2',4-Tribromodiphenyl ether	1.2 ml 50 µg/ml
BDE-21	2,3,4-Tribromodiphenyl ether	1.2 ml 50 µg/ml
BDE-28	2,4,4'-Tribromodiphenyl ether	1.2 ml 50 µg/ml
BDE-30	2,4,6-Tribromodiphenyl ether	1.2 ml 50 µg/ml
BDE-37	3,4,4'-Tribromodiphenyl ether	1.2 ml 50 µg/ml
BDE-47	2,2',4,4'-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-49	2,2',4,5'-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-54	2,2',6,6'-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-60	2,3,4,4'-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-66	2,3',4,4'-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-71	2,3',4',6-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-77	3,3',4,4'-Tetrabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-82	2,2',3,3',4-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-85	2,2',3,4,4'-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-99	2,2',4,4',5-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-100	2,2',4,4',6-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-104	2,2',4,6,6'-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-105	2,3,3',4,4'-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-119	2,3',4,4',6-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-126	3,3',4,4',5-Pentabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-128	2,2',3,3',4,4'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-138	2,2',3,4,4',5'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-139	2,2',3,4,4',6-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-140	2,2',3,4,4',6'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-149	2,2',3,4',5,6-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-153	2,2',4,4',5,5'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-154	2,2',4,4',5,6'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-155	2,2',4,4',6,6'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-156	2,3,3',4,4',5-Hexabromodiphenyl ether	1.2 ml 50 µg/ml

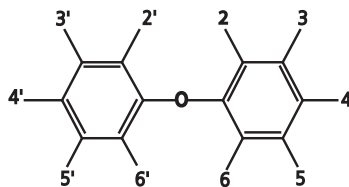


NATIVE BROMINATED DIPHENYL ETHERS (PBDEs)

Catalogue Number	Product (nonane solution)	Qty/Conc
BDE-169	3,3',4,4',5,5'-Hexabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-170	2,2',3,3',4,4',5-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-171	2,2',3,3',4,4',6-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-175	2,2',3,3',4,5',6-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-176	2,2',3,3',4,6,6'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-177	2,2',3,3',4',5,6-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-179	2,2',3,3',5,6,6'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-180	2,2',3,4,4',5,5'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-181	2,2',3,4,4',5,6-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-182	2,2',3,4,4',5,6'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-183	2,2',3,4,4',5',6-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-184	2,2',3,4,4',6,6'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-188	2,2',3,4',5,6,6'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-189	2,3,3',4,4',5,5'-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-191*	2,3,3',4,4',5',6-Heptabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-194*	2,2',3,3',4,4',5,5'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-195*	2,2',3,3',4,4',5,6-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-196*	2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-197*	2,2',3,3',4,4',6,6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-198*	2,2',3,3',4,5,5',6,-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-199*	2,2',3,3',4,5,5',6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-200*	2,2',3,3',4,5,6,6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-201*	2,2',3,3',4,5',6,6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-202*	2,2',3,3',5,5',6,6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-203*	2,2',3,4,4',5,5',6-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-204*	2,2',3,4,4',5,6,6'-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-205*	2,3,3',4,4',5,5',6-Octabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-206*	2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-207*	2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-208*	2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether	1.2 ml 50 µg/ml
BDE-209*	Decabromodiphenyl ether	1.2 ml 50 µg/ml
4PC-BDE-208*	2,2',3,3',4,5,5',6,6'-Nonabromo-4'-chlorodiphenyl ether	1.2 ml 50 µg/ml

4PC-BDE-208 may be useful as an internal or surrogate standard for HRGC/ECD, HRGC/FID, and/or HRGC/MS analyses.

* Toluene solution



PBDE WINDOW DEFINING SOLUTION/MIXTURE

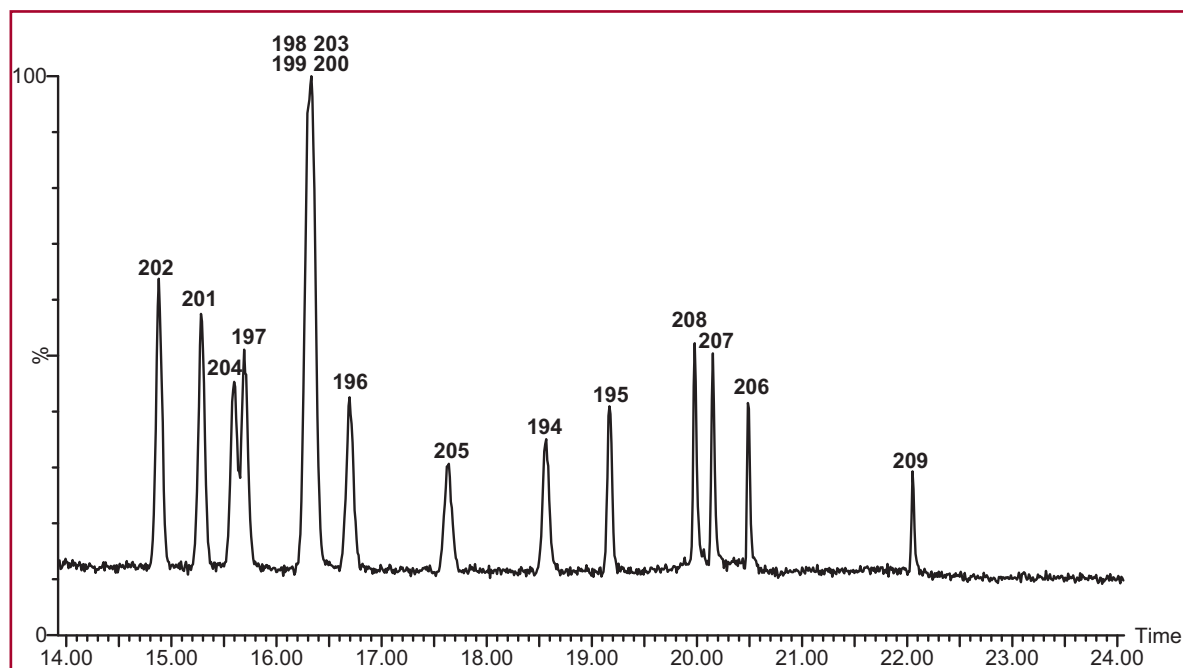
Catalogue Number	Product (nonane solution)	Qty/Conc	
BDE-WD	PBDE Window Defining Solution/Mixture for use with a J&W DB-5HT column	1.2 ml	
		FIRST ELUTER (IUPAC)	LAST ELUTER (IUPAC)
			CONCENTRATION (µg/ml each)
Bromodiphenyl ethers		1	3
Dibromodiphenyl ethers		10	15
Tribromodiphenyl ethers		30	37
Tetrabromodiphenyl ethers		54	60
Pentabromodiphenyl ethers		104	82
Hexabromodiphenyl ethers		155	128
Heptabromodiphenyl ethers		188	170
Octabromodiphenyl ethers		202	195
Nonabromodiphenyl ethers		208	206
Decabromodiphenyl ether			209
			5.0
			5.0

NATIVE BROMINATED DIPHENYL ETHERS: SOLUTION/MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc	
BDE-MXA	Native PBDE Solution/Mixture	1.2 ml	
		IUPAC	
2,2',4,4'-Tetrabromodiphenyl ether		47	5 µg/ml
2,2',4,4',5-Pentabromodiphenyl ether		99	5 µg/ml
2,2',4,4',5,5'-Hexabromodiphenyl ether		153	5 µg/ml
BDE-MXB	Native PBDE Solution/Mixture	1.2 ml	
		IUPAC	
2,4,4'-Tribromodiphenyl ether		28	5 µg/ml
2,2',4,4',5,6'-Hexabromodiphenyl ether		154	5 µg/ml
2,2',3,4,4',5',6-Heptabromodiphenyl ether		183	5 µg/ml
BDE-MXD	Native PBDE Solution/Mixture	1.2 ml	
		IUPAC	
2,2',4-Tribromodiphenyl ether		17	5 µg/ml
2,2',4,4'-Tetrabromodiphenyl ether		47	5 µg/ml
2,3',4,4'-Tetrabromodiphenyl ether		66	5 µg/ml
2,2',4,4',6-Pentabromodiphenyl ether		100	5 µg/ml
2,2',4,4',5,5'-Hexabromodiphenyl ether		153	5 µg/ml
2,2',3,4,4',5',6-Heptabromodiphenyl ether		183	5 µg/ml
Decabromodiphenyl ether		209	10 µg/ml

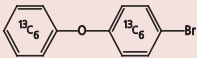
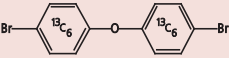
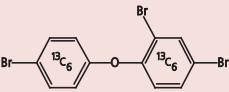
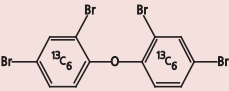
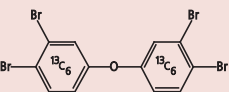
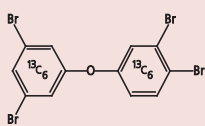
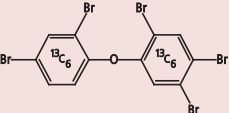
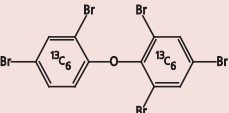
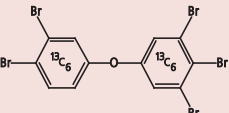
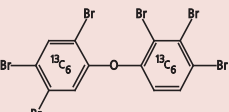
NATIVE BROMINATED DIPHENYL ETHERS: SOLUTION/MIXTURE

Catalogue Number	Product (nonane/toluene solution)	Qty/Conc
BDE-OND	Solution/Mixture of Octa-, Nona-, and Deca-BDEs	1.2 ml
	IUPAC	
2,2',3,3',4,4',5,5'-Octabromodiphenyl ether	194	1.0 µg/ml
2,2',3,3',4,4',5,6-Octabromodiphenyl ether	195	1.0 µg/ml
2,2',3,3',4,4',5,6'-Octabromodiphenyl ether	196	1.0 µg/ml
2,2',3,3',4,4',6,6'-Octabromodiphenyl ether	197	1.0 µg/ml
2,2',3,3',4,5,5',6-Octabromodiphenyl ether	198	1.0 µg/ml
2,2',3,3',4,5,5',6'-Octabromodiphenyl ether	199	1.0 µg/ml
2,2',3,3',4,5,6,6'-Octabromodiphenyl ether	200	1.0 µg/ml
2,2',3,3',4,5',6,6'-Octabromodiphenyl ether	201	1.0 µg/ml
2,2',3,3',5,5',6,6'-Octabromodiphenyl ether	202	1.0 µg/ml
2,2',3,4,4',5,5',6-Octabromodiphenyl ether	203	1.0 µg/ml
2,2',3,4,4',5,6,6'-Octabromodiphenyl ether	204	1.0 µg/ml
2,3,3',4,4',5,5',6-Octabromodiphenyl ether	205	1.0 µg/ml
2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether	206	2.5 µg/ml
2,2',3,3',4,4',5,6,6'-Nonabromodiphenyl ether	207	2.5 µg/ml
2,2',3,3',4,5,5',6,6'-Nonabromodiphenyl ether	208	2.5 µg/ml
Decabromodiphenyl ether	209	2.5 µg/ml



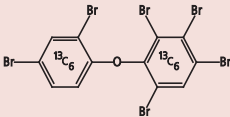
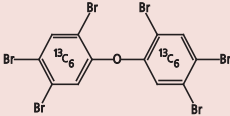
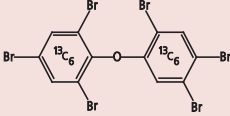
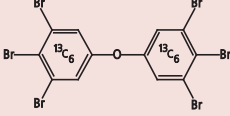
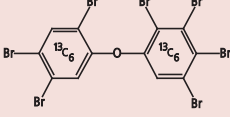
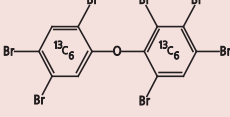
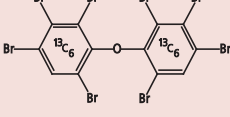
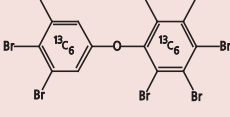
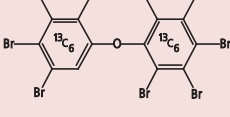
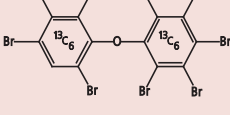
HRGC/HRMS Data for BDE-OND on a 15m DB-5HT column.

MASS-LABELLED BROMINATED DIPHENYL ETHERS

Catalogue Number	Product
MBDE-3	 <p>4-Bromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-15	 <p>4,4'-Dibromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-28	 <p>2,4,4'-Tribromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-47	 <p>2,2',4,4'-Tetrabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-77	 <p>3,3',4,4'-Tetrabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-79	 <p>3,3',4,5'-Tetrabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-99	 <p>2,2',4,4',5-Pentabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-100	 <p>2,2',4,4',6-Pentabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-126	 <p>3,3',4,4',5-Pentabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-138	 <p>2,2',3,4,4',5'-Hexabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

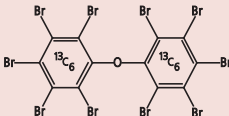
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED BROMINATED DIPHENYL ETHERS

Catalogue Number	Product
MBDE-139	 <p>2,2',3,4,4',6-Hexabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-153	 <p>2,2',4,4',5,5'-Hexabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-154	 <p>2,2',4,4',5,6'-Hexabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-169	 <p>3,3',4,4',5,5'-Hexabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-180	 <p>2,2',3,4,4',5,5'-Heptabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-183	 <p>2,2',3,4,4',5,6-Heptabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MBDE-197	 <p>2,2',3,3',4,4',6,6'-Octabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MBDE-205	 <p>2,3,3',4,4',5,5',6-Octabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MBDE-206	 <p>2,2',3,3',4,4',5,5',6-Nonabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
MBDE-207	 <p>2,2',3,3',4,4',5,6,6'-Nonabromo[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED BROMINATED DIPHENYL ETHERS

Catalogue Number	Product
MBDE-209	 <p>Decabromo[¹³C₁₂]diphenyl ether 1.2 ml; 25 µg/ml (±1.2 µg/ml); in toluene</p>

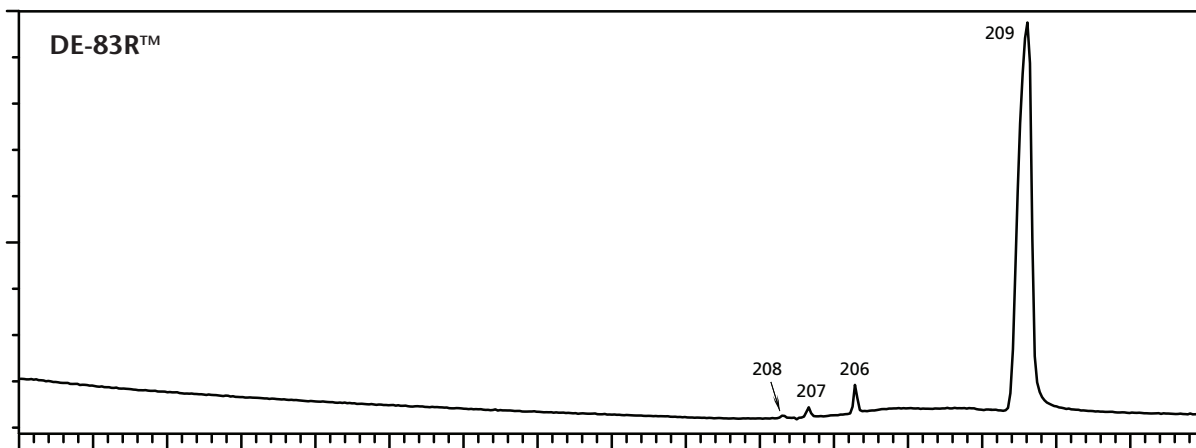
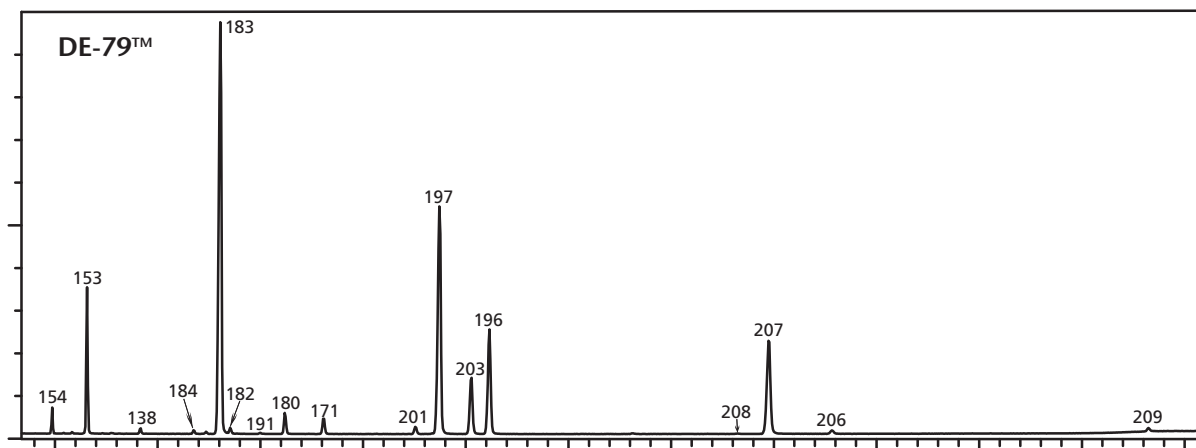
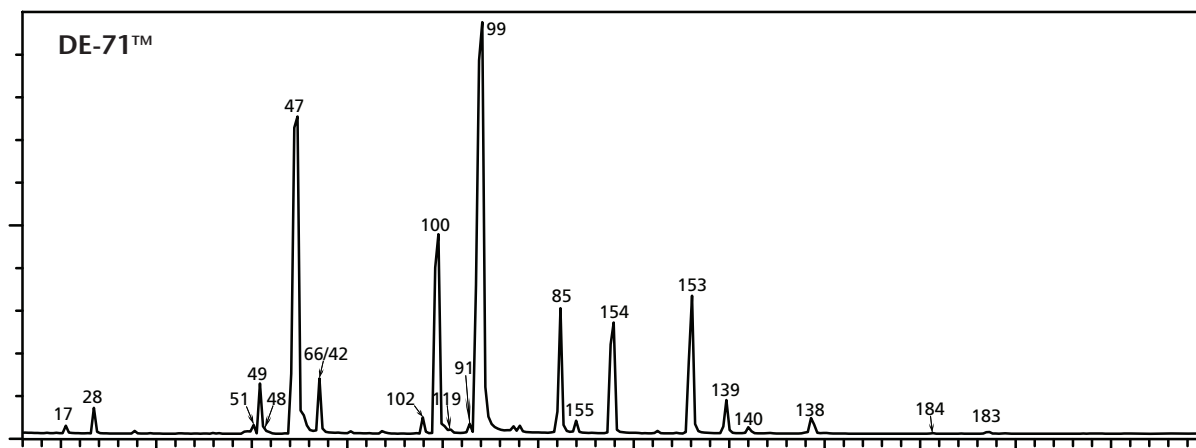
* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED BROMINATED DIPHENYL ETHERS: SOLUTION/MIXTURES

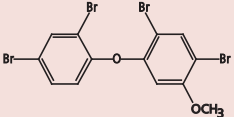
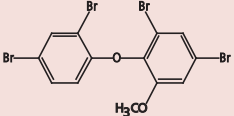
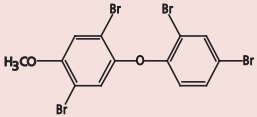
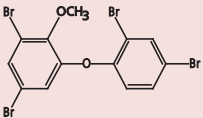
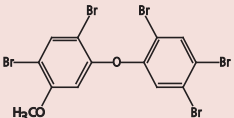
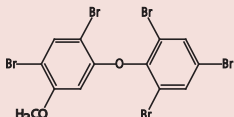
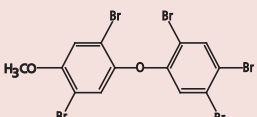
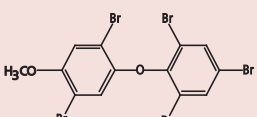
Catalogue Number	Product (nonane solution)	Qty/Conc
MBDE-MXA	Mass-Labelled PBDE Solution/Mixture	1.2 ml
	IUPAC	
	2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
MBDE-MXB	Mass-Labelled PBDE Solution/Mixture	1.2 ml
	IUPAC	
	2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',3,4,4',5',6-Heptabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
MBDE-MXC	Mass-Labelled PBDE Solution/Mixture	1.2 ml
	IUPAC	
	4-Bromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	4,4'-Dibromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,4,4'-Tribromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4'-Tetrabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4',5-Pentabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',4,4',5,6'-Hexabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml
	2,2',3,4,4',5',6-Heptabromo[¹³ C ₁₂]diphenyl ether	5 µg/ml

BROMINATED DIPHENYL ETHER TECHNICAL MIXTURES

Catalogue Number	Product (toluene solution)	Qty/Conc
TBDE-71	Great Lakes Chemical DE-71™ Pentabromodiphenyl Oxide	1.2 ml 100 µg/ml
TBDE-79	Great Lakes Chemical DE-79™ Octabromodiphenyl Oxide	1.2 ml 100 µg/ml
TBDE-83R	Great Lakes Chemical DE-83R™ Decabromodiphenyl Oxide	1.2 ml 100 µg/ml



NATIVE METHOXY-BROMODIPHENYL ETHERS (MeO-BDEs)

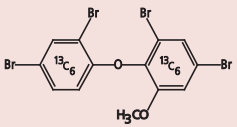
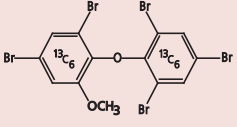
Catalogue Number	Product
5MBDE47	 <p>2,2',4,4'-Tetrabromo-5-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
6MBDE47	 <p>2,2',4,4'-Tetrabromo-6-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
4PMBDE49	 <p>2,2',4',5-Tetrabromo-4-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
2PMBDE68	 <p>2',3,4',5-Tetrabromo-2-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
5PMBDE99	 <p>2,2',4,4',5-Pentabromo-5'-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
5PMBDE100	 <p>2,2',4,4',6'-Pentabromo-5-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
4PMBDE101	 <p>2,2',4,5,5'-Pentabromo-4'-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
4PMBDE103	 <p>2,2',4',5,6'-Pentabromo-4-methoxydiphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

NOTE: In order to emphasize their relationship to the corresponding PBDE, these compounds have been numbered based on the diphenyl ether as the parent molecule with bromines retaining their BDE numbers. The methoxy groups are treated as additional substituents and listed alphabetically.

METHOXY-BROMODIPHENYL ETHERS: SOLUTION/MIXTURE

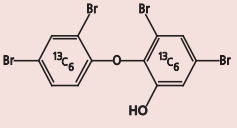
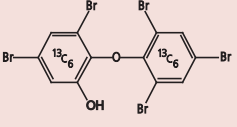
Catalogue Number	Product (nonane solution)	Qty/Conc
MeOBDES	Methoxy-Bromodiphenyl Ethers Solution/Mixture	1.2 ml
	2,2',4,4'-Tetrabromo-5-methoxydiphenyl ether	5 µg/ml
	2,2',4,4'-Tetrabromo-6-methoxydiphenyl ether	5 µg/ml
	2,2',4',5-Tetrabromo-4-methoxydiphenyl ether	5 µg/ml
	2',3,4',5-Tetrabromo-2-methoxydiphenyl ether	5 µg/ml
	2,2',4,4',5-Pentabromo-5'-methoxydiphenyl ether	5 µg/ml
	2,2',4,4',6'-Pentabromo-5-methoxydiphenyl ether	5 µg/ml
	2,2',4,5,5'-Pentabromo-4'-methoxydiphenyl ether	5 µg/ml
	2,2',4',5,6'-Pentabromo-4-methoxydiphenyl ether	5 µg/ml

MASS-LABELLED METHOXY-BROMODIPHENYL ETHERS

Catalogue Number	Product
M6MBDE47	 <p>2,2',4,4'-Tetrabromo-6-methoxy[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
M6PMBDE100	 <p>2,2',4,4',6-Pentabromo-6'-methoxy[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED HYDROXY-BROMODIPHENYL ETHERS

Catalogue Number	Product
M6HBDE47	 <p>2,2',4,4'-Tetrabromo-6-hydroxy[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
M6PHBDE100	 <p>2,2',4,4',6-Pentabromo-6'-hydroxy[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

NOTE: In order to emphasize their relationship to the corresponding PBDE, these compounds have been numbered based on the diphenyl ether as the parent molecule with bromines retaining their BDE numbers. The methoxy and hydroxy groups are treated as additional substituents and listed alphabetically.

NATIVE BROMINATED BIPHENYLS (PBBs)

Catalogue Number	Product (nonane solution)	Qty/Conc
BB-1	2-Bromobiphenyl	1.2 ml 50 µg/ml
BB-2	3-Bromobiphenyl	1.2 ml 50 µg/ml
BB-3	4-Bromobiphenyl	1.2 ml 50 µg/ml
BB-4	2,2'-Dibromobiphenyl	1.2 ml 50 µg/ml
BB-7	2,4-Dibromobiphenyl	1.2 ml 50 µg/ml
BB-9	2,5-Dibromobiphenyl	1.2 ml 50 µg/ml
BB-10	2,6-Dibromobiphenyl	1.2 ml 50 µg/ml
BB-15	4,4'-Dibromobiphenyl	1.2 ml 50 µg/ml
BB-18	2,2',5-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-22	2,3,4'-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-26	2,3',5-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-29	2,4,5-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-30	2,4,6-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-31	2,4',5-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-37	3,4,4'-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-38	3,4,5-Tribromobiphenyl	1.2 ml 50 µg/ml
BB-49	2,2',4,5'-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-52	2,2',5,5'-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-53	2,2',5,6'-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-56	2,3,3',4'-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-75	2,4,4',6-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-77	3,3',4,4'-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-80	3,3',5,5'-Tetrabromobiphenyl	1.2 ml 50 µg/ml
BB-101	2,2',4,5,5'-Pentabromobiphenyl	1.2 ml 50 µg/ml
BB-103	2,2',4,5',6-Pentabromobiphenyl	1.2 ml 50 µg/ml
BB-153	2,2',4,4',5,5'-Hexabromobiphenyl	1.2 ml 50 µg/ml
BB-154	2,2',4,4',5,6'-Hexabromobiphenyl	1.2 ml 50 µg/ml
BB-155	2,2',4,4',6,6'-Hexabromobiphenyl	1.2 ml 50 µg/ml
BB-156	2,3,3',4,4',5-Hexabromobiphenyl	1.2 ml 50 µg/ml
BB-169	3,3',4,4',5,5'-Hexabromobiphenyl	1.2 ml 50 µg/ml
BB-180	2,2',3,4,4',5,5'-Heptabromobiphenyl	1.2 ml 50 µg/ml
BB-194	2,2',3,3',4,4',5,5'-Octabromobiphenyl	1.2 ml 50 µg/ml
BB-205	2,3,3',4,4',5,5',6-Octabromobiphenyl	1.2 ml 50 µg/ml
BB-206*	2,2',3,3',4,4',5,5',6-Nonabromobiphenyl	1.2 ml 50 µg/ml
BB-209*	Decabromobiphenyl	1.2 ml 50 µg/ml

* 50% Nonane/50% Toluene Solution

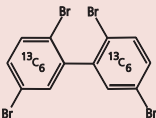
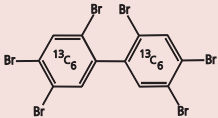
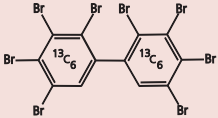
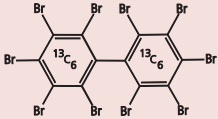
NATIVE BROMINATED BIPHENYLS: SOLUTION/MIXTURE

Catalogue Number	Product (nonane solution)	Qty/Conc
PBB-MXA	Native PBB Solution/Mixture	1.2 ml
	IUPAC	
4-Bromobiphenyl	3	1 µg/ml
4,4'-Dibromobiphenyl	15	1 µg/ml
2,2',5-Tribromobiphenyl	18	1 µg/ml
2,2',5,5'-Tetrabromobiphenyl	52	1 µg/ml
2,2',4,5,5'-Pentabromobiphenyl	101	2 µg/ml
2,2',4,4',5,5'-Hexabromobiphenyl	153	2 µg/ml
2,2',3,4,4',5,5'-Heptabromobiphenyl	180	2 µg/ml
2,2',3,3',4,4',5,5'-Octabromobiphenyl	194	2 µg/ml
2,2',3,3',4,4',5,5',6-Nonabromobiphenyl	206	5 µg/ml
Decabromobiphenyl	209	5 µg/ml

POLYBROMINATED BIPHENYL TECHNICAL MIXTURES

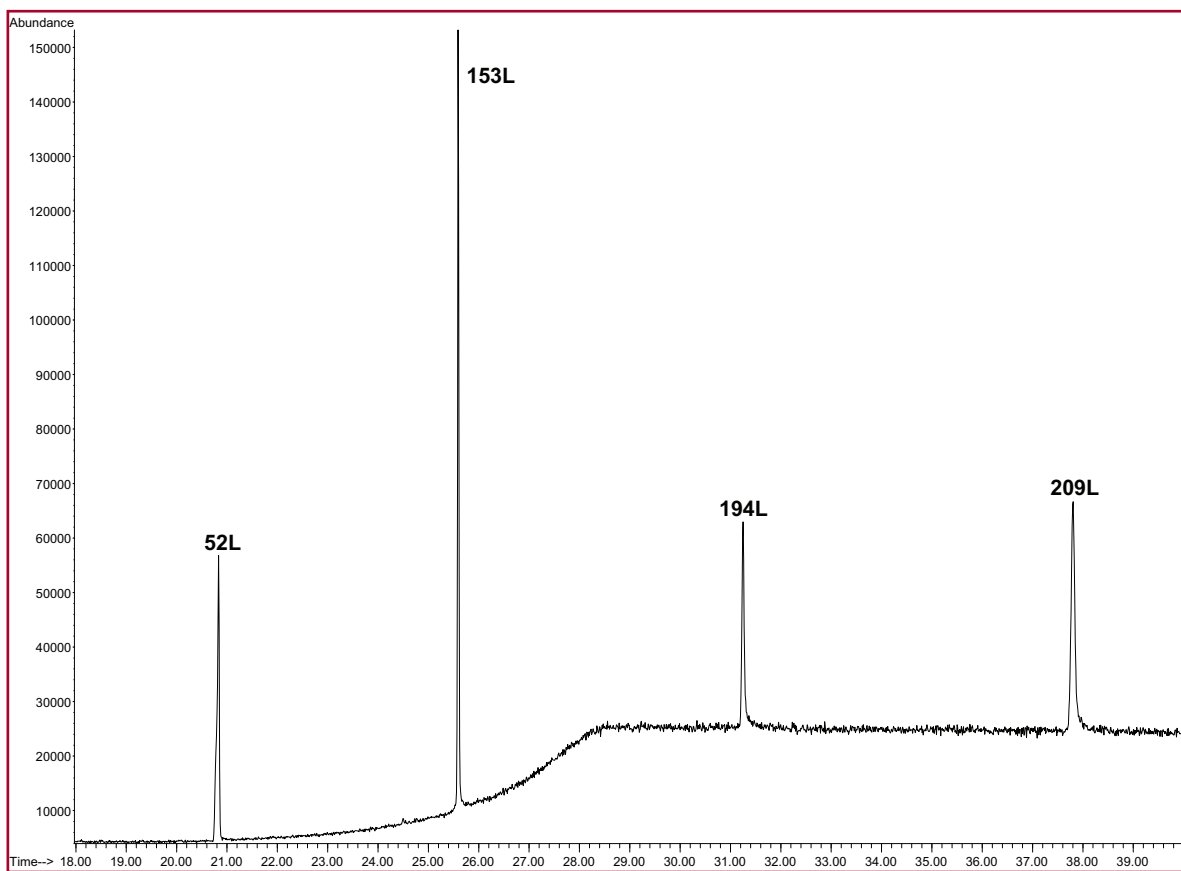
Catalogue Number	Product (nonane solution)	Qty/Conc
TBB-BP6	Great Lakes Chemical Firemaster BP-6™ Hexabromobiphenyl	1.2 ml 100 µg/ml
TBB-809D	Chemische Fabrik Kalk Bromkal80-9D™ Nonabromobiphenyl	1.2 ml 100 µg/ml

MASS-LABELLED BROMINATED BIPHENYLS

Catalogue Number	Product
MBB-52	 <p>2,2',5,5'-Tetrabromo[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic purity; 99% or greater</p>
MBB-153	 <p>2,2',4,4',5,5'-Hexabromo[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic purity; 99% or greater</p>
MBB-194	 <p>2,2',3,3',4,4',5,5'-Octabromo[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic purity; 99% or greater</p>
MBB-209	 <p>Decabromo[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic purity; 99% or greater</p>

MASS-LABELLED BROMINATED BIPHENYLS: SOLUTION/MIXTURE

Catalogue Number	Product (nonane solution)	Qty/Conc
MBB-MXA	Mass-Labelled PBB Solution/Mixture	1.2 ml
	IUPAC	
2,2',5,5'-Tetrabromo[¹³ C ₁₂]biphenyl	52L	1 µg/ml
2,2',4,4',5,5'-Hexabromo[¹³ C ₁₂]biphenyl	153L	2 µg/ml
2,2',3,3',4,4',5,5'-Octabromo[¹³ C ₁₂]biphenyl	194L	2 µg/ml
Decabromo[¹³ C ₁₂]biphenyl	209L	5 µg/ml



HRGC/LRMS Data for MBB-MXA on a 30m DB-5 column.



Ingrid O'Gorman
South River, Ontario, Canada

HALOGENATED FLAME RETARDANTS & RELATED COMPOUNDS

This section is devoted to halogenated flame retardants (HFRs) and related compounds. Since 2012, we have added a number of flame retardants, most notably:

Native and mass-labelled Hexabromocyclododecane (HBCD) mixtures

Native Experimental Flame Retardants (EFRs)

Native and mass-labelled Organophosphorus Compounds

2-Ethylhexyl-d₁₇-2,3,4,5-tetrabromo[¹³C₆]benzoate (MEHTBB)

Bis(2-Ethylhexyl-d₁₇)-tetrabromo[¹³C₆]phthalate (MBEHTBP)

This section also contains compounds related to HFRs that are created through metabolism, combustion or other processes, namely:

Native and mass-labelled PBDDs

Native PBDFs

Mixed Br/Cl Dioxins and Furans

Native and mass-labelled Bromophenols

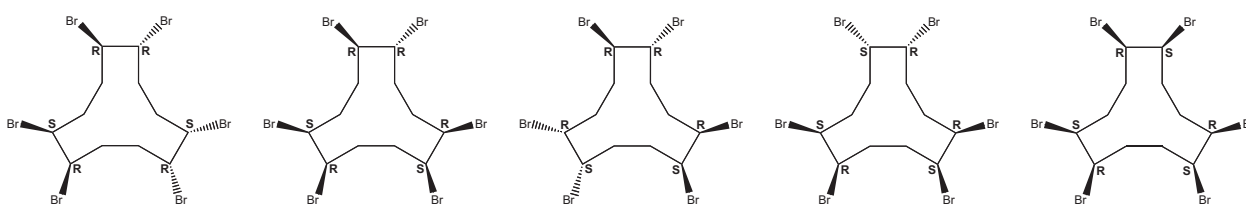


NATIVE HEXABROMOCYCLODODECANE ISOMERS (HBCDs)

Catalogue Number	Product (toluene solution)	Qty/Conc
aHBCD	α -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
bHBCD	β -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
gHBCD	γ -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
dHBCD	δ -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
eHBCD	ε -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
zHBCD	ζ -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
etaHBCD	η -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
tHBCD	θ -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
iHBCD	ι -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml
kHBCD	κ -1,2,5,6,9,10-Hexabromocyclododecane	1.2 ml 50 μ g/ml

NATIVE HBCD ISOMERS: SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
HBCD-MXA	Native Hexabromocyclododecane Isomer Solution/Mixture	1.2 ml
	α -1,2,5,6,9,10-Hexabromocyclododecane	10 μ g/ml
	β -1,2,5,6,9,10-Hexabromocyclododecane	10 μ g/ml
	γ -1,2,5,6,9,10-Hexabromocyclododecane	10 μ g/ml



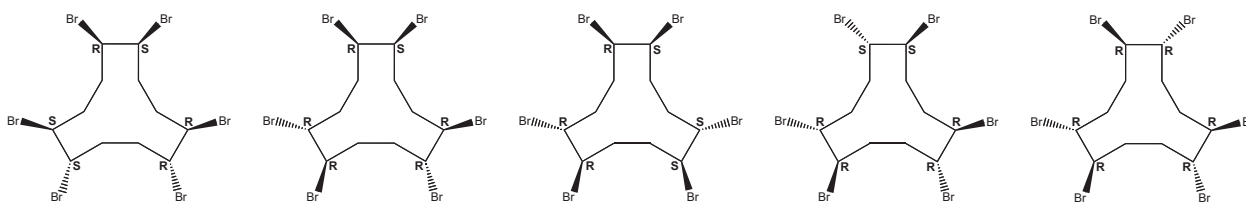
alpha

beta

gamma

delta

epsilon



zeta

eta

theta

iota

kappa

¹³C-LABELLED HEXABROMOCYCLODODECANE ISOMERS

Catalogue Number	Product (toluene solution)	Qty/Conc
MaHBCD	α -1,2,5,6,9,10-Hexabromo[¹³ C ₁₂]cyclododecane	1.2 ml 50 µg/ml
MbHBCD	β -1,2,5,6,9,10-Hexabromo[¹³ C ₁₂]cyclododecane	1.2 ml 50 µg/ml
MgHBCD	γ -1,2,5,6,9,10-Hexabromo[¹³ C ₁₂]cyclododecane	1.2 ml 50 µg/ml

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

DEUTERATED HEXABROMOCYCLODODECANE ISOMERS

Catalogue Number	Product (toluene solution)	Qty/Conc
DaHBCD	α -1,2,5,6,9,10-Hexabromocyclododecane-d ₁₈	1.2 ml 50 µg/ml
DbHBCD	β -1,2,5,6,9,10-Hexabromocyclododecane-d ₁₈	1.2 ml 50 µg/ml
DgHBCD	γ -1,2,5,6,9,10-Hexabromocyclododecane-d ₁₈	1.2 ml 50 µg/ml

* Unless stated otherwise, isotopic purities of these compounds are 98%.

¹³C-LABELLED HBCD ISOMERS: SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
MHBCD-MXA	Mass-Labelled Hexabromocyclododecane Isomer Solution/Mixture	1.2 ml
	α -1,2,5,6,9,10-Hexabromocyclo[¹³ C ₁₂]dodecane	10 µg/ml
	β -1,2,5,6,9,10-Hexabromocyclo[¹³ C ₁₂]dodecane	10 µg/ml
	γ -1,2,5,6,9,10-Hexabromocyclo[¹³ C ₁₂]dodecane	10 µg/ml

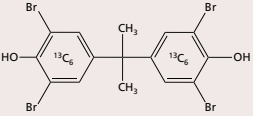
PENTABROMOCYCLODODECENE (PBCD)

Catalogue Number	Product (toluene solution)	Qty/Conc
PBCD	<i>rac</i> -(1,5 <i>R</i> ,6,5,9 <i>S</i> ,10 <i>R</i>)-pentabromocyclododecene	1.2 ml 50 µg/ml

TETRABROMOBISPHENOL-A (TBBPA)

Catalogue Number	Product (methanol solution)	Qty/Conc
TBBPA	3,3',5,5'-Tetrabromobisphenol-A	1.2 ml 50 µg/ml

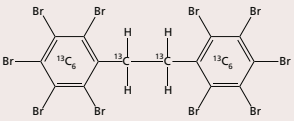
MASS-LABELLED TETRABROMOBISPHENOL-A

Catalogue Number	Product
MTBBPA	 <p>3,3',5,5'-Tetrabromobisphenol-A [rings; ¹³C₁₂] 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; Isotopic purity; 99% or greater</p>

DECABROMODIPHENYLETHANE (DBDPE)

Catalogue Number	Product (toluene solution)	Qty/Conc
DBDPE	1,2-Bis(pentabromophenyl)ethane	1.2 ml 25 µg/ml

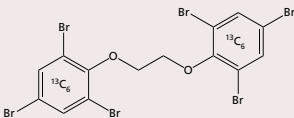
MASS-LABELLED DECABROMODIPHENYLETHANE

Catalogue Number	Product
MDBDPE	 <p>1,2-Bis(pentabromophenyl)ethane [¹³C₁₄] 1.2 ml; 25 µg/ml (±1.2 µg/ml); in toluene; Isotopic purity; 99% or greater</p>

1,2-BIS(2,4,6-TRIBROMOPHENOXY)ETHANE (BTBPE)

Catalogue Number	Product (nonane solution)	Qty/Conc
BTBPE	1,2-Bis(2,4,6-tribromophenoxy)ethane	1.2 ml 50 µg/ml

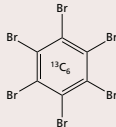
MASS-LABELLED 1,2-BIS(2,4,6-TRIBROMOPHENOXY)ETHANE

Catalogue Number	Product
MBTBPE	 <p>1,2-Bis(2,4,6-tribromo[¹³C₆]phenoxy)ethane 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic purity; 99% or greater</p>

HEXABROMOBENZENE (HBBZ)

Catalogue Number	Product (toluene solution)	Qty/Conc
HBBZ	Hexabromobenzene	1.2 ml 50 µg/ml

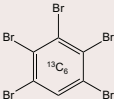
MASS-LABELLED HEXABROMOBENZENE

Catalogue Number	Product
MHBBZ	 <p>Hexabromo[¹³C₆]benzene 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>

PENTABROMOBENZENE (PBBZ)

Catalogue Number	Product (toluene solution)	Qty/Conc
PBBZ	Pentabromobenzene	1.2 ml 50 µg/ml

MASS-LABELLED PENTABROMOBENZENE

Catalogue Number	Product
MPBBZ	 <p>Pentabromo[¹³C₆]benzene 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>

PENTABROMOETHYLBENZENE (PBEB)

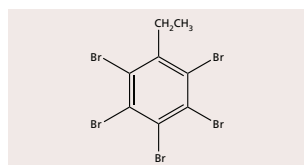
Catalogue Number	Product (toluene solution)	Qty/Conc
PBEB	Pentabromoethylbenzene	1.2 ml 50 µg/ml

PENTABROMOTOLUENE (PBT)

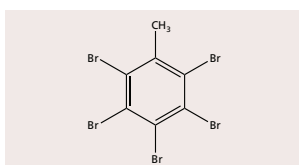
Catalogue Number	Product (toluene solution)	Qty/Conc
PBT	Pentabromotoluene	1.2 ml 50 µg/ml

TETRABROMO-P-XYLENE (pTBX)

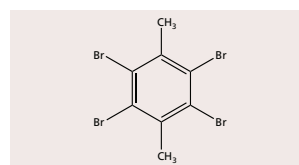
Catalogue Number	Product (toluene solution)	Qty/Conc
pTBX	2,3,5,6-Tetrabromo-p-xylene	1.2 ml 50 µg/ml



Pentabromoethylbenzene



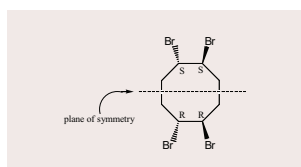
Pentabromotoluene



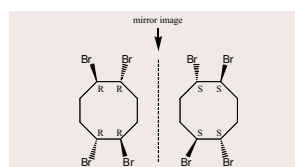
2,3,5,6-Tetrabromo-p-xylene

1,2,5,6-TETRABROMOCYCLOOCTANE (TBCO)

Catalogue Number	Product (toluene solution)	Qty/Conc
aTBCO	(1R,2R,5S,6S)-1,2,5,6-tetrabromocyclooctane	1.2 ml 50 µg/ml
bTBCO	rac-(1R,2R,5R,6R)-1,2,5,6-tetrabromocyclooctane	1.2 ml 50 µg/ml



aTBCO



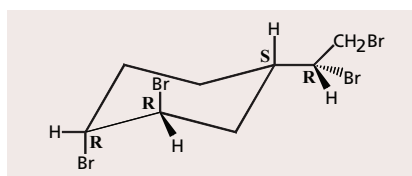
bTBCO

TETRABROMOETHYLCYCLOHEXANE (TBECH)

Catalogue Number	Product (toluene solution)	Qty/Conc
bTBECH	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i>)-1,2-dibromo-(4 <i>S</i>)-4-((1 <i>S</i>)-1,2-dibromoethyl)cyclohexane	1.2 ml 50 µg/ml
gTBECH	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i>)-1,2-dibromo-(4 <i>R</i>)-4-((1 <i>R</i>)-1,2-dibromoethyl)cyclohexane	1.2 ml 50 µg/ml

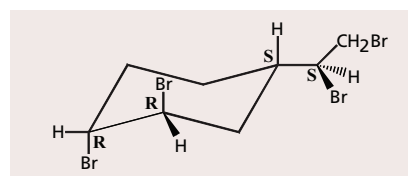
TETRABROMOETHYLCYCLOHEXANE ISOMERIC SOLUTION/MIXTURES

Catalogue Number	Product (toluene solution)	Qty/Conc
abTBECH	TBECH Isomeric Solution/Mixture	1.2 ml
aTBECH	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i>)-1,2-dibromo-(4 <i>S</i>)-4-((1 <i>R</i>)-1,2-dibromoethyl)cyclohexane	50 µg/ml
bTBECH	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i>)-1,2-dibromo-(4 <i>S</i>)-4-((1 <i>S</i>)-1,2-dibromoethyl)cyclohexane	50 µg/ml
gdTBECH	TBECH Isomeric Solution/Mixture	1.2 ml
gTBECH	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i>)-1,2-dibromo-(4 <i>R</i>)-4-((1 <i>R</i>)-1,2-dibromoethyl)cyclohexane	50 µg/ml
dTBECH	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i>)-1,2-dibromo-(4 <i>R</i>)-4-((1 <i>S</i>)-1,2-dibromoethyl)cyclohexane	50 µg/ml



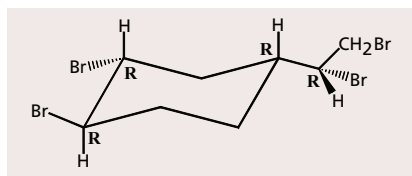
aTBECH

rac-(1*R*,2*R*)-1,2-dibromo-(4*S*)-4-((1*R*)-1,2-dibromoethyl)cyclohexane



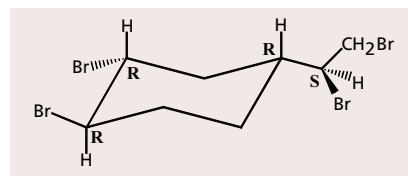
bTBECH

rac-(1*R*,2*R*)-1,2-dibromo-(4*S*)-4-((1*S*)-1,2-dibromoethyl)cyclohexane



gTBECH

rac-(1*R*,2*R*)-1,2-dibromo-(4*R*)-4-((1*R*)-1,2-dibromoethyl)cyclohexane

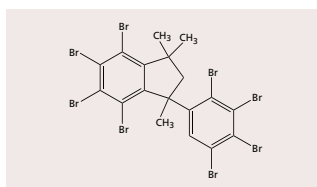


dTBECH

rac-(1*R*,2*R*)-1,2-dibromo-(4*R*)-4-((1*S*)-1,2-dibromoethyl)cyclohexane

OCTABROMOTRIMETHYLPHENYLINDANE

Catalogue Number	Product (toluene solution)	Qty/Conc
OBIND	4,5,6,7-Tetrabromo-1,1,3-trimethyl-3-(2,3,4,5-tetrabromophenyl)-indane	1.2 ml 50 µg/ml

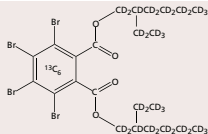


OBIND

BIS(2-ETHYLHEXYL)TETRABROMOPHTHALATE (BEHTBP)

Catalogue Number	Product (toluene solution)	Qty/Conc
BEHTBP	Bis(2-ethyl-1-hexyl)tetrabromophthalate	1.2 ml 50 µg/ml

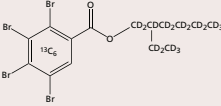
BIS(2-ETHYLHEXYL-d₁₇)TETRABROMO[¹³C₆]PHTHALATE (MBEHTBP)

Catalogue Number	Product
MBEHTBP	 <p>Bis(2-ethylhexyl-d₁₇)tetrabromo[¹³C₆]phthalate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater (¹³C₆); 98% or greater (²H₃₄)</p>

2-ETHYLHEXYL-2,3,4,5-TETRABROMOBENZOATE (EHTBB)

Catalogue Number	Product (toluene solution)	Qty/Conc
EHTBB	2-Ethylhexyl-2,3,4,5-tetrabromobenzoate	1.2 ml 50 µg/ml

2-ETHYLHEXYL-d₁₇-2,3,4,5-TETRABROMO[¹³C₆]BENZOATE (MEHTBB)

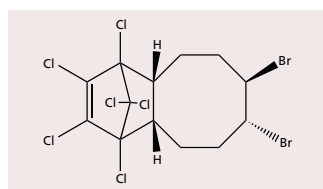
Catalogue Number	Product
MEHTBB	 <p>2-Ethylhexyl-d₁₇-2,3,4,5-tetrabromo[¹³C₆]benzoate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater (¹³C₆); 98% or greater (²H₁₇)</p>

HEXACHLOROCYCLOPENTENYL-DIBROMOCYCLOOCTANE (HCDBCO)

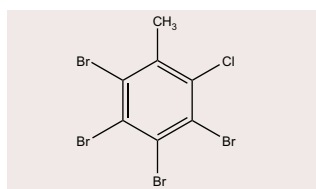
Catalogue Number	Product (toluene solution)	Qty/Conc
HCDBCO	<i>rac</i> -(1 <i>R</i> ,2 <i>R</i> ,5 <i>R</i> ,6 <i>R</i> ,9 <i>S</i> ,10 <i>S</i>)-5,6-dibromo-1,10,11,12,13,13-hexachlorotricyclo[8.2.1.0 ^{2,9}]tridec-11-ene	1.2 ml 50 µg/ml

TETRABROMO-O-CHLOROTOLUENE (TBCT)

Catalogue Number	Product (toluene solution)	Qty/Conc
TBCT	Tetrabromo- <i>o</i> -chlorotoluene	1.2 ml 50 µg/ml



HCDBCO



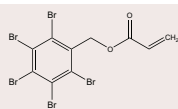
TBCT

PENTABROMOBENZYL ACRYLATE

Catalogue Number

Product

PBBA



Pentabromobenzyl acrylate

1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene

2,4,6-TRIBROMOPHENYL ETHERS

Catalogue Number

Product (toluene solution)

Qty/Conc

ATE

Allyl 2,4,6-tribromophenyl ether

1.2 ml 50 µg/ml

DPTE

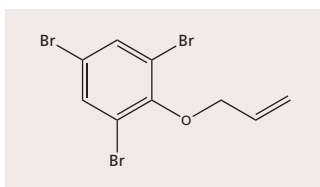
2,3-Dibromopropyl 2,4,6-tribromophenyl ether

1.2 ml 50 µg/ml

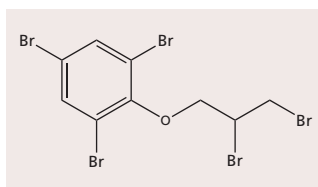
BATE

2-Bromoallyl 2,4,6-tribromophenyl ether

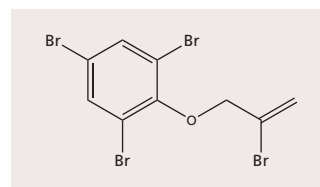
1.2 ml 50 µg/ml



ATE



DPTE



BATE

DECHLORANE PLUS®

Catalogue Number

Product (toluene solution)

Qty/Conc

s-DP

syn-Dechlorane Plus®

1.2 ml 50 µg/ml

a-DP

anti-Dechlorane Plus®

1.2 ml 50 µg/ml

DECHLORINATED DECHLORANE PLUS®

Catalogue Number

Product (toluene solution)

Qty/Conc

aCl10DP

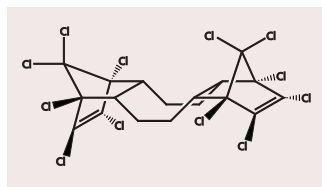
Cl10 Dechlorane Plus®

1.2 ml 50 µg/ml

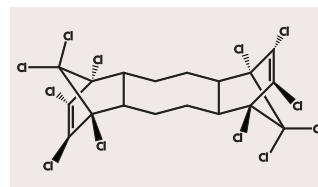
aCl11DP

Cl11 Dechlorane Plus®

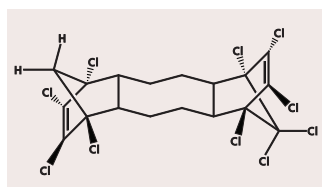
1.2 ml 50 µg/ml



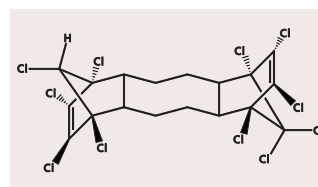
syn-Dechlorane Plus®



anti-Dechlorane Plus®



anti-Cl10 Dechlorane Plus®



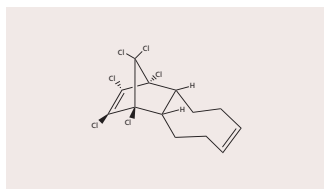
anti-Cl11 Dechlorane Plus®

DECHLORANE PLUS® MONO ADDUCTS

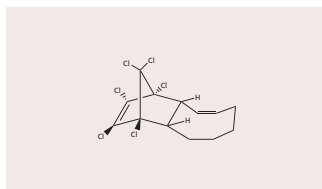
Catalogue Number	Product (toluene solution)	Qty/Conc
DPMA	Dechlorane Plus® Mono adduct	1.2 ml 50 µg/ml
1,3-DPMA	1,3-Dechlorane Plus® Mono adduct	1.2 ml 50 µg/ml

EXPERIMENTAL FLAME RETARDANTS (EFRs)

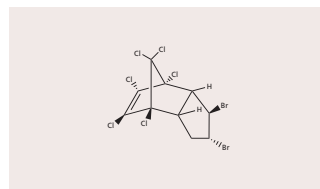
Catalogue Number	Product (toluene solution)	Qty/Conc
DBCD	Dibromochlordene	1.2 ml 50 µg/ml
Dec-601	Dechlorane 601	1.2 ml 50 µg/ml
Dec-602	Dechlorane 602	1.2 ml 50 µg/ml
Dec-603	Dechlorane 603	1.2 ml 50 µg/ml
Dec-604	Dechlorane 604	1.2 ml 50 µg/ml
Dec-604CB	Dechlorane 604 Component B	1.2 ml 50 µg/ml
CPlus	Chlordene Plus	1.2 ml 50 µg/ml
DBALD	Dibromoaldrin	1.2 ml 50 µg/ml
HCPN	Hexachloro(phenyl)norbornene	1.2 ml 50 µg/ml



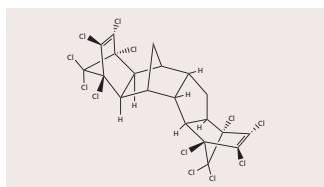
DPMA



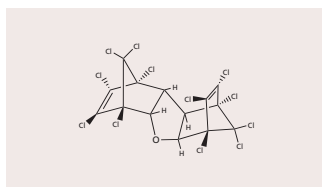
1,3-DPMA



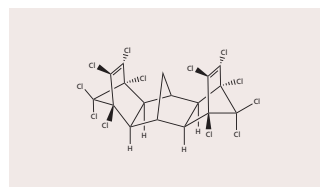
DBCD



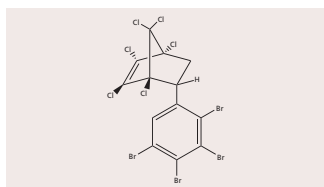
Dec-601



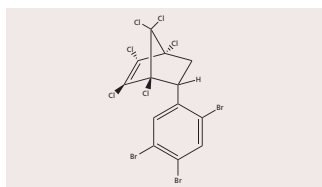
Dec-602



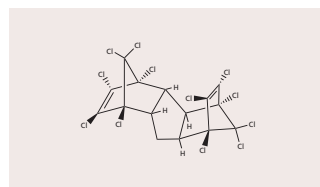
Dec-603



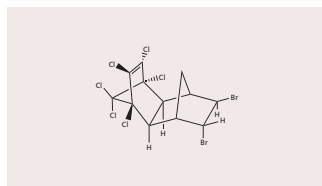
Dec-604



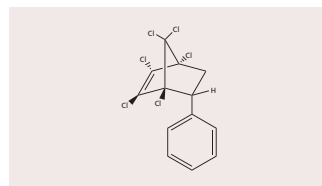
Dec-604CB



CPlus

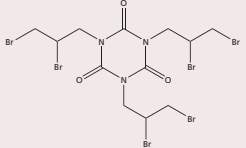


DBALD



HCPN

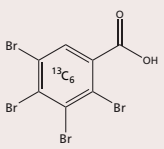
TRIS(2,3-DIBROMOPROPYL)ISOCYANURATE

Catalogue Number	Product
T23BPIC	 <p>Tris(2,3-dibromopropyl)isocyanurate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

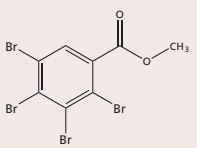
2,3,4,5-TETRABROMOBENZOIC ACID (TBBA)

Catalogue Number	Product (methanol solution)	Qty/Conc
TBBA	2,3,4,5-Tetrabromobenzoic acid	1.2 ml 50 µg/ml

¹³C-LABELLED TETRABROMOBENZOIC ACID (TBBA)

Catalogue Number	Product
MTBBA	 <p>2,3,4,5-Tetrabromobenzoic acid [¹³C₆-ring] 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; Isotopic purity; 99% or greater</p>

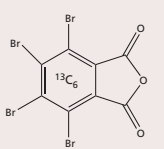
METHYL-2,3,4,5-TETRABROMOBENZOATE (MeTBBA)

Catalogue Number	Product
MeTBBA	 <p>Methyl-2,3,4,5-Tetrabromobenzoate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

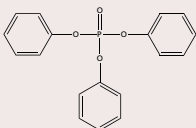
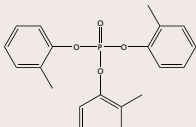
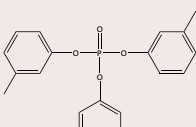
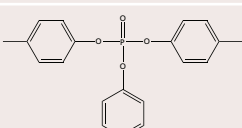
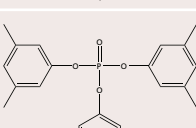
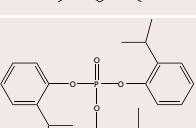
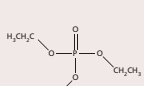
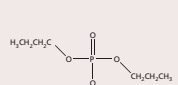
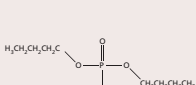
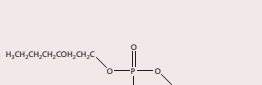
TETRABROMOPHTHALIC ANHYDRIDE (TBPA_n)

Catalogue Number	Product (toluene solution)	Qty/Conc
TBPAn	Tetrabromophthalic anhydride	1.2 ml 50 µg/ml

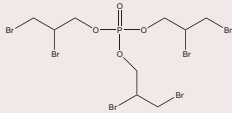
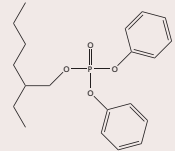
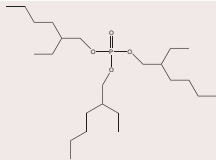
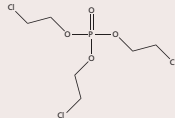
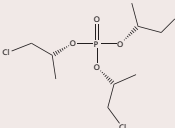
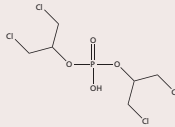
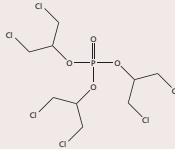
¹³C-LABELLED TETRABROMOPHTHALIC ANHYDRIDE (MTBPAn)

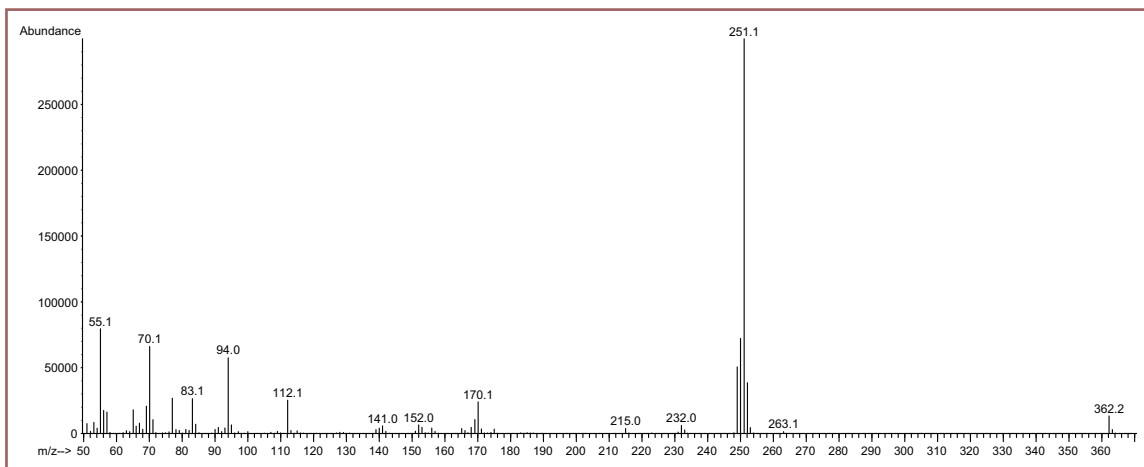
Catalogue Number	Product
MTBPAn	 <p>Tetrabromo[¹³C₆]phthalic anhydride 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>

NATIVE ORGANOPHOSPHORUS COMPOUNDS

Catalogue Number	Product
TPP	 <p>Triphenylphosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TOTP	 <p>Tri-o-tolyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TMTP	 <p>Tri-m-tolyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TPTP	 <p>Tri-p-tolyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
T35DMPP	 <p>Tris(3,5-dimethylphenyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
T2IPPP	 <p>Tris(2-isopropylphenyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TEP	 <p>Tri-ethyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TPrP	 <p>Tri-n-propyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TBP	 <p>Tri-n-butyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TBEP	 <p>Tris(2-butoxyethyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

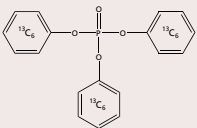
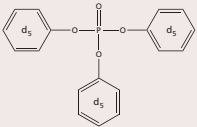
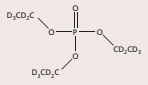
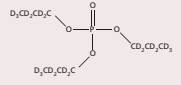
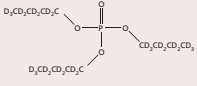
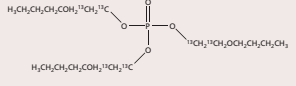
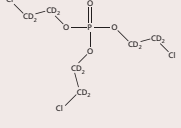
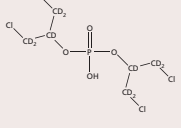
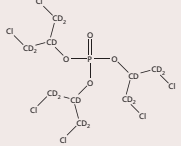
NATIVE ORGANOPHOSPHORUS COMPOUNDS

Catalogue Number	Product
TDBPP	 <p>Tris(2,3-dibromopropyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
EHDP	 <p>2-Ethylhexyl diphenyl phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TEHP	 <p>Tris(2-ethylhexyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TCEP	 <p>Tris(2-chloroethyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
TCPP	 <p>Tris[(2<i>R</i>)-1-chloro-2-propyl] phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
BDCP	 <p>Bis(1,3-dichloro-2-propyl) phosphate (97% pure) 1.2 ml; 48.5 µg/ml (±2.4 µg/ml); in <u>acetonitrile</u></p>
TDCPP	 <p>Tris(1,3-dichloro-2-propyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>



HRGC/LRMS EI+ Spectra Data for EHDP on a 15m DB-5HT column.

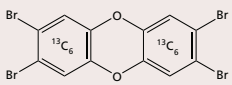
MASS-LABELLED ORGANOPHOSPHORUS COMPOUNDS

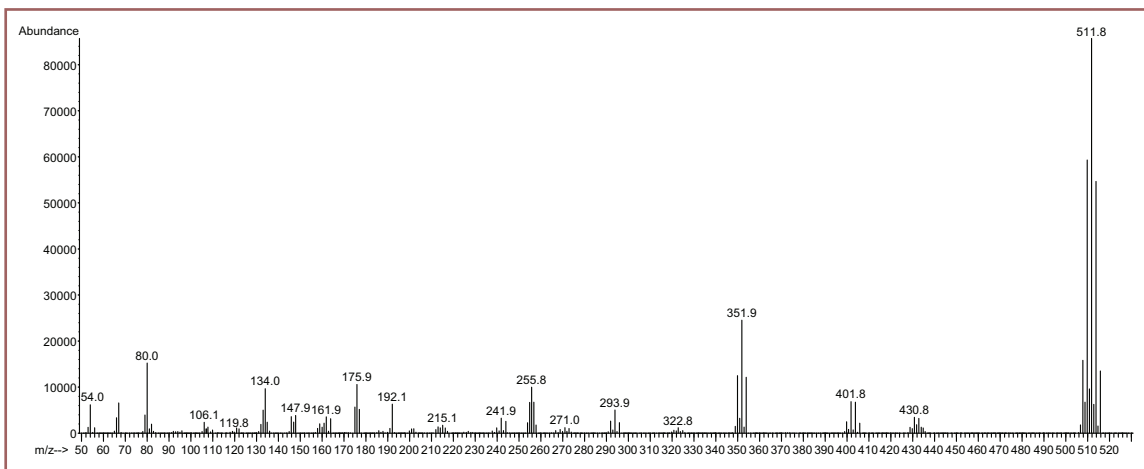
Catalogue Number	Product
MTPP	 <p>¹³C₁₈-Triphenylphosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater (¹³C₁₈)</p>
dTPP	 <p>Triphenylphosphate-d₁₅ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 98% or greater (²H₁₅)</p>
dTEP	 <p>Tri-ethyl phosphate-d₁₅ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 98% or greater (²H₁₅)</p>
dTPrP	 <p>Tri-n-propyl phosphate-d₂₁ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 98% or greater (²H₂₁)</p>
dTBP	 <p>Tri-n-butyl phosphate-d₂₇ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 98% or greater (²H₂₇)</p>
MGTBEP	 <p>Tris(2-butoxy-[¹³C₂]-ethyl) phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene Isotopic purity; 99% or greater (¹³C₆)</p>
dTCEP	 <p>Tris(2-chloroethyl) phosphate-d₁₂ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 98% or greater (²H₁₂)</p>
dBDCP	 <p>Bis(1,3-dichloro-2-propyl) phosphate-d₁₀ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in <u>acetonitrile</u>; Isotopic purity; 98% or greater (²H₁₀)</p>
dTDCPP	 <p>Tris(1,3-dichloro-2-propyl) phosphate-d₁₅ 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 98% or greater (²H₁₅)</p>

NATIVE BROMINATED DIBENZO-p-DIOXINS (PBDDs)

Catalogue Number	Product (toluene solution)	Qty/Conc
BDD-1	1-Bromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-27/28	2,7/2,8-Dibromodibenzo-p-dioxin mix	1.2 ml 50 µg/ml
BDD-237	2,3,7-Tribromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-1234	1,2,3,4-Tetrabromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-1378	1,3,7,8-Tetrabromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-2378	2,3,7,8-Tetrabromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-12378	1,2,3,7,8-Pentabromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-12478	1,2,4,7,8-Pentabromodibenzo-p-dioxin	1.2 ml 50 µg/ml
BDD-1234678	1,2,3,4,6,7,8-Heptabromodibenzo-p-dioxin	1.2 ml 25 µg/ml
BDD-12346789	Octabromodibenzo-p-dioxin	1.2 ml 10 µg/ml

MASS-LABELLED BROMINATED DIBENZO-p-DIOXIN

Catalogue Number	Product
MBDD-2378	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">  </div> <div> <p>2,3,7,8-Tetrabromo[¹³C₁₂]dibenzo-p-dioxin</p> <p>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;</p> <p>Isotopic purity; 99% or greater</p> </div> </div>



HRGC/LRMS EI+ Spectra Data for MBDD-2378 on a 15m DB-5HT column.

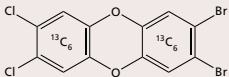
NATIVE BROMINATED DIBENZOFURANS (PBDFs)

Catalogue Number	Product (toluene solution)	Qty/Conc
BDF-4	4-Bromodibenzofuran	1.2 ml 50 µg/ml
BDF-24	2,4-Dibromodibenzofuran	1.2 ml 50 µg/ml
BDF-28	2,8-Dibromodibenzofuran	1.2 ml 50 µg/ml
BDF-138	1,3,8-Tribromodibenzofuran	1.2 ml 50 µg/ml
BDF-234	2,3,4-Tribromodibenzofuran	1.2 ml 50 µg/ml
BDF-238	2,3,8-Tribromodibenzofuran	1.2 ml 50 µg/ml
BDF-247	2,4,7-Tribromodibenzofuran	1.2 ml 50 µg/ml
BDF-1278	1,2,7,8-Tetrabromodibenzofuran	1.2 ml 50 µg/ml
BDF-2378	2,3,7,8-Tetrabromodibenzofuran	1.2 ml 50 µg/ml
BDF-12378	1,2,3,7,8-Pentabromodibenzofuran	1.2 ml 50 µg/ml
BDF-23478	2,3,4,7,8-Pentabromodibenzofuran	1.2 ml 50 µg/ml
BDF-1234678	1,2,3,4,6,7,8-Heptabromodibenzofuran	1.2 ml 25 µg/ml
BDF-12346789	Octabromodibenzofuran (96%)	1.2 ml 24 µg/ml

NATIVE BROMO/CHLORO DIBENZO-p-DIOXINS

Catalogue Number	Product (toluene solution)	Qty/Conc
7-B-23-CDD	7-Bromo-2,3-dichlorodibenzo-p-dioxin (96%)	1.2 ml 48 µg/ml
2-B-378-CDD	2-Bromo-3,7,8-trichlorodibenzo-p-dioxin (96%)	1.2 ml 48 µg/ml
2-B-1378-CDD	2-Bromo-1,3,7,8-tetrachlorodibenzo-p-dioxin (96%)	1.2 ml 48 µg/ml
23-B-78-CDD	2,3-Dibromo-7,8-dichlorodibenzo-p-dioxin	1.2 ml 50 µg/ml

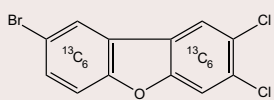
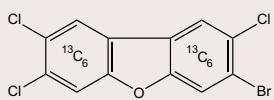
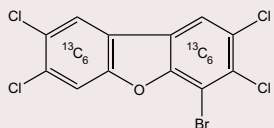
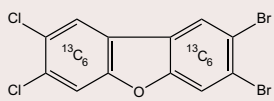
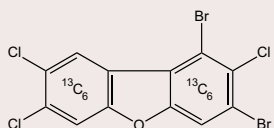
MASS-LABELLED BROMO/CHLORO DIBENZO-p-DIOXIN

Catalogue Number	Product
M23-B-78-CDD	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  </div> <div> <p>2,3-Dibromo-7,8-dichloro[¹³C₁₂]dibenzo-p-dioxin</p> <p>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;</p> <p>Isotopic purity; 99% or greater</p> </div> </div>

NATIVE BROMO/CHLORO DIBENZOFURANS

Catalogue Number	Product (toluene solution)	Qty/Conc
8-B-23-CDF	8-Bromo-2,3-dichlorodibenzofuran	1.2 ml 50 µg/ml
3-B-278-CDF	3-Bromo-2,7,8-trichlorodibenzofuran	1.2 ml 50 µg/ml
8-B-234-CDF	8-Bromo-2,3,4-trichlorodibenzofuran	1.2 ml 50 µg/ml
4-B-2378-CDF	4-Bromo-2,3,7,8-tetrachlorodibenzofuran	1.2 ml 50 µg/ml
12-B-78-CDF	1,2-Dibromo-7,8-dichlorodibenzofuran	1.2 ml 50 µg/ml
23-B-78-CDF	2,3-Dibromo-7,8-dichlorodibenzofuran	1.2 ml 50 µg/ml
13-B-278-CDF	1,3-Dibromo-2,7,8-trichlorodibenzofuran	1.2 ml 50 µg/ml

MASS-LABELLED BROMO/CHLORO DIBENZOFURANS

Catalogue Number	Product
M8-B-23-CDF	 <p>8-Bromo-2,3-dichloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>
M3-B-278-CDF	 <p>3-Bromo-2,7,8-trichloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>
M4-B-2378-CDF	 <p>4-Bromo-2,3,7,8-tetrachloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>
M23-B-78-CDF	 <p>2,3-Dibromo-7,8-dichloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>
M13-B-278-CDF	 <p>1,3-Dibromo-2,7,8-trichloro[¹³C₁₂]dibenzofuran 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic purity; 99% or greater</p>

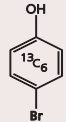
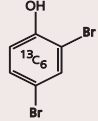
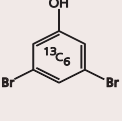
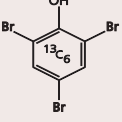
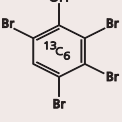
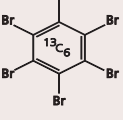
NATIVE BROMOPHENOLS

Catalogue Number	Product (toluene solution)	Qty/Conc
BRP-2	2-Bromophenol	1.2 ml 100 µg/ml
BRP-3	3-Bromophenol	1.2 ml 100 µg/ml
BRP-4	4-Bromophenol	1.2 ml 100 µg/ml
BRP-23	2,3-Dibromophenol	1.2 ml 100 µg/ml
BRP-24	2,4-Dibromophenol	1.2 ml 100 µg/ml
BRP-25	2,5-Dibromophenol	1.2 ml 100 µg/ml
BRP-26	2,6-Dibromophenol	1.2 ml 100 µg/ml
BRP-34	3,4-Dibromophenol	1.2 ml 100 µg/ml
BRP-35	3,5-Dibromophenol	1.2 ml 100 µg/ml
BRP-234	2,3,4-Tribromophenol	1.2 ml 100 µg/ml
BRP-235	2,3,5-Tribromophenol	1.2 ml 100 µg/ml
BRP-236	2,3,6-Tribromophenol	1.2 ml 100 µg/ml
BRP-245	2,4,5-Tribromophenol	1.2 ml 100 µg/ml
BRP-246	2,4,6-Tribromophenol	1.2 ml 100 µg/ml
BRP-345	3,4,5-Tribromophenol	1.2 ml 100 µg/ml
BRP-2345	2,3,4,5-Tetrabromophenol	1.2 ml 100 µg/ml
BRP-2346	2,3,4,6-Tetrabromophenol	1.2 ml 100 µg/ml
BRP-2356	2,3,5,6-Tetrabromophenol	1.2 ml 100 µg/ml
BRP-23456	Pentabromophenol	1.2 ml 100 µg/ml

NATIVE BROMOPHENOLS: SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
BRPS	Native Bromophenols; Solution/Mixture	1.2 ml
	2-Bromophenol	5 µg/ml
	3-Bromophenol	5 µg/ml
	4-Bromophenol	5 µg/ml
	2,3-Dibromophenol	5 µg/ml
	2,4-Dibromophenol	5 µg/ml
	2,5-Dibromophenol	5 µg/ml
	2,6-Dibromophenol	5 µg/ml
	3,4-Dibromophenol	5 µg/ml
	3,5-Dibromophenol	5 µg/ml
	2,3,4-Tribromophenol	5 µg/ml
	2,3,5-Tribromophenol	5 µg/ml
	2,3,6-Tribromophenol	5 µg/ml
	2,4,5-Tribromophenol	5 µg/ml
	2,4,6-Tribromophenol	5 µg/ml
	3,4,5-Tribromophenol	5 µg/ml
	2,3,4,5-Tetrabromophenol	5 µg/ml
	2,3,4,6-Tetrabromophenol	5 µg/ml
	2,3,5,6-Tetrabromophenol	5 µg/ml
	Pentabromophenol	5 µg/ml

MASS-LABELLED BROMOPHENOLS

Catalogue Number	Product
MBRP-4	 4-Bromo[¹³ C ₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene
MBRP-24	 2,4-Dibromo[¹³ C ₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene
MBRP-35	 3,5-Dibromo[¹³ C ₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene
MBRP-246	 2,4,6-Tribromo[¹³ C ₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene
MBRP-2346	 2,3,4,6-Tetrabromo[¹³ C ₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene
MBRP-23456	 Pentabromo[¹³ C ₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene

* Unless stated otherwise, isotopic purities of these compounds are 99% or greater.

MASS-LABELLED BROMOPHENOLS: SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
MBRPS	Mass-Labelled Bromophenols; Solution/Mixture	1.2 ml
	4-Bromo[¹³ C ₆]phenol	5 µg/ml
	2,4-Dibromo[¹³ C ₆]phenol	5 µg/ml
	2,4,6-Tribromo[¹³ C ₆]phenol	5 µg/ml
	2,3,4,6-Tetrabromo[¹³ C ₆]phenol	5 µg/ml
	Pentabromo[¹³ C ₆]phenol	5 µg/ml

Lydia Rennie
Cobourg, Ontario, Canada



PERFLUORINATED COMPOUNDS (PFCs)

Wellington started to synthesize perfluorinated compounds in 2004 and, since then, we have regularly added new native and mass-labelled standards to our inventory. In this section you will find individual standards of the following groups of compounds including, in most cases, mass-labelled analogues as well as some useful solution/mixtures:

PFC-C-CVS Calibration Set and Support Solutions

Perfluoroalkanesulfonates (PFASs)

Perfluoroalkylcarboxylic acids (PFCAs)

Perfluorooctanesulfonamides (FOSAs)

Perfluorooctanesulfonamidoethanols (FOSEs)

Perfluorooctanesulfonamidoacetic acids (FOSAAs)

Fluorinated Telomer Alcohols (FTOHs)

Fluorinated Telomer Acids (FTAs)

Unsaturated Fluorinated Telomer Acids (FTUAs)

Perfluoroalkylphosphonic Acids (PFAPAs)

Perfluoroalkylphosphinic Acids (X:XPFPi)

Polyfluorinated Phosphate Esters (PAPs and SAmPAPs)

Fluorinated Telomer Acrylates and Acetates (FTAcrs and FTOAcS)

PFCs are still emerging environmental contaminants and each of the groups of compounds listed above pose unique analytical challenges. In addition, the individual isomers, such as the branched PFOA and PFOS isomers, are being found to have different toxicokinetic and ecokinetic properties. Thus our inventory of PFCs will continue to grow and we would urge you to visit our website for announcements of new products.



PFC-CVS-C

Catalogue Number	Product (methanol solution)	Qty/Conc
PFC-CVS-C	PFC-CVS-C	1 kit
	Calibration Solutions CS1-CS5	(5 ampoules)
PFC-C-CS1	CS1	200 µl
PFC-C-CS2	CS2	200 µl
PFC-C-CS3	CS3	200 µl
PFC-C-CS4	CS4	200 µl
PFC-C-CS5	CS5	200 µl

		PFC-C- CS1 (ng/ml)	PFC-C- CS2 (ng/ml)	PFC-C- CS3 (ng/ml)	PFC-C- CS4 (ng/ml)	PFC-C- CS5 (ng/ml)
Native PFCs						
Perfluoro-n-butanoic acid	PFBA	2.0	10	50	200	1000
Perfluoro-n-pentanoic acid	PFPeA	2.0	10	50	200	1000
Perfluoro-n-hexanoic acid	PFHxA	2.0	10	50	200	1000
Perfluoro-n-heptanoic acid	PFHpA	2.0	10	50	200	1000
Perfluoro-n-octanoic acid	PFOA	2.0	10	50	200	1000
Perfluoro-n-nonanoic acid	PFNA	2.0	10	50	200	1000
Perfluoro-n-decanoic acid	PFDA	2.0	10	50	200	1000
Perfluoro-n-undecanoic acid	PFUdA	2.0	10	50	200	1000
Perfluoro-n-dodecanoic acid	PFDoA	2.0	10	50	200	1000
Perfluoro-n-tridecanoic acid	PFTTrDA	2.0	10	50	200	1000
Perfluoro-n-tetradecanoic acid	PFTeDA	2.0	10	50	200	1000
Perfluoro-n-hexadecanoic acid	PFHxDA	2.0	10	50	200	1000
Perfluoro-n-octadecanoic acid	PFODA	2.0	10	50	200	1000
Potassium perfluoro-1-butanefluorobutanesulfonate	L-PFBS	2.0	10	50	200	1000
Sodium perfluoro-1-pentanesulfonate	L-PFPeS	2.0	10	50	200	1000
Sodium perfluoro-1-hexanesulfonate	L-PFHxS	2.0	10	50	200	1000
Sodium perfluoro-1-heptanesulfonate	L-PFHpS	2.0	10	50	200	1000
Sodium perfluoro-1-octanesulfonate	L-PFOS	2.0	10	50	200	1000
Sodium perfluoro-1-nonanesulfonate	L-PFNS	2.0	10	50	200	1000
Sodium perfluoro-1-decanesulfonate	L-PFDS	2.0	10	50	200	1000
Sodium perfluoro-1-dodecanesulfonate	L-PFDoS	2.0	10	50	200	1000
Mass-Labelled PFCs Extraction Standards						
Perfluoro-n-[¹³ C ₄]butanoic acid	MPFBA	50	50	50	50	50
Perfluoro-n-[¹³ C ₅]pentanoic acid	M5PFPeA	50	50	50	50	50
Perfluoro-n-[1,2,3,4,6- ¹³ C ₅]hexanoic acid	M5PFHxA	50	50	50	50	50
Perfluoro-n-[1,2,3,4- ¹³ C ₄]heptanoic acid	M4PFHpA	50	50	50	50	50
Perfluoro-n-[¹³ C ₈]octanoic acid	M8PFOA	50	50	50	50	50
Perfluoro-n-[¹³ C ₉]nonanoic acid	M9PFNA	50	50	50	50	50
Perfluoro-n-[1,2,3,4,5,6- ¹³ C ₆]decanoic acid	M6PFDA	50	50	50	50	50
Perfluoro-n-[1,2,3,4,5,6,7- ¹³ C ₇]undecanoic acid	M7PFUdA	50	50	50	50	50
Perfluoro-n-[1,2- ¹³ C ₂]dodecanoic acid	MPFDoA	50	50	50	50	50
Perfluoro-n-[1,2- ¹³ C ₂]tetradecanoic acid	M2PFTeDA	50	50	50	50	50
Sodium perfluoro-1-[2,3,4- ¹³ C ₃]butanesulfonate	M3PFBS	50	50	50	50	50
Sodium perfluoro-1-[1,2,3- ¹³ C ₃]hexanesulfonate	M3PFHxS	50	50	50	50	50
Sodium perfluoro-1-[¹³ C ₈]octanesulfonate	M8PFOS	50	50	50	50	50
Mass-Labelled PFCs Injection Standards						
Perfluoro-n-[2,3,4- ¹³ C ₃]butanoic acid	M3PFBA	50	50	50	50	50
Perfluoro-n-[1,2- ¹³ C ₂]octanoic acid	M2PFOA	50	50	50	50	50
Perfluoro-n-[1,2- ¹³ C ₂]decanoic acid	MPFDA	50	50	50	50	50
Sodium perfluoro-1-[1,2,3,4- ¹³ C ₄]octanesulfonate	MPFOS	50	50	50	50	50

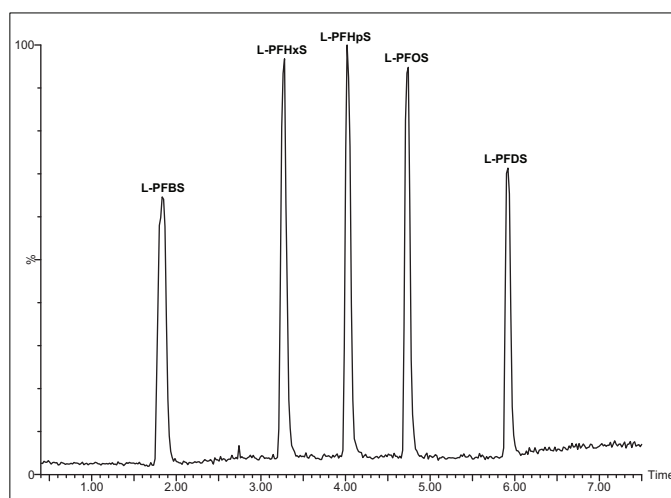
NOTE: All perfluoroalkylsulfonate concentrations are reported as the salt.

NATIVE LINEAR PERFLUOROALKYLSULFONATES (PFASs)

Catalogue Number	Product (methanol solution)	Qty/Conc
L-PFBS	Potassium perfluoro-1-butanesulfonate	1.2 ml 50 µg/ml
L-PFPeS	Sodium perfluoro-1-pentanesulfonate	1.2 ml 50 µg/ml
L-PFHxS	Sodium perfluoro-1-hexanesulfonate	1.2 ml 50 µg/ml
L-PFHpS	Sodium perfluoro-1-heptanesulfonate	1.2 ml 50 µg/ml
L-PFOS	Sodium perfluoro-1-octanesulfonate	1.2 ml 50 µg/ml
L-PFOSK	Potassium perfluoro-1-octanesulfonate	1.2 ml 50 µg/ml
L-PFNS	Sodium perfluoro-1-nonanesulfonate	1.2 ml 50 µg/ml
L-PFDS	Sodium perfluoro-1-decanesulfonate	1.2 ml 50 µg/ml
L-PFDoS	Sodium perfluoro-1-dodecanesulfonate	1.2 ml 50 µg/ml

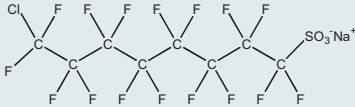
NATIVE PERFLUOROALKYLSULFONATES: SOLUTION/MIXTURE

Catalogue Number	Product (methanol solution)	Qty/Conc
PFS-MXA	Native PFAS Solution/Mixture	1.2 ml
	Potassium perfluoro-1-butanesulfonate	2 µg/ml
	Sodium perfluoro-1-hexanesulfonate	2 µg/ml
	Sodium perfluoro-1-heptanesulfonate	2 µg/ml
	Sodium perfluoro-1-octanesulfonate	2 µg/ml
	Sodium perfluoro-1-decanesulfonate	2 µg/ml



Chromatogram of PFS-MXA (Acquity UPLC BEH Shield RP₁₈ column)

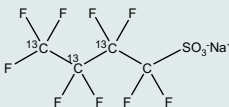
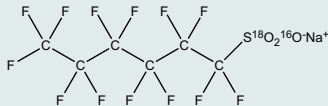
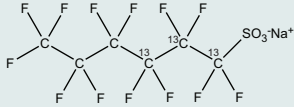
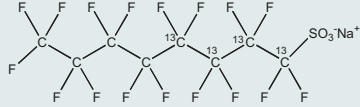
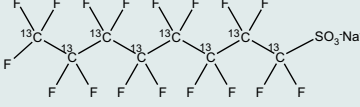
NATIVE CHLORO-PERFLUOROALKYLSULFONATE

Catalogue Number	Product
8Cl-PFOS	 <p>Sodium 8-chloroperfluoro-1-octanesulfonate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>

NATIVE BRANCHED PERFLUOROALKYLSULFONATES

Catalogue Number	Product (methanol solution)	Qty/Conc
br-PFHxSK	L-PFHxS with branched isomers (Potassium Salt)	1.2 ml 50 µg/ml
br-PFOSK	L-PFOSK with branched isomers	1.2 ml 50 µg/ml
T-PFOS	Potassium perfluorooctanesulfonate (Technical Grade)	1.2 ml 50 µg/ml
NaP3MHpS	Sodium perfluoro-3-methylheptanesulfonate	1.2 ml 50 µg/ml
NaP6MHpS	Sodium perfluoro-6-methylheptanesulfonate	1.2 ml 50 µg/ml
ipPFNS	Sodium perfluoro-7-methyloctanesulfonate	1.2 ml 50 µg/ml

MASS-LABELLED PERFLUOROALKYLSULFONATES

Catalogue Number	Product
M3PFBS	 <p>Sodium perfluoro-1-[2,3,4-¹³C₃]-butanesulfonate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 2,3,4-¹³C₃</p>
MPFHxS	 <p>Sodium perfluoro-1-hexane[¹⁸O₂]sulfonate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 94% ¹⁸O₂</p>
M3PFHxS	 <p>Sodium perfluoro-1-[1,2,3-¹³C₃]-hexanesulfonate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3-¹³C₃</p>
MPFOS	 <p>Sodium perfluoro-1-[1,2,3,4-¹³C₄]-octanesulfonate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4-¹³C₄</p>
M8PFOS	 <p>Sodium perfluoro-1-[¹³C₈]-octanesulfonate 1.2 ml; 48.5 µg/ml (±2.4 µg/ml); in methanol >99% linear; >99% ¹³C₈</p>

NOTE: All perfluoroalkylsulfonate concentrations are reported as the salt.

NATIVE LINEAR PERFLUOROALKYLCARBOXYLIC ACIDS (PFCAs)

Catalogue Number	Product (methanol solution)	Qty/Conc
PFBA	Perfluoro-n-butanoic acid	1.2 ml 50 µg/ml
PFPeA	Perfluoro-n-pentanoic acid	1.2 ml 50 µg/ml
PFHxA	Perfluoro-n-hexanoic acid	1.2 ml 50 µg/ml
PFHpA	Perfluoro-n-heptanoic acid	1.2 ml 50 µg/ml
PFOA	Perfluoro-n-octanoic acid	1.2 ml 50 µg/ml
PFNA	Perfluoro-n-nonanoic acid	1.2 ml 50 µg/ml
PFDA	Perfluoro-n-decanoic acid	1.2 ml 50 µg/ml
PFUdA	Perfluoro-n-undecanoic acid	1.2 ml 50 µg/ml
PFDoA	Perfluoro-n-dodecanoic acid	1.2 ml 50 µg/ml
PFTTrDA	Perfluoro-n-tridecanoic acid	1.2 ml 50 µg/ml
PFTeDA	Perfluoro-n-tetradecanoic acid	1.2 ml 50 µg/ml
PFHxDA	Perfluoro-n-hexadecanoic acid	1.2 ml 50 µg/ml
PFODA	Perfluoro-n-octadecanoic acid	1.2 ml 50 µg/ml

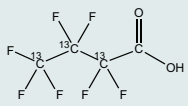
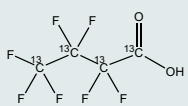
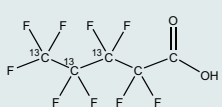

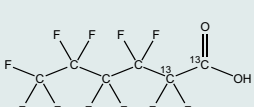
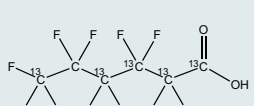
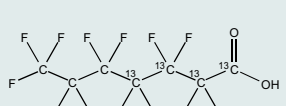
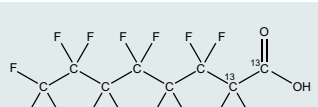
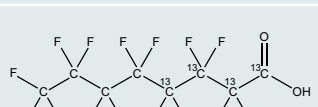
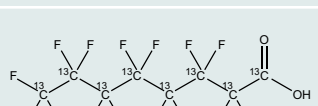
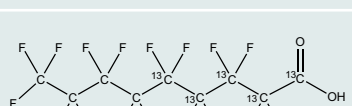
NATIVE PERFLUOROALKYLCARBOXYLIC ACIDS: SOLUTION/MIXTURE

Catalogue Number	Product (methanol solution)	Qty/Conc
PFC-MXA	Native PFCa Solution/Mixture	1.2 ml
	Perfluoro-n-butanoic acid	2 µg/ml
	Perfluoro-n-pentanoic acid	2 µg/ml
	Perfluoro-n-hexanoic acid	2 µg/ml
	Perfluoro-n-heptanoic acid	2 µg/ml
	Perfluoro-n-octanoic acid	2 µg/ml
	Perfluoro-n-nonanoic acid	2 µg/ml
	Perfluoro-n-decanoic acid	2 µg/ml
	Perfluoro-n-undecanoic acid	2 µg/ml
	Perfluoro-n-dodecanoic acid	2 µg/ml
	Perfluoro-n-tridecanoic acid	2 µg/ml
	Perfluoro-n-tetradecanoic acid	2 µg/ml

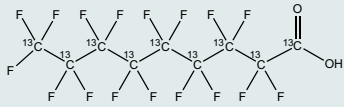
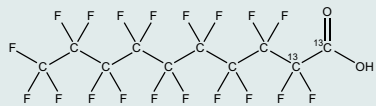
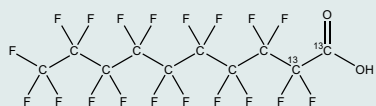
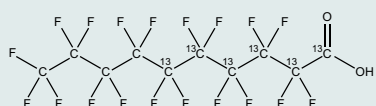
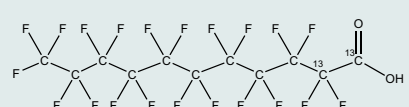
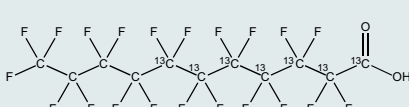
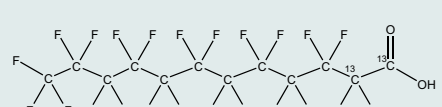
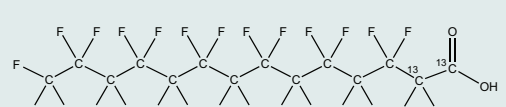

NATIVE BRANCHED PERFLUOROALKYLCARBOXYLIC ACIDS

Catalogue Number	Product (methanol solution)	Qty/Conc
T-PFOA	Perfluorooctanoic acid (Technical Grade)	1.2 ml 50 µg/ml
P3MHpA	Perfluoro-3-methylheptanoic acid	1.2 ml 50 µg/ml
P4MOA	Perfluoro-4-methyloctanoic acid	1.2 ml 50 µg/ml
ipPFNA	Perfluoro-7-methyloctanoic acid (90%)	1.2 ml 45 µg/ml
P355TMHxA	Perfluoro-3,5,5-trimethylhexanoic acid	1.2 ml 50 µg/ml
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	1.2 ml 50 µg/ml

MASS-LABELLED PERFLUOROALKYLCARBOXYLIC ACIDS

Catalogue Number	Product
M3PFBA	 <p>Perfluoro-n-[2,3,4-¹³C₃]butanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 2,3,4-¹³C₃</p>
MPFBA	 <p>Perfluoro-n-[¹³C₄]butanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% ¹³C₄</p>
M3PFPeA	 <p>Perfluoro-n-[3,4,5-¹³C₃]pentanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 3,4,5-¹³C₃</p>
M5PFPeA	 <p>Perfluoro-n-[¹³C₅]pentanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% ¹³C₅</p>
MPFHxA	 <p>Perfluoro-n-[1,2-¹³C₂]hexanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2-¹³C₂</p>
M5PFHxA	 <p>Perfluoro-n-[1,2,3,4,6-¹³C₅]hexanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4,6-¹³C₅</p>
M4PFHpA	 <p>Perfluoro-n-[1,2,3,4-¹³C₄]heptanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4-¹³C₄</p>
M2ZPFOA	 <p>Perfluoro-n-[1,2-¹³C₂]octanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2-¹³C₂</p>
MPFOA	 <p>Perfluoro-n-[1,2,3,4-¹³C₄]octanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4-¹³C₄</p>
M8PFOA	 <p>Perfluoro-n-[¹³C₈]octanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 97.9% ¹³C₈ and 2.1% ¹³C₄</p>
MPFNA	 <p>Perfluoro-n-[1,2,3,4,5-¹³C₅]nonanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4,5-¹³C₅</p>

MASS-LABELLED PERFLUOROALKYLCARBOXYLIC ACIDS

Catalogue Number	Product
M9PFNA 	Perfluoro-n-[¹³ C ₉]nonanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% ¹³ C ₉
MPFDA 	Perfluoro-n-[1,2- ¹³ C ₂]decanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2- ¹³ C ₂
MPFDA-A 	Perfluoro-n-[1,2- ¹³ C ₂]decanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in <u>acetonitrile</u> >99% linear; >99% 1,2- ¹³ C ₂
M6PFDA 	Perfluoro-n-[1,2,3,4,5,6- ¹³ C ₆]decanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4,5,6- ¹³ C ₆
MPFUdA 	Perfluoro-n-[1,2- ¹³ C ₂]undecanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2- ¹³ C ₂
M7PFUdA 	Perfluoro-n-[1,2,3,4,5,6,7- ¹³ C ₇]undecanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2,3,4,5,6,7- ¹³ C ₇
MPFDoA 	Perfluoro-n-[1,2- ¹³ C ₂]dodecanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2- ¹³ C ₂
M2PFTeDA 	Perfluoro-n-[1,2- ¹³ C ₂]tetradecanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2- ¹³ C ₂
M2PFHxDA 	Perfluoro-n-[1,2- ¹³ C ₂]hexadecanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; >99% 1,2- ¹³ C ₂

MIXED NATIVE PFCAs AND PFASs: SOLUTION/MIXTURES

Catalogue Number	Product (methanol solution)	Qty/Conc
PFAC-MXA	Native PFCAs and PFASs Solution/Mixture	1.2 ml
Perfluoro-n-butanoic acid		5 µg/ml
Perfluoro-n-pentanoic acid		5 µg/ml
Perfluoro-n-hexanoic acid		5 µg/ml
Perfluoro-n-heptanoic acid		5 µg/ml
Perfluoro-n-octanoic acid		5 µg/ml
Perfluoro-n-nonanoic acid		5 µg/ml
Perfluoro-n-decanoic acid		5 µg/ml
Potassium perfluoro-1-buthanesulfonate		5 µg/ml
Sodium perfluoro-1-hexanesulfonate		5 µg/ml
Sodium perfluoro-1-octanesulfonate		5 µg/ml
PFAC-MXB	Native PFCAs and PFASs Solution/Mixture	1.2 ml
Perfluoro-n-butanoic acid		2 µg/ml
Perfluoro-n-pentanoic acid		2 µg/ml
Perfluoro-n-hexanoic acid		2 µg/ml
Perfluoro-n-heptanoic acid		2 µg/ml
Perfluoro-n-octanoic acid		2 µg/ml
Perfluoro-n-nonanoic acid		2 µg/ml
Perfluoro-n-decanoic acid		2 µg/ml
Perfluoro-n-undecanoic acid		2 µg/ml
Perfluoro-n-dodecanoic acid		2 µg/ml
Perfluoro-n-tridecanoic acid		2 µg/ml
Perfluoro-n-tetradecanoic acid		2 µg/ml
Perfluoro-n-hexadecanoic acid		2 µg/ml
Perfluoro-n-octadecanoic acid		2 µg/ml
Potassium perfluoro-1-buthanesulfonate		2 µg/ml
Sodium perfluoro-1-hexanesulfonate		2 µg/ml
Sodium perfluoro-1-octanesulfonate		2 µg/ml
Sodium perfluoro-1-decanesulfonate		2 µg/ml

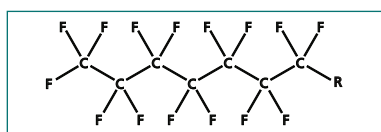
MIXED MASS-LABELLED PFCAs AND PFASs: SOLUTION/MIXTURE

Catalogue Number	Product (methanol solution)	Qty/Conc
MPFAC-MXA	Mass-Labelled PFCAs and PFASs Solution/Mixture	1.2 ml
Perfluoro-n-[1,2,3,4- ¹³ C ₄]butanoic acid		2 µg/ml
Perfluoro-n-[1,2- ¹³ C ₂]hexanoic acid		2 µg/ml
Perfluoro-n-[1,2,3,4- ¹³ C ₄]octanoic acid		2 µg/ml
Perfluoro-n-[1,2,3,4,5- ¹³ C ₅]nonanoic acid		2 µg/ml
Perfluoro-n-[1,2- ¹³ C ₂]decanoic acid		2 µg/ml
Perfluoro-n-[1,2- ¹³ C ₂]undecanoic acid		2 µg/ml
Perfluoro-n-[1,2- ¹³ C ₂]dodecanoic acid		2 µg/ml
Sodium perfluoro-1-hexane[¹⁸ O ₂]sulfonate		2 µg/ml
Sodium perfluoro-1-[1,2,3,4- ¹³ C ₄]octanesulfonate		2 µg/ml

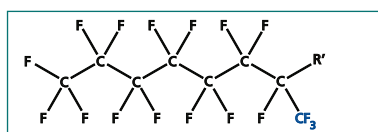
NOTE: Listed concentrations for the perfluoroalkylsulfonates are reported as the salt.

PFOS/PFOA ISOMERS

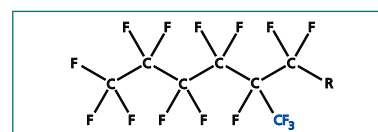
Catalogue Number	Product (methanol solution)	Qty/Anion Conc
P1MHpS	Sodium Perfluoro-1-methylheptane sulfonate	200 µl 1.00 µg/ml
P3MHpS	Sodium Perfluoro-3-methylheptane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-3-methylheptanoic acid	1.90 µg/ml
P4MHpS	Sodium Perfluoro-4-methylheptane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-4-methylheptanoic acid	2.20 µg/ml
P5MHpS	Sodium Perfluoro-5-methylheptane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-5-methylheptanoic acid	1.96 µg/ml
P6MHpS	Sodium Perfluoro-6-methylheptane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-6-methylheptanoic acid	3.10 µg/ml
P55DMHxS	Sodium Perfluoro-5,5-dimethylhexane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-5,5-dimethylhexanoic acid	1.95 µg/ml
P44DMHxS	Sodium Perfluoro-4,4-dimethylhexane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-4,4-dimethylhexanoic acid	3.14 µg/ml
P45DMHxS	Sodium Perfluoro-4,5-dimethylhexane sulfonate	200 µl 1.00 µg/ml
	Perfluoro-4,5-dimethylhexanoic acid	1.22 µg/ml
	Sodium Perfluoro-3,5-dimethylhexane sulfonate	0.50 µg/ml
	Perfluoro-3,5-dimethylhexanoic acid	0.60 µg/ml



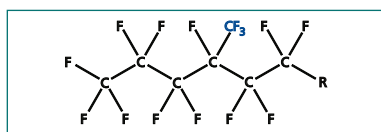
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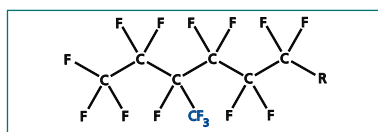
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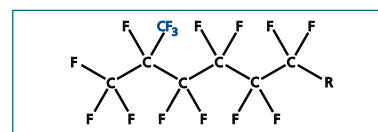
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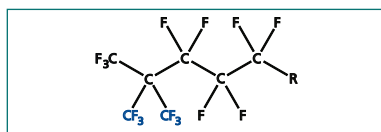
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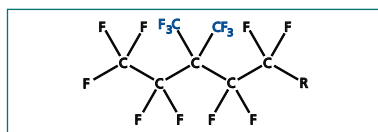
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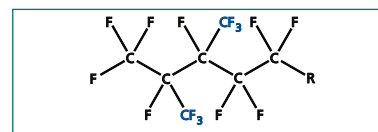
Perfluoro-6-methyl-



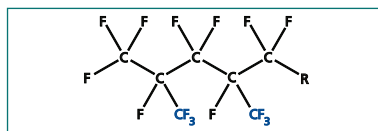
Perfluoro-5,5-dimethyl-



Perfluoro-4,4-dimethyl-



Perfluoro-4,5-dimethyl-



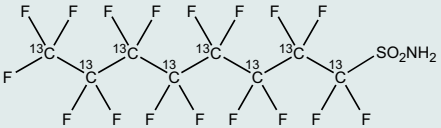
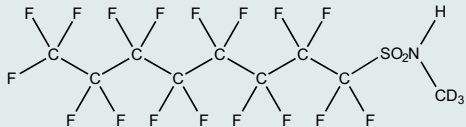
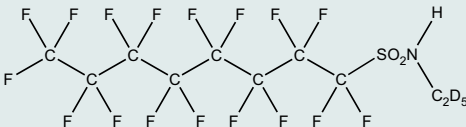
Perfluoro-3,5-dimethyl-

NOTE: R= CO₂⁻ and CF₂SO₃⁻
R'= SO₃⁻ only

NATIVE PERFLUOROCTANESULFONAMIDES (FOSAs)

Catalogue Number	Product (methanol solution)	Qty/Conc
FOSA-I	Perfluoro-1-octanesulfonamide (in isopropanol)	1.2 ml 50 µg/ml
N-MeFOSA-M	N-methylperfluoro-1-octanesulfonamide	1.2 ml 50 µg/ml
N,N-Me2FOSA-M	N,N-dimethylperfluoro-1-octanesulfonamide	1.2 ml 50 µg/ml
N-EtFOSA-M	N-ethylperfluoro-1-octanesulfonamide	1.2 ml 50 µg/ml

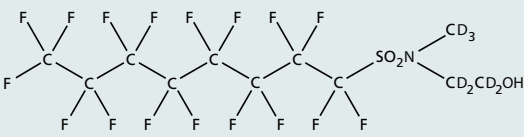
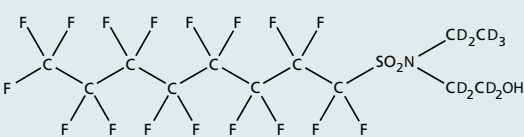
MASS-LABELLED PERFLUOROCTANESULFONAMIDES

Catalogue Number	Product
M8FOSA-I	 <p>Perfluoro-1-[¹³C₈]octanesulfonamide 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol >99% linear; >99% ¹³C₈</p>
d-N-MeFOSA-M	 <p>N-methyl-d₃-perfluoro-1-octanesulfonamide 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 98% ²H₃</p>
d-N-EtFOSA-M	 <p>N-ethyl-d₅-perfluoro-1-octanesulfonamide 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 98% ²H₅</p>

NATIVE PERFLUOROCTANESULFONAMIDOETHANOLS (FOSEs)

Catalogue Number	Product (methanol solution)	Qty/Conc
N-MeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	1.2 ml 50 µg/ml
N-EtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	1.2 ml 50 µg/ml

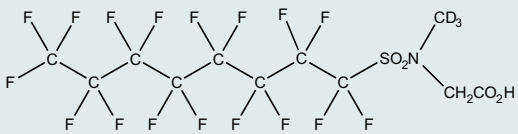
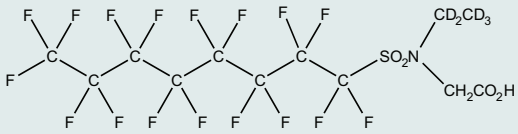
MASS-LABELLED PERFLUOROCTANESULFONAMIDOETHANOLS

Catalogue Number	Product
d7-N-MeFOSE-M	 <p>2-(N-methyl-d₃-perfluoro-1-octanesulfonamido)ethan-d₄-ol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 98% ²H₇</p>
d9-N-EtFOSE-M	 <p>2-(N-ethyl-d₅-perfluoro-1-octanesulfonamido)ethan-d₄-ol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 98% ²H₉</p>

NATIVE PERFLUOROOCETANESULFONAMIDOACETIC ACIDS (FOSAAs)

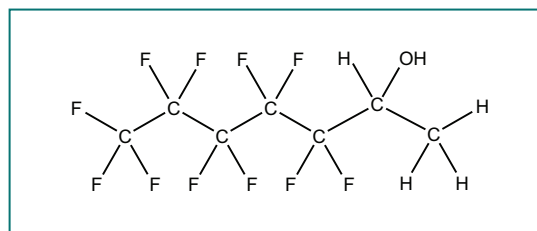
Catalogue Number	Product (methanol solution)	Qty/Conc
FOSAA	Perfluoro-1-octanesulfonamidoacetic acid (in isopropanol)	1.2 ml 50 µg/ml
N-MeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid	1.2 ml 50 µg/ml
N-EtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid	1.2 ml 50 µg/ml

MASS-LABELLED PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

Catalogue Number	Product
d3-N-MeFOSAA	 <p>N-methyl-d₃-perfluoro-1-octanesulfonamidoacetic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 98% ²H₃</p>
d5-N-EtFOSAA	 <p>N-ethyl-d₅-perfluoro-1-octanesulfonamidoacetic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol >99% linear; 98% ²H₅</p>

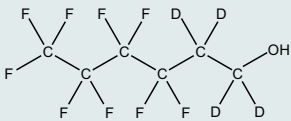
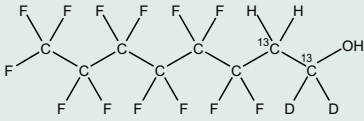
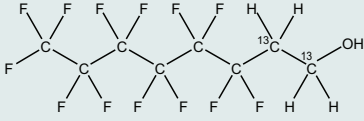
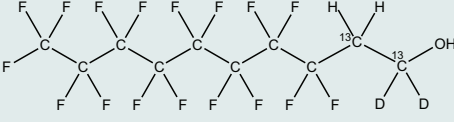
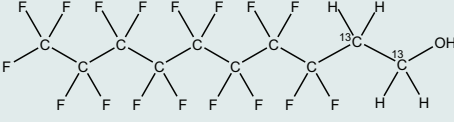
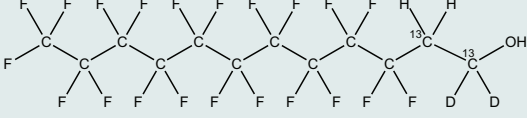
NATIVE TELOMER ALCOHOLS (FTOHs)

Catalogue Number	Product (methanol solution)	Qty/Conc
FBET	2-Perfluorobutyl ethanol (4:2)	1.2 ml 50 µg/ml
5:2sFTOH	1-Perfluoropentyl ethanol (5:2 secondary)	1.2 ml 50 µg/ml
FHET	2-Perfluorohexyl ethanol (6:2)	1.2 ml 50 µg/ml
7:2sFTOH	1-Perfluoroheptyl ethanol (7:2 secondary)	1.2 ml 50 µg/ml
FOET	2-Perfluorooctyl ethanol (8:2)	1.2 ml 50 µg/ml
FDET	2-Perfluorodecyl ethanol (10:2)	1.2 ml 50 µg/ml



5:2sFTOH: 1-Perfluoropentyl ethanol

MASS-LABELLED TELOMER ALCOHOLS

Catalogue Number	Product
MF BET	 <p>2-Perfluorobutyl-[1,1,2,2-²H₄]-ethanol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 98% 1,1,2,2-²H₄</p>
MF HET	 <p>2-Perfluorohexyl-[1,1-²H₂]-[1,2-¹³C₂]-ethanol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; 98% 1,1-²H₂, >99% 1,2-¹³C₂</p>
M2 FHET	 <p>2-Perfluorohexyl-[1,2-¹³C₂]-ethanol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; >99% 1,2-¹³C₂</p>
MFO ET	 <p>2-Perfluorooctyl-[1,1-²H₂]-[1,2-¹³C₂]-ethanol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; 98% 1,1-²H₂, >99% 1,2-¹³C₂</p>
M2 FO ET	 <p>2-Perfluorooctyl-[1,2-¹³C₂]-ethanol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; >99% 1,2-¹³C₂</p>
MF DE T	 <p>2-Perfluorodecyl-[1,1-²H₂]-[1,2-¹³C₂]-ethanol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; 98% 1,1-²H₂, >99% 1,2-¹³C₂</p>

NATIVE TELOMER ACIDS (FTAs)

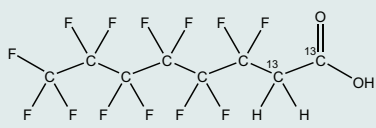
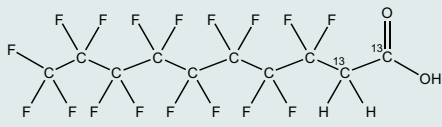
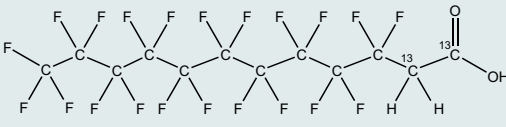
Catalogue Number	Product (isopropanol solution)	Qty/Conc
FHEA	2-Perfluorohexyl ethanoic acid (6:2)	1.2 ml 50 µg/ml
FOEA	2-Perfluorooctyl ethanoic acid (8:2)	1.2 ml 50 µg/ml
FDEA	2-Perfluorodecyl ethanoic acid (10:2)	1.2 ml 50 µg/ml

Catalogue Number	Product (methanol solution)	Qty/Conc
FPrPA	3-Perfluoropropyl propanoic acid (3:3)	1.2 ml 50 µg/ml
FPePA	3-Perfluoropentyl propanoic acid (5:3)	1.2 ml 50 µg/ml
FHpPA	3-Perfluoroheptyl propanoic acid (7:3)	1.2 ml 50 µg/ml

NATIVE TELOMER ACIDS: SOLUTION/MIXTURE

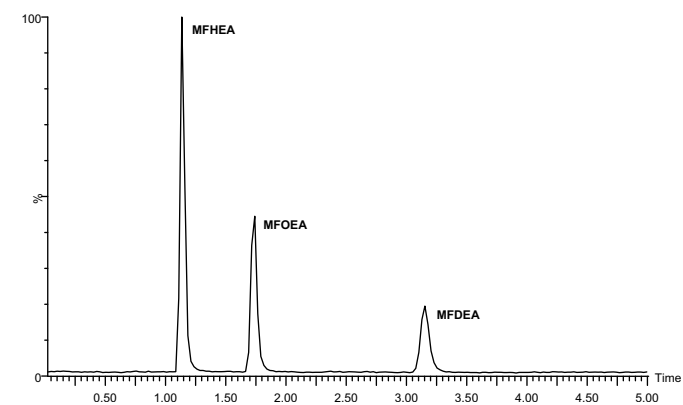
Catalogue Number	Product (isopropanol solution)	Qty/Conc
FTA-MXA	Native FTA Solution/Mixture	1.2 ml
	2-Perfluorohexyl ethanoic acid (6:2)	2 µg/ml
	2-Perfluorooctyl ethanoic acid (8:2)	2 µg/ml
	2-Perfluorodecyl ethanoic acid (10:2)	2 µg/ml

MASS-LABELLED TELOMER ACIDS

Catalogue Number	Product
MFHEA	 <p>2-Perfluorohexyl-[1,2-¹³C₂]-ethanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol; > 99% ¹³C₂</p>
MFOEA	 <p>2-Perfluorooctyl-[1,2-¹³C₂]-ethanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol; > 99% ¹³C₂</p>
MFDEA	 <p>2-Perfluorodecyl-[1,2-¹³C₂]-ethanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol; > 99% ¹³C₂</p>

MASS-LABELLED TELOMER ACIDS: SOLUTION/MIXTURE

Catalogue Number	Product (isopropanol solution)	Qty/Conc
MFTA-MXA	Mass-Labelled FTA Solution/Mixture	1.2 ml
	2-Perfluorohexyl-[1,2- ¹³ C ₂]-ethanoic acid (6:2)	2 µg/ml
	2-Perfluorooctyl-[1,2- ¹³ C ₂]-ethanoic acid (8:2)	2 µg/ml
	2-Perfluorodecyl-[1,2- ¹³ C ₂]-ethanoic acid (10:2)	2 µg/ml

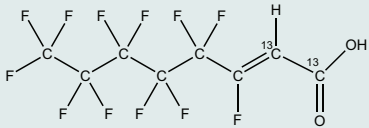
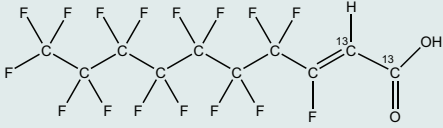
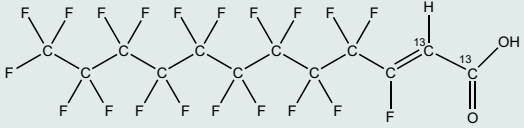


Chromatogram of MFTA-MXA (Acquity UPLC BEH Shield RP₁₈ column)

NATIVE UNSATURATED TELOMER ACIDS (FTUAs)

Catalogue Number	Product (isopropanol solution)	Qty/Conc
FHUEA	2H-Perfluoro-2-octenoic acid (6:2)	1.2 ml 50 µg/ml
FOUEA	2H-Perfluoro-2-decenoic acid (8:2)	1.2 ml 50 µg/ml
FDUEA	2H-Perfluoro-2-dodecenoic acid (10:2)	1.2 ml 50 µg/ml

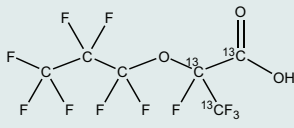
MASS-LABELLED UNSATURATED TELOMER ACIDS

Catalogue Number	Product
MFHUEA	 <p>2H-Perfluoro-[1,2-¹³C₂]-2-octenoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol; > 99% ¹³C₂</p>
MFOUEA	 <p>2H-Perfluoro-[1,2-¹³C₂]-2-decenoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol; > 99% ¹³C₂</p>
MFDEUA	 <p>2H-Perfluoro-[1,2-¹³C₂]-2-dodecenoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in isopropanol; > 99% ¹³C₂</p>

NATIVE HEXAFLUOROPROPYLENE OXIDE DIMER ACID

Catalogue Number	Product (methanol solution)	Qty/Conc
HFPO-DA	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)propanoic acid	1.2 ml 50 µg/ml

MASS-LABELLED HEXAFLUOROPROPYLENE OXIDE DIMER ACID

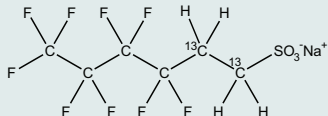
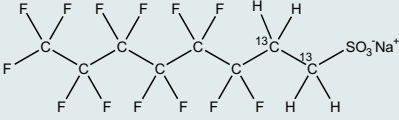
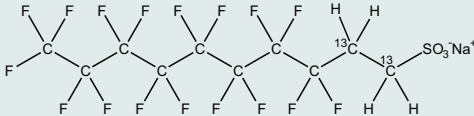
Catalogue Number	Product
M3HFPO-DA	 <p>2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-¹³C₃-propanoic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³C₃</p>

NATIVE TELOMER SULFONATES (FTSs)

Catalogue Number	Product (methanol solution)	Qty/Conc
4:2FTS	Sodium 1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	1.2 ml 50 µg/ml
6:2FTS	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	1.2 ml 50 µg/ml
8:2FTS	Sodium 1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	1.2 ml 50 µg/ml
10:2FTS	Sodium 1H,1H,2H,2H-perfluorododecane sulfonate (10:2)	1.2 ml 50 µg/ml

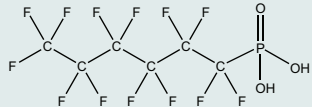
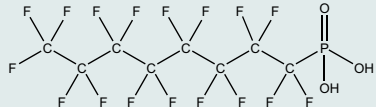
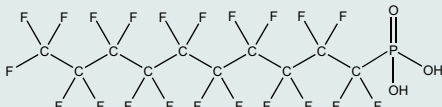
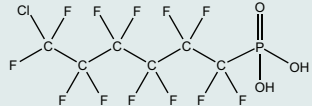
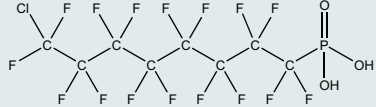
NOTE: Listed concentrations are reported as the salt.

MASS-LABELLED TELOMER SULFONATES

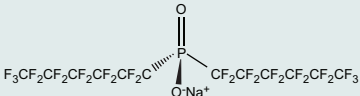
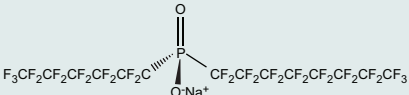
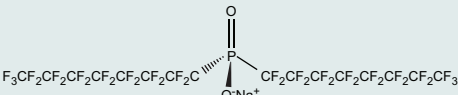
Catalogue Number	Product
M2-4:2FTS	 <p>Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-¹³C₂]-hexane sulfonate (4:2) 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³C₂</p>
M2-6:2FTS	 <p>Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-¹³C₂]-octane sulfonate (6:2) 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³C₂</p>
M2-8:2FTS	 <p>Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-¹³C₂]-decane sulfonate (8:2) 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³C₂</p>

NOTE: Listed concentration is reported as the salt.

NATIVE PERFLUOROALKYLPHOSPHONIC ACIDS (PFAPAs)

Catalogue Number	Product
PFHxPA	 <p>Perfluorohexylphosphonic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;</p>
PFOPA	 <p>Perfluorooctylphosphonic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;</p>
PFDPA	 <p>Perfluorodecylphosphonic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;</p>
Cl-PFHxPA	 <p>6-Chloroperfluorohexylphosphonic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;</p>
Cl-PFOPA	 <p>8-Chloroperfluorooctylphosphonic acid 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;</p>

NATIVE SODIUM PERFLUOROALKYL PHOSPHINATES (X:XPFPi)

Catalogue Number	Product
6:6PFPi 	Sodium bis(perfluorohexyl)phosphinate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;
6:8PFPi 	Sodium perfluorohexylperfluorooctylphosphinate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;
8:8PFPi 	Sodium bis(perfluorooctyl)phosphinate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;

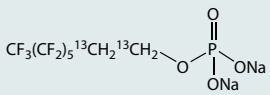
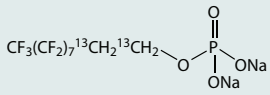
NATIVE MONO-SUBSTITUTED POLYFLUORINATED PHOSPHATE ESTERS

Catalogue Number	Product (methanol solution)	Qty/Conc
6:2PAP	Sodium 1H,1H,2H,2H-perfluorooctylphosphate	1.2 ml 50 µg/ml
8:2PAP	Sodium 1H,1H,2H,2H-perfluorodecylphosphate	1.2 ml 50 µg/ml

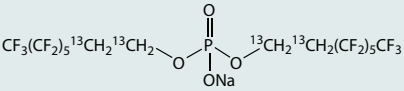
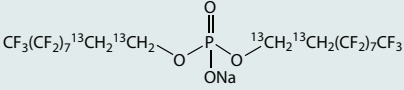
NATIVE DI-SUBSTITUTED POLYFLUORINATED PHOSPHATE ESTERS

Catalogue Number	Product (methanol solution)	Qty/Conc
6:2diPAP	Sodium bis(1H,1H,2H,2H-perfluorooctyl)phosphate	1.2 ml 50 µg/ml
6:2/8:2diPAP	Sodium (1H,1H,2H,2H-perfluorooctyl-1H,1H,2H,2H-perfluorodecyl)phosphate	1.2 ml 50 µg/ml
8:2diPAP	Sodium bis(1H,1H,2H,2H-perfluorodecyl)phosphate	1.2 ml 50 µg/ml

MASS-LABELLED MONO-SUBSTITUTED POLYFLUORINATED PHOSPHATE ESTERS (PAPs)

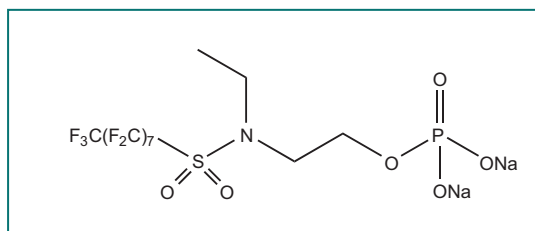
Catalogue Number	Product
M2-6:2PAP 	Sodium 1H,1H,2H,2H-[1,2- ¹³ C ₂]perfluorooctylphosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³ C ₂
M2-8:2PAP 	Sodium 1H,1H,2H,2H-[1,2- ¹³ C ₂]perfluorodecylphosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³ C ₂

MASS-LABELLED DI-SUBSTITUTED POLYFLUORINATED PHOSPHATE ESTERS (diPAPs)

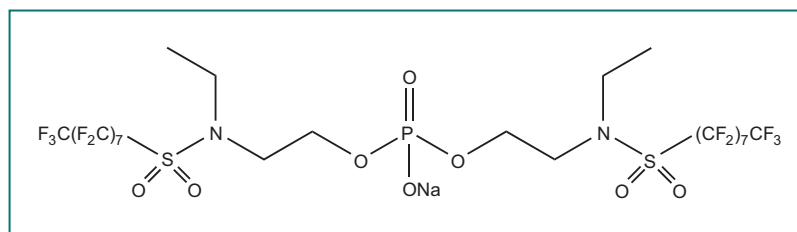
Catalogue Number	Product
M4-6:2diPAP 	Sodium bis(1H,1H,2H,2H-[1,2- ¹³ C ₂]perfluorooctyl)- phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³ C ₄
M4-8:2diPAP 	Sodium bis(1H,1H,2H,2H-[1,2- ¹³ C ₂]perfluorodecyl)- phosphate 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; > 99% ¹³ C ₄

NATIVE POLYFLUORINATED PHOSPHATE ESTERS (SAmPAPs)

Catalogue Number	Product (methanol solution)	Qty/Conc
SAmPAP	Sodium 2-(N-ethylperfluorooctane-1-sulfonamido)ethyl phosphate	1.2 ml 50 µg/ml
diSAmPAP	Sodium bis[2-(N-ethylperfluorooctane-1-sulfonamido)ethyl] phosphate	1.2 ml 50 µg/ml



SAmPAP



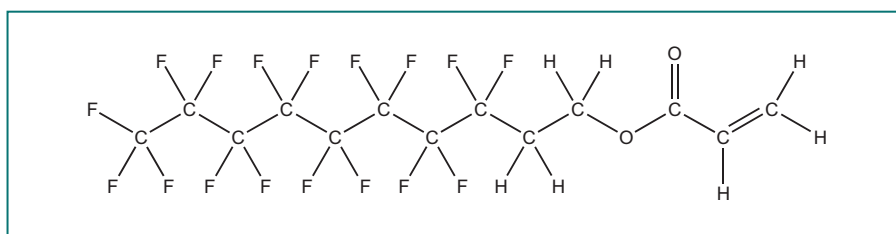
diSAmPAP

NATIVE TELOMER ACRYLATES (X:2FTAcr)

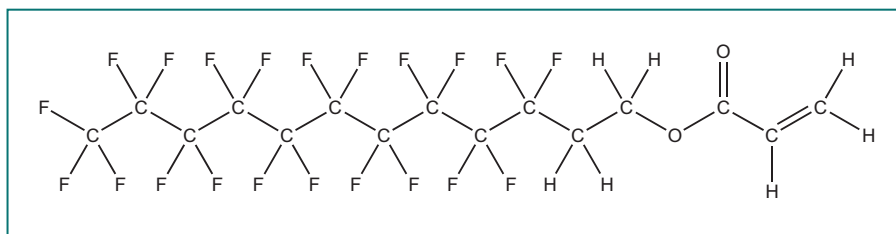
Catalogue Number	Product (isooctane solution)	Qty/Conc
8:2FTAcr	1H,1H,2H,2H-Perfluorodecyl acrylate	1.2 ml 50 µg/ml
10:2FTAcr	1H,1H,2H,2H-Perfluorododecyl acrylate (97%)	1.2 ml 48.5 µg/ml

NATIVE TELOMER ACETATES (X:2FTOAc)

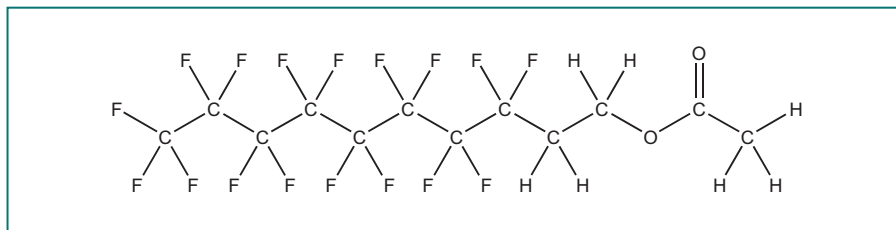
Catalogue Number	Product (isooctane solution)	Qty/Conc
8:2FTOAc	1H,1H,2H,2H-Perfluorodecyl acetate	1.2 ml 50 µg/ml
10:2FTOAc	1H,1H,2H,2H-Perfluorododecyl acetate	1.2 ml 50 µg/ml



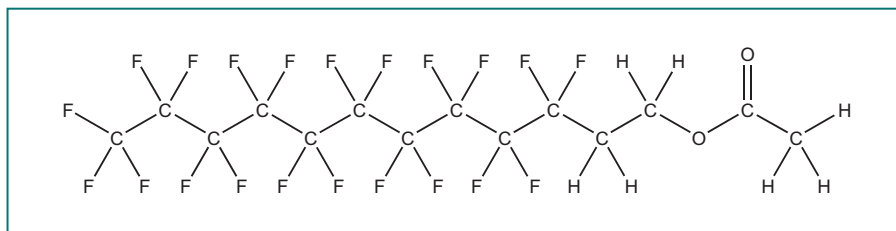
8:2FTAcr



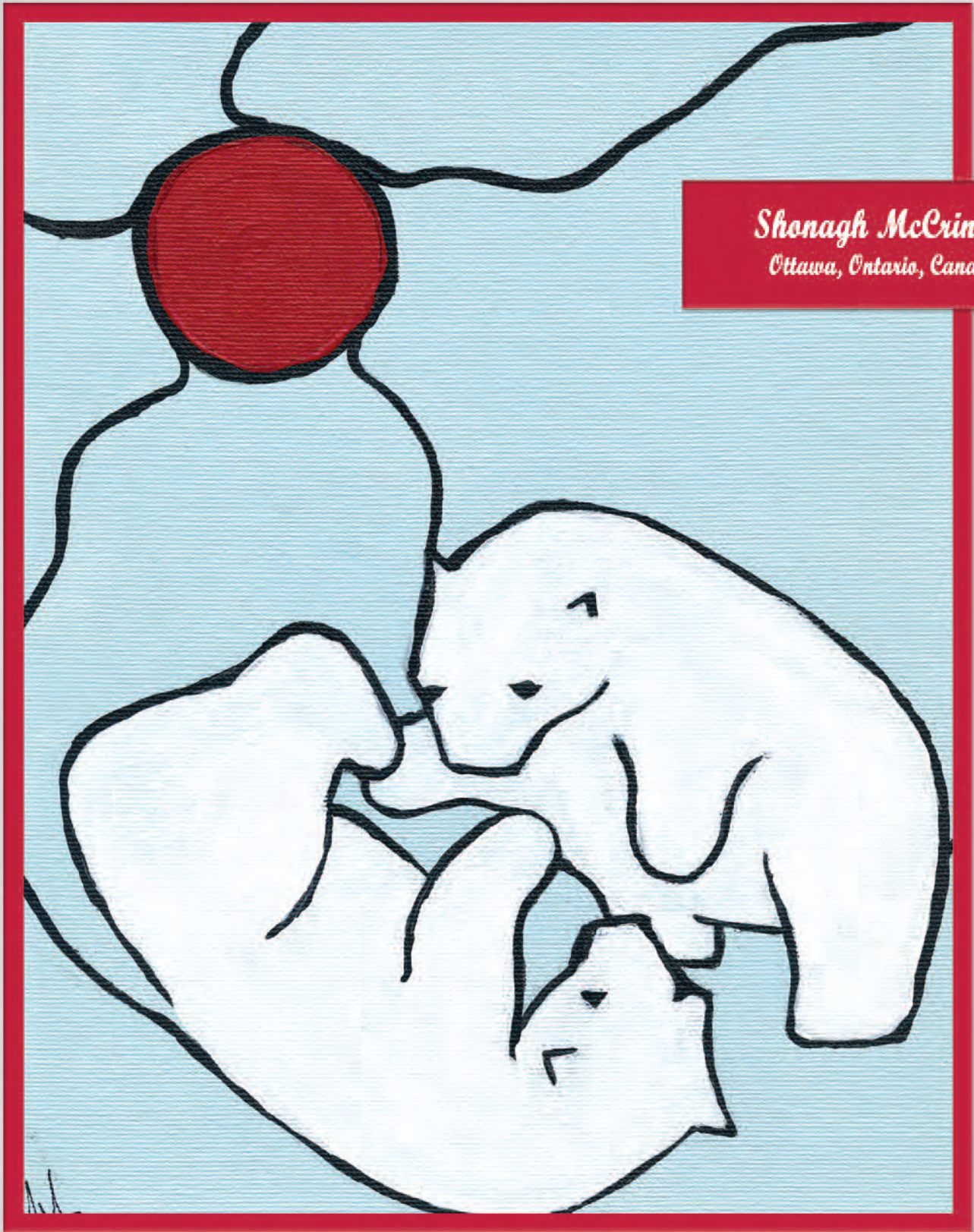
10:2FTAcr



8:2FTOAc



10:2FTOAc



Shonagh McCrindle
Ottawa, Ontario, Canada

CERTIFIED REFERENCE MATERIALS

Wellington currently offers three certified reference materials (CRMs) for use in testing an analytical lab's ability to generate accurate and reproducible data using real, as opposed to fortified, samples.

The following CRMs are currently offered:

WMS-01: Lake Sediment for Organic Contaminant Analysis.

WMF-01: Freeze-Dried Fish Tissue for Organic Contaminant Analysis.

CARP-2: Fish Tissue for Organic Contaminant Analysis.

More details on each of these CRMs, including the analytes and their certified values, are given in the following section.



WMS-01: REFERENCE LAKE SEDIMENT for ORGANIC CONTAMINANT ANALYSIS

Catalogue Number	Product	Qty/Conc
WMS-01	Reference Lake Sediment, WMS-01	25 g
Chlorinated Dibenzo-p-dioxins (PCDDs)		Certified Reference value (pg/g)
2,3,7,8-Tetrachlorodibenzo-p-dioxin Total Tetrachlorodibenzo-p-dioxins		17.7 ± 5.6 60.1 ± 25
1,2,3,7,8-Pentachlorodibenzo-p-dioxin Total Pentachlorodibenzo-p-dioxins		7.96 ± 2.8 69.5 ± 23
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin Total Hexachlorodibenzo-p-dioxins		8.66 ± 2.7 20.8 ± 4.8 17.3 ± 8.0 238 ± 86
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin Total Heptachlorodibenzo-p-dioxins		293 ± 63 608 ± 152
Octachlorodibenzo-p-dioxin		1899 ± 456
Chlorinated Dibenzofurans (PCDFs)		
2,3,7,8-Tetrachlorodibenzofuran Total Tetrachlorodibenzofurans		52.5 ± 16 374 ± 162
1,2,3,7,8-Pentachlorodibenzofuran 2,3,4,7,8-Pentachlorodibenzofuran Total Pentachlorodibenzofurans		12.6 ± 5.0 18.5 ± 6.1 225 ± 113
1,2,3,4,7,8-Hexachlorodibenzofuran 1,2,3,6,7,8-Hexachlorodibenzofuran 1,2,3,7,8,9-Hexachlorodibenzofuran 2,3,4,6,7,8-Hexachlorodibenzofuran Total Hexachlorodibenzofurans		67.3 ± 24 20.3 ± 8.7 2.68* ± 4.0 16 ± 8.0 262 ± 95
1,2,3,4,6,7,8-Heptachlorodibenzofuran 1,2,3,4,7,8,9-Heptachlorodibenzofuran Total Heptachlorodibenzofurans		299 ± 73 15.1 ± 4.6 411 ± 100
Octachlorodibenzofuran		509 ± 157
Chlorinated Biphenyls (PCBs-IUPAC)		
3,3',4,4'-Tetrachlorobiphenyl (77)		1717 ± 520
3,4,4',5-Tetrachlorobiphenyl (81)		75* ± 79
2,3,3',4,4'-Pentachlorobiphenyl (105)		3998 ± 951
2,3,4,4',5-Pentachlorobiphenyl (114)		207 ± 128
2,3',4,4',5-Pentachlorobiphenyl (118)		8115 ± 1663
2',3,4,4',5-Pentachlorobiphenyl (123)		209 ± 191
3,3',4,4',5-Pentachlorobiphenyl (126)		84.9 ± 35
2,3,3',4,4',5-Hexachlorobiphenyl (156)		715 ± 248
2,3,3',4,4',5'-Hexachlorobiphenyl (157)		186 ± 81
2,3',4,4',5,5'-Hexachlorobiphenyl (167)		330 ± 85
3,3',4,4',5,5'-Hexachlorobiphenyl (169)		7.97 ± 5.3
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)		85.2 ± 17.8

* Provisional value for information purposes only. Any negative deviation is inadmissible.
The concentrations of these analytes may be certified at a later date as more data becomes available.

WMF-01: REFERENCE FISH TISSUE for ORGANIC CONTAMINANT ANALYSIS

Catalogue Number	Product	Qty/Conc
WMF-01	Reference "Freeze-Dried" Fish Tissue, WMF-01	1 x 10 g
Chlorinated Dibenzo-p-dioxins (PCDDs)		
		Certified Reference value (pg/g)
2,3,7,8-Tetrachlorodibenzo-p-dioxin		13.1 ± 4.4
1,2,3,7,8-Pentachlorodibenzo-p-dioxin		2.72 ± 1.3
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin		0.22* ± 0.3
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin		0.88 ± 0.4
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin		0.27* ± 0.4
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		0.59* ± 0.7
Octachlorodibenzo-p-dioxin		3.91* ± 6.2
Chlorinated Dibenzofurans (PCDFs)		
2,3,7,8-Tetrachlorodibenzofuran		13.1 ± 4.9
1,2,3,7,8-Pentachlorodibenzofuran		1.53* ± 1.4
2,3,4,7,8-Pentachlorodibenzofuran		7.15 ± 2.2
1,2,3,4,7,8-Hexachlorodibenzofuran		0.86* ± 1.0
1,2,3,6,7,8-Hexachlorodibenzofuran		0.51* ± 0.7
1,2,3,7,8,9-Hexachlorodibenzofuran		0.25* ± 0.4
2,3,4,6,7,8-Hexachlorodibenzofuran		0.68* ± 1.2
1,2,3,4,6,7,8-Heptachlorodibenzofuran		1.01* ± 1.9
1,2,3,4,7,8,9-Heptachlorodibenzofuran		0.30* ± 0.5
Octachlorodibenzofuran		1.38* ± 2.1
Chlorinated Biphenyls (PCBs-IUPAC)		
3,3',4,4'-Tetrachlorobiphenyl (77)		2233 ± 720
3,4,4',5-Tetrachlorobiphenyl (81)		201 ± 58
2,3,3',4,4'-Pentachlorobiphenyl (105)		49050 ± 14200
2,3,4,4',5-Pentachlorobiphenyl (114)		3523 ± 1670
2,3',4,4',5-Pentachlorobiphenyl (118)		130100 ± 32500
2',3,4,4',5-Pentachlorobiphenyl (123)		4233* ± 2620
3,3',4,4',5-Pentachlorobiphenyl (126)		739 ± 260
2,3,3',4,4',5-Hexachlorobiphenyl (156)		14890 ± 5020
2,3,3',4,4',5'-Hexachlorobiphenyl (157)		3488 ± 870
2,3',4,4',5,5'-Hexachlorobiphenyl (167)		9750 ± 3090
3,3',4,4',5,5'-Hexachlorobiphenyl (169)		76 ± 30
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)		2016 ± 611
Brominated Diphenyl Ethers (PBDEs-IUPAC)		
2,4,4'-Tribromodiphenyl ether (28)		3124 ± 290
2,2',4,4'-Tetrabromodiphenyl ether (47)		123200 ± 24800
2,2',4,4',5-Pentabromodiphenyl ether (99)		37500 ± 4220
2,2',4,4',6-Pentabromodiphenyl ether (100)		35870 ± 14500
2,2',4,4',5,5'-Hexabromodiphenyl ether (153)		17040 ± 8000
2,2',4,4',5,6'-Hexabromodiphenyl ether (154)		19790 ± 2880
2,2',3,4,4',5',6-Heptabromodiphenyl ether (183)		532* ± 400

* Provisional value for information purposes only. Any negative deviation is inadmissible.
The concentrations of these analytes may be certified at a later date as more data becomes available.

CARP-2: REFERENCE FISH TISSUE for ORGANIC CONTAMINANT ANALYSIS

Catalogue Number	Product	Qty/Conc
CARP-2	Reference Fish Tissue, CARP-2	6 x 9 g
Polychlorinated Biphenyls (PCBs) Congener (IUPAC)		Certified Concentration µg/kg (wet weight basis)
18		27.3 ± 4.0
28		34.0 ± 7.2
44		86.6 ± 25.9
52		138 ± 43
118		148 ± 33
128		20.4 ± 4.4
153		105 ± 22
180		53.3 ± 13.0
194		10.9 ± 3.1
206		4.4 ± 1.1
Polychlorinated Biphenyls (PCBs) Congener (IUPAC)		Reference Concentration* µg/kg (wet weight basis)
8		4.8 ± 1.8
66/95		174 ± 52
101/90		145 ± 48
105		53.2 ± 15.6
138/163/164		103 ± 30
170/190		20.6 ± 2.9
187/182		37.1 ± 6.3
209		4.6 ± 2.0
Polychlorinated dibenzo-p-dioxins (PCDDs)		ng/kg (wet weight basis)*
2,3,7,8-Tetrachlorodibenzo-p-dioxin		7.4 ± 0.7
1,2,3,7,8-Pentachlorodibenzo-p-dioxin		5.3 ± 1.3
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin		1.6 ± 0.3
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin		5.8 ± 0.8
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin		0.78 ± 0.12
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		6.4 ± 0.9
Octachlorodibenzo-p-dioxin		9.4 ± 1.7
Polychlorinated dibenzofurans (PCDFs)		ng/kg (wet weight basis)*
2,3,7,8-Tetrachlorodibenzofuran		18.2 ± 1.6
1,2,3,7,8-Pentachlorodibenzofuran		5.6 ± 0.3
Pesticides		µg/kg (wet weight basis)*
gamma-chlordane		4.5 ± 0.7
2,4'-DDE		2.9 ± 0.5
trans-nonachlor		11.0 ± 0.9
dieldrin		8.3 ± 0.8
4,4'-DDE		158 ± 14
2,4'-DDD		21.8 ± 0.7
4,4'-DDD		90.9 ± 8.5

* Not Certified

CARP-2 was prepared and certified by the National Research Council of Canada (NRCC), Institute for Environmental Research and Technology.

ADDITIONAL PRODUCTS

PAH Calibration Sets

and Native and Mass-Labelled Support Solutions

Chlorinated Biphenyls (HO-PCBs):

Native and Mass-Labelled Individuals;
Mass-Labelled Solution/Mixture

Methoxy Chlorobiphenyls (MeO-PCBs):

Native and Mass-Labelled Individuals and Solution/Mixtures

Chlorinated Biphenylenes (PCBPs):

Native and Mass-Labelled

Triclocarban:

Native and Mass-Labelled

Triclosan and Methyl Triclosan:

Native and Mass-Labelled and Chlorinated Derivatives

Tris(4-chlorophenyl) Methane and Methanol:

Native and Mass-Labelled

Chlorinated Naphthalenes (PCNs):

Native Individuals and Solution/Mixtures

Chlorinated Diphenyl Ethers (PCDEs):

Native and Mass-Labelled

Native and Mass-Labelled Chlorobenzene and Chlorophenol Solution/Mixtures

Mass-Labelled Chlorobenzenes and Chlorophenols

Melamine and Cyanuric Acid:

Native and Mass-Labelled

Native and Mass-Labelled Bisphenol A and Native Bisphenol Analogues

Native and Mass-Labelled Tetrachlorodibenzothiophenes

Native and Mass-Labelled Halogenated Carbazoles



PAH-CVS-A

Catalogue Number	Product (isooctane/toluene solution)	Qty/Conc
PAH-CVS-A	PAH-CVS-A Calibration Solutions CS1-CS5	1 kit (5 ampoules)
PAH-A-CS1	CS1	1.0 ml
PAH-A-CS2	CS2	1.0 ml
PAH-A-CS3	CS3	1.0 ml
PAH-A-CS4	CS4	1.0 ml
PAH-A-CS5	CS5	1.0 ml

	PAH-A- CS1 (ng/ml)	PAH-A- CS2 (ng/ml)	PAH-A- CS3 (ng/ml)	PAH-A- CS4 (ng/ml)	PAH-A- CS5 (ng/ml)
Native PAHs					
Naphthalene	2.0	10	40	200	800
Acenaphthylene	2.0	10	40	200	800
Acenaphthene	2.0	10	40	200	800
Fluorene	2.0	10	40	200	800
Phenanthrene	2.0	10	40	200	800
Anthracene	2.0	10	40	200	800
Fluoranthene	2.0	10	40	200	800
Pyrene	2.0	10	40	200	800
Benz[a]anthracene	2.0	10	40	200	800
Cyclopenta[c,d]pyrene	2.0	10	40	200	800
Chrysene	2.0	10	40	200	800
5-Methylchrysene	2.0	10	40	200	800
Benzo[b]fluoranthene	2.0	10	40	200	800
Benzo[k]fluoranthene	2.0	10	40	200	800
Benzo[j]fluoranthene	2.0	10	40	200	800
Benzo[a]pyrene	2.0	10	40	200	800
Indeno[1,2,3-c,d]pyrene	2.0	10	40	200	800
Dibenz[a,h]anthracene	2.0	10	40	200	800
Benzo[g,h,i]perylene	2.0	10	40	200	800
Dibenzo[a,l]pyrene	2.0	10	40	200	800
Dibenzo[a,e]pyrene	2.0	10	40	200	800
Dibenzo[a,i]pyrene	2.0	10	40	200	800
Dibenzo[a,h]pyrene	2.0	10	40	200	800
Deuterated PAHs					
Naphthalene-d ₈	100	100	100	100	100
Acenaphthene-d ₁₀	100	100	100	100	100
Fluorene-d ₁₀	100	100	100	100	100
Phenanthrene-d ₁₀	100	100	100	100	100
Anthracene-d ₁₀	100	100	100	100	100
Fluoranthene-d ₁₀	100	100	100	100	100
Pyrene-d ₁₀	100	100	100	100	100
Benz[a]anthracene-d ₁₂	100	100	100	100	100
Chrysene-d ₁₂	100	100	100	100	100
Benzo[b]fluoranthene-d ₁₂	100	100	100	100	100
Benzo[k]fluoranthene-d ₁₂	100	100	100	100	100
Benzo[a]pyrene-d ₁₂	100	100	100	100	100
Indeno[1,2,3-c,d]pyrene-d ₁₂	100	100	100	100	100
Dibenz[a,h]anthracene-d ₁₄	100	100	100	100	100
Benzo[g,h,i]perylene-d ₁₂	100	100	100	100	100
Dibenzo[a,i]pyrene-d ₁₄	100	100	100	100	100
Deuterated PAH Internal Standards					
Acenaphthylene-d ₈	100	100	100	100	100
p-Terphenyl-d ₁₄	100	100	100	100	100
Benzo[e]pyrene-d ₁₂	100	100	100	100	100

Catalogue Number	Product (isooctane/toluene solution)	Qty/Conc
PAH-LCS-A	PAH Labelled Compound Solution	1.2 ml
PAH-ISS-A	PAH Internal Standard Spiking Solution	1.2 ml
PAH-STK-A	PAH Native Stock Solution	1.2 ml

	PAH-LCS-A (ng/ml)	PAH-ISS-A (ng/ml)	PAH-STK-A (ng/ml)
Native PAHs			
Naphthalene	—	—	4000
Acenaphthylene	—	—	4000
Acenaphthene	—	—	4000
Fluorene	—	—	4000
Phenanthrene	—	—	4000
Anthracene	—	—	4000
Fluoranthene	—	—	4000
Pyrene	—	—	4000
Benz[a]anthracene	—	—	4000
Cyclopenta[c,d]pyrene	—	—	4000
Chrysene	—	—	4000
5-Methylchrysene	—	—	4000
Benzo[b]fluoranthene	—	—	4000
Benzo[k]fluoranthene	—	—	4000
Benzo[j]fluoranthene	—	—	4000
Benzo[a]pyrene	—	—	4000
Indeno[1,2,3-c,d]pyrene	—	—	4000
Dibenz[a,h]anthracene	—	—	4000
Benzo[g,h,i]perylene	—	—	4000
Dibenzo[a,l]pyrene	—	—	4000
Dibenzo[a,e]pyrene	—	—	4000
Dibenzo[a,i]pyrene	—	—	4000
Dibenzo[a,h]pyrene	—	—	4000
Deuterated PAHs			
Naphthalene-d ₈	2000	—	—
Acenaphthene-d ₁₀	2000	—	—
Fluorene-d ₁₀	2000	—	—
Phenanthrene-d ₁₀	2000	—	—
Anthracene-d ₁₀	2000	—	—
Fluoranthene-d ₁₀	2000	—	—
Pyrene-d ₁₀	2000	—	—
Benz[a]anthracene-d ₁₂	2000	—	—
Chrysene-d ₁₂	2000	—	—
Benzo[b]fluoranthene-d ₁₂	2000	—	—
Benzo[k]fluoranthene-d ₁₂	2000	—	—
Benzo[a]pyrene-d ₁₂	2000	—	—
Indeno[1,2,3-c,d]pyrene-d ₁₂	2000	—	—
Dibenz[a,h]anthracene-d ₁₄	2000	—	—
Benzo[g,h,i]perylene-d ₁₂	2000	—	—
Dibenzo[a,i]pyrene-d ₁₄	2000	—	—
Deuterated PAH Internal Standards			
Acenaphthylene-d ₈	—	2000	—
p-Terphenyl-d ₁₄	—	2000	—
Benzo[e]pyrene-d ₁₂	—	2000	—

PAH-CVS-B

Catalogue Number	Product (isooctane/toluene solution)	Qty/Conc
PAH-CVS-B	PAH-CVS-B	1 kit
	Calibration Solutions CS1-CS5	(5 ampoules)
PAH-B-CS1	CS1	1.0 ml
PAH-B-CS2	CS2	1.0 ml
PAH-B-CS3	CS3	1.0 ml
PAH-B-CS4	CS4	1.0 ml
PAH-B-CS5	CS5	1.0 ml

	PAH-B-CS1 (ng/ml)	PAH-B-CS2 (ng/ml)	PAH-B-CS3 (ng/ml)	PAH-B-CS4 (ng/ml)	PAH-B-CS5 (ng/ml)
Native PAHs					
Naphthalene	2.0	10	50	250	1000
2-Methylnaphthalene	2.0	10	50	250	1000
Acenaphthylene	2.0	10	50	250	1000
Acenaphthene	2.0	10	50	250	1000
Fluorene	2.0	10	50	250	1000
Phenanthrene	2.0	10	50	250	1000
Anthracene	2.0	10	50	250	1000
Fluoranthene	2.0	10	50	250	1000
Pyrene	2.0	10	50	250	1000
Benzo[c]fluorene	2.0	10	50	250	1000
Benzo[a]anthracene	2.0	10	50	250	1000
Cyclopenta[c,d]pyrene	2.0	10	50	250	1000
Chrysene	2.0	10	50	250	1000
5-Methylchrysene	2.0	10	50	250	1000
Benzo[b]fluoranthene	2.0	10	50	250	1000
Benzo[k]fluoranthene	2.0	10	50	250	1000
Benzo[j]fluoranthene	2.0	10	50	250	1000
Benzo[e]pyrene	2.0	10	50	250	1000
Benzo[a]pyrene	2.0	10	50	250	1000
Perylene	2.0	10	50	250	1000
Indeno[1,2,3-c,d]pyrene	2.0	10	50	250	1000
Dibenz[a,h]anthracene	2.0	10	50	250	1000
Benzo[g,h,i]perylene	2.0	10	50	250	1000
Dibenzo[a,l]pyrene	2.0	10	50	250	1000
Dibenzo[a,e]pyrene	2.0	10	50	250	1000
Dibenzo[a,i]pyrene	2.0	10	50	250	1000
Dibenzo[a,h]pyrene	2.0	10	50	250	1000
Deuterated PAHs (PAH-LCS-B)					
Naphthalene-d ₈	100	100	100	100	100
2-Methylnaphthalene-d ₁₀	100	100	100	100	100
Acenaphthylene-d ₈	100	100	100	100	100
Phenanthrene-d ₁₀	100	100	100	100	100
Anthracene-d ₁₀	100	100	100	100	100
Fluoranthene-d ₁₀	100	100	100	100	100
Benzo[a]anthracene-d ₁₂	100	100	100	100	100
Chrysene-d ₁₂	100	100	100	100	100
Benzo[b]fluoranthene-d ₁₂	100	100	100	100	100
Benzo[k]fluoranthene-d ₁₂	100	100	100	100	100
Benzo[a]pyrene-d ₁₂	100	100	100	100	100
Perylene-d ₁₂	100	100	100	100	100
Indeno[1,2,3-c,d]pyrene-d ₁₂	100	100	100	100	100
Dibenz[a,h]anthracene-d ₁₄	100	100	100	100	100
Benzo[g,h,i]perylene-d ₁₂	100	100	100	100	100
Dibenzo[a,i]pyrene-d ₁₄	100	100	100	100	100
Internal Standards (PAH-ISS-B)					
Acenaphthene-d ₁₀	100	100	100	100	100
Pyrene-d ₁₀	100	100	100	100	100
Benzo[e]pyrene-d ₁₂	100	100	100	100	100
Sampling Standards (PAH-SS-B)					
Fluorene-d ₁₀	100	100	100	100	100
p-Terphenyl-d ₁₄	100	100	100	100	100

Catalogue Number	Product (isooctane/toluene solution)			Qty/Conc
PAH-LCS-B	PAH Labelled Compound Solution			1.2 ml
PAH-ISS-B	PAH Internal Standard Spiking Solution			1.2 ml
PAH-SS-B	PAH Sampling Standard Solution			1.2 ml
PAH-STK-B	PAH Native Stock Solution			1.2 ml
	PAH-LCS-B (ng/ml)	PAH-ISS-B (ng/ml)	PAH-SS-B (ng/ml)	PAH-STK-B (ng/ml)
Native PAHs				
Naphthalene	—	—	—	2500
2-Methylnaphthalene	—	—	—	2500
Acenaphthylene	—	—	—	2500
Acenaphthene	—	—	—	2500
Fluorene	—	—	—	2500
Phenanthrene	—	—	—	2500
Anthracene	—	—	—	2500
Fluoranthene	—	—	—	2500
Pyrene	—	—	—	2500
Benzo[c]fluorene	—	—	—	2500
Benz[a]anthracene	—	—	—	2500
Cyclopenta[c,d]pyrene	—	—	—	2500
Chrysene	—	—	—	2500
5-Methylchrysene	—	—	—	2500
Benzo[b]fluoranthene	—	—	—	2500
Benzo[k]fluoranthene	—	—	—	2500
Benzo[j]fluoranthene	—	—	—	2500
Benzo[e]pyrene	—	—	—	2500
Benzo[a]pyrene	—	—	—	2500
Perylene	—	—	—	2500
Indeno[1,2,3-c,d]pyrene	—	—	—	2500
Dibenz[a,h]anthracene	—	—	—	2500
Benzo[g,h,i]perylene	—	—	—	2500
Dibenzo[a,i]pyrene	—	—	—	2500
Dibenzo[a,e]pyrene	—	—	—	2500
Dibenzo[a,i]pyrene	—	—	—	2500
Dibenzo[a,h]pyrene	—	—	—	2500
Deuterated PAHs				
Naphthalene-d ₈	5000	—	—	—
2-Methylnaphthalene-d ₁₀	5000	—	—	—
Acenaphthylene-d ₈	5000	—	—	—
Phenanthrene-d ₁₀	5000	—	—	—
Anthracene-d ₁₀	5000	—	—	—
Fluoranthene-d ₁₀	5000	—	—	—
Benz[a]anthracene-d ₁₂	5000	—	—	—
Chrysene-d ₁₂	5000	—	—	—
Benzo[b]fluoranthene-d ₁₂	5000	—	—	—
Benzo[k]fluoranthene-d ₁₂	5000	—	—	—
Benzo[a]pyrene-d ₁₂	5000	—	—	—
Perylene-d ₁₂	5000	—	—	—
Indeno[1,2,3-c,d]pyrene-d ₁₂	5000	—	—	—
Dibenz[a,h]anthracene-d ₁₄	5000	—	—	—
Benzo[g,h,i]perylene-d ₁₂	5000	—	—	—
Dibenzo[a,i]pyrene-d ₁₄	5000	—	—	—
Internal Standards				
Acenaphthene-d ₁₀	—	5000	—	—
Pyrene-d ₁₀	—	5000	—	—
Benzo[e]pyrene-d ₁₂	—	5000	—	—
Sampling Standards				
Fluorene-d ₁₀	—	—	5000	—
p-Terphenyl-d ₁₄	—	—	5000	—

METHOD 429: HRGC/LRMS CALIBRATION SOLUTIONS FOR PAHs

Catalogue Number	Product (isooctane/toluene solution)	Qty/Conc
L429-CVS	L429-CVS Calibration Solutions CS1-CS5	1 kit (5 ampoules)
L429-CS1	CS1	1.0 ml
L429-CS2	CS2	1.0 ml
L429-CS3	CS3	1.0 ml
L429-CS4	CS4	1.0 ml
L429-CS5	CS5	1.0 ml

	L429-CS1 (ng/μl)	L429-CS2 (ng/μl)	L429-CS3 (ng/μl)	L429-CS4 (ng/μl)	L429-CS5 (ng/μl)
Native PAHs					
Naphthalene	0.25	0.5	1.0	2.5	5.0
2-Methylnaphthalene	0.25	0.5	1.0	2.5	5.0
Acenaphthylene	0.25	0.5	1.0	2.5	5.0
Acenaphthene	0.25	0.5	1.0	2.5	5.0
Fluorene	0.25	0.5	1.0	2.5	5.0
Phenanthrene	0.25	0.5	1.0	2.5	5.0
Anthracene	0.25	0.5	1.0	2.5	5.0
Fluoranthene	0.25	0.5	1.0	2.5	5.0
Pyrene	0.25	0.5	1.0	2.5	5.0
Benz[a]anthracene	0.25	0.5	1.0	2.5	5.0
Chrysene	0.25	0.5	1.0	2.5	5.0
Benzo[b]fluoranthene	0.25	0.5	1.0	2.5	5.0
Benzo[k]fluoranthene	0.25	0.5	1.0	2.5	5.0
Benzo[e]pyrene	0.25	0.5	1.0	2.5	5.0
Benzo[a]pyrene	0.25	0.5	1.0	2.5	5.0
Perylene	0.25	0.5	1.0	2.5	5.0
Indeno[1,2,3-c,d]pyrene	0.25	0.5	1.0	2.5	5.0
Dibenz[a,h]anthracene	0.25	0.5	1.0	2.5	5.0
Benzo[g,h,i]perylene	0.25	0.5	1.0	2.5	5.0
Surrogate Standards					
Fluorene-d ₁₀	1.0	1.0	1.0	1.0	1.0
p-Terphenyl-d ₁₄	1.0	1.0	1.0	1.0	1.0
Internal Standards					
Naphthalene-d ₈	1.0	1.0	1.0	1.0	1.0
2-Methylnaphthalene-d ₁₀	1.0	1.0	1.0	1.0	1.0
Acenaphthylene-d ₈	1.0	1.0	1.0	1.0	1.0
Phenanthrene-d ₁₀	1.0	1.0	1.0	1.0	1.0
Fluoranthene-d ₁₀	1.0	1.0	1.0	1.0	1.0
Benz[a]anthracene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Chrysene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Benzo[b]fluoranthene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Benzo[k]fluoranthene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Benzo[a]pyrene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Perylene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Indeno[1,2,3-c,d]pyrene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Dibenz[a,h]anthracene-d ₁₄	1.0	1.0	1.0	1.0	1.0
Benzo[g,h,i]perylene-d ₁₂	1.0	1.0	1.0	1.0	1.0
Alternate Standard					
Anthracene-d ₁₀	1.0	1.0	1.0	1.0	1.0
Recovery Standards					
Acenaphthene-d ₁₀	1.0	1.0	1.0	1.0	1.0
Pyrene-d ₁₀	1.0	1.0	1.0	1.0	1.0
Benzo[e]pyrene-d ₁₂	1.0	1.0	1.0	1.0	1.0

METHOD 429: HRGC/LRMS CALIBRATION SOLUTIONS FOR PAHs

Catalogue Number	Product (isooctane/toluene solution)					Qty/Conc
L429-SS	Method 429 Surrogate Standard Stock Solution					1.2 ml
L429-IS	Method 429 Internal Standard Stock Solution					1.2 ml
L429-AS	Method 429 Alternate Standard Stock Solution					1.2 ml
L429-RS	Method 429 Recovery Standard Stock Solution					1.2 ml
L429-PAR	Method 429 Native PAH Stock Solution					1.2 ml

	L429-SS (µg/ml)	L429-IS (µg/ml)	L429-AS (µg/ml)	L429-RS (µg/ml)	L429-PAR (µg/ml)
Native PAHs					
Naphthalene	—	—	—	—	2.0
2-Methylnaphthalene	—	—	—	—	2.0
Acenaphthylene	—	—	—	—	2.0
Acenaphthene	—	—	—	—	2.0
Fluorene	—	—	—	—	2.0
Phenanthrene	—	—	—	—	2.0
Anthracene	—	—	—	—	2.0
Fluoranthene	—	—	—	—	2.0
Pyrene	—	—	—	—	2.0
Benz[a]anthracene	—	—	—	—	2.0
Chrysene	—	—	—	—	2.0
Benzo[b]fluoranthene	—	—	—	—	2.0
Benzo[k]fluoranthene	—	—	—	—	2.0
Benzo[e]pyrene	—	—	—	—	2.0
Benzo[a]pyrene	—	—	—	—	2.0
Perylene	—	—	—	—	2.0
Indeno[1,2,3-c,d]pyrene	—	—	—	—	2.0
Dibenz[a,h]anthracene	—	—	—	—	2.0
Benzo[g,h,i]perylene	—	—	—	—	2.0
Surrogate Standards					
Fluorene-d ₁₀	100	—	—	—	—
p-Terphenyl-d ₁₄	100	—	—	—	—
Internal Standards					
Naphthalene-d ₈	—	100	—	—	—
2-Methylnaphthalene-d ₁₀	—	100	—	—	—
Acenaphthylene-d ₈	—	100	—	—	—
Phenanthrene-d ₁₀	—	100	—	—	—
Fluoranthene-d ₁₀	—	100	—	—	—
Benz[a]anthracene-d ₁₂	—	100	—	—	—
Chrysene-d ₁₂	—	100	—	—	—
Benzo[b]fluoranthene-d ₁₂	—	100	—	—	—
Benzo[k]fluoranthene-d ₁₂	—	100	—	—	—
Benzo[a]pyrene-d ₁₂	—	100	—	—	—
Perylene-d ₁₂	—	100	—	—	—
Indeno[1,2,3-c,d]pyrene-d ₁₂	—	100	—	—	—
Dibenz[a,h]anthracene-d ₁₄	—	100	—	—	—
Benzo[g,h,i]perylene-d ₁₂	—	100	—	—	—
Alternate Standard					
Anthracene-d ₁₀	—	—	100	—	—
Recovery Standards					
Acenaphthene-d ₁₀	—	—	—	100	—
Pyrene-d ₁₀	—	—	—	100	—
Benzo[e]pyrene-d ₁₂	—	—	—	100	—

EPA PAH SOLUTION/MIXTURES

Catalogue Number	Product (toluene solution)	Qty/Conc
EPA-PAH-STK	Native PAH Solution/Mixture	1.2 ml
	Naphthalene	5 µg/ml
	Acenaphthylene	5 µg/ml
	Acenaphthene	5 µg/ml
	Fluorene	5 µg/ml
	Phenanthrene	5 µg/ml
	Anthracene	5 µg/ml
	Fluoranthene	5 µg/ml
	Pyrene	5 µg/ml
	Benzo[a]anthracene	5 µg/ml
	Chrysene	5 µg/ml
	Benzo[b]fluoranthene	5 µg/ml
	Benzo[k]fluoranthene	5 µg/ml
	Benzo[a]pyrene	5 µg/ml
	Indeno[1,2,3-c,d]pyrene	5 µg/ml
	Benzo[g,h,i]perylene	5 µg/ml
	Dibenzo[a,h]anthracene	5 µg/ml

Catalogue Number	Product (toluene solution)	Qty/Conc
EPA-PAH-LCS	Deuterated PAH Solution/Mixture	1.2 ml
	Naphthalene-d ₈	5 µg/ml
	Acenaphthylene-d ₈	5 µg/ml
	Acenaphthene-d ₁₀	5 µg/ml
	Fluorene-d ₁₀	5 µg/ml
	Phenanthrene-d ₁₀	5 µg/ml
	Anthracene-d ₁₀	5 µg/ml
	Fluoranthene-d ₁₀	5 µg/ml
	Pyrene-d ₁₀	5 µg/ml
	Benzo[a]anthracene-d ₁₂	5 µg/ml
	Chrysene-d ₁₂	5 µg/ml
	Benzo[b]fluoranthene-d ₁₂	5 µg/ml
	Benzo[k]fluoranthene-d ₁₂	5 µg/ml
	Benzo[a]pyrene-d ₁₂	5 µg/ml
	Indeno[1,2,3-c,d]pyrene-d ₁₂	5 µg/ml
	Benzo[g,h,i]perylene-d ₁₂	5 µg/ml
	Dibenzo[a,h]anthracene-d ₁₄	5 µg/ml

* The solutions above can be used with the **PAH-CVS-B** calibration solutions.

EPA & EU PAH SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
EPA-EU-PAH-ISS	Deuterated PAH Solution/Mixture	1.2 ml
2-Methylnaphthalene-d ₁₀		5 µg/ml
p-Terphenyl-d ₁₄		5 µg/ml
Benzo[e]pyrene-d ₁₂		5 µg/ml

EU PAH SOLUTION/MIXTURES

Catalogue Number	Product (toluene solution)	Qty/Conc
EU-PAH-STK	Native PAH Solution/Mixture	1.2 ml
Benzo[c]fluorene		5 µg/ml
Cyclopenta[c,d]pyrene		5 µg/ml
Benzo[a]anthracene		5 µg/ml
Chrysene		5 µg/ml
5-Methylchrysene		5 µg/ml
Benzo[b]fluoranthene		5 µg/ml
Benzo[k]fluoranthene		5 µg/ml
Benzo[j]fluoranthene		5 µg/ml
Benzo[a]pyrene		5 µg/ml
Indeno[1,2,3-c,d]pyrene		5 µg/ml
Benzo[g,h,i]perylene		5 µg/ml
Dibenzo[a,h]anthracene		5 µg/ml
Dibenzo[a,l]pyrene		5 µg/ml
Dibenzo[a,e]pyrene		5 µg/ml
Dibenzo[a,i]pyrene		5 µg/ml
Dibenzo[a,h]pyrene		5 µg/ml

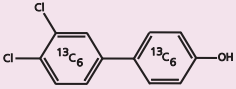
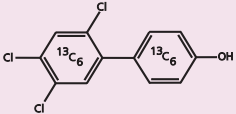
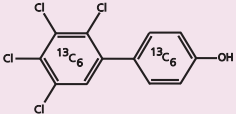
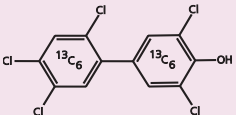
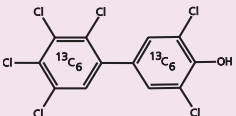
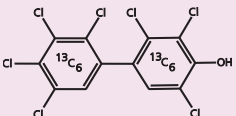
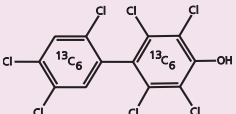
Catalogue Number	Product (toluene solution)	Qty/Conc
EU-PAH-LCS	Deuterated PAH Solution/Mixture	1.2 ml
Benzo[a]anthracene-d ₁₂		5 µg/ml
Chrysene-d ₁₂		5 µg/ml
Benzo[b]fluoranthene-d ₁₂		5 µg/ml
Benzo[k]fluoranthene-d ₁₂		5 µg/ml
Benzo[a]pyrene-d ₁₂		5 µg/ml
Indeno[1,2,3-c,d]pyrene-d ₁₂		5 µg/ml
Benzo[g,h,i]perylene-d ₁₂		5 µg/ml
Dibenzo[a,h]anthracene-d ₁₄		5 µg/ml
Dibenzo[a,i]pyrene-d ₁₄		5 µg/ml

* The solutions above can be used with the **PAH-CVS-B** calibration solutions.

NATIVE CHLORINATED BIPHENYLS (HO-PCBs)

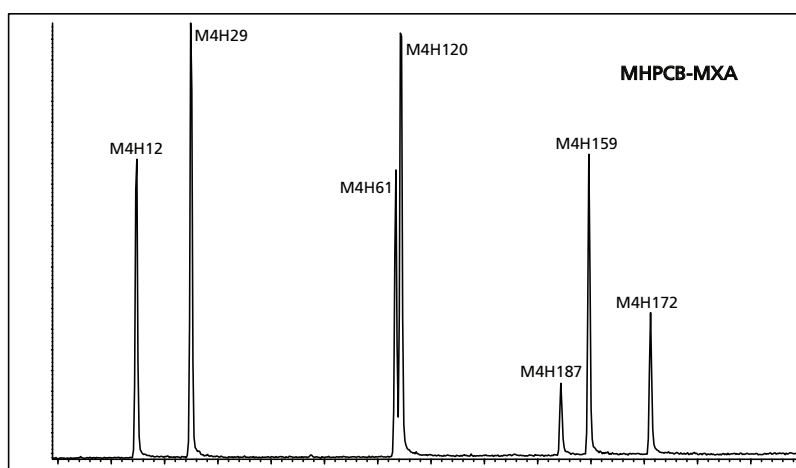
Catalogue Number	Product (nonane solution)	Qty/Conc
4H107	2,3,3',4',5-Pentachloro-4-biphenylol	1.2 ml 50 µg/ml
4H108	2',3,3',4',5-Pentachloro-4-biphenylol (96.5%)	1.2 ml 48.3 µg/ml
3H118	2,3',4,4',5-Pentachloro-3-biphenylol	1.2 ml 50 µg/ml
4H130	2,2',3,3',4',5-Hexachloro-4-biphenylol	1.2 ml 50 µg/ml
3H138	2,2',3',4,4',5-Hexachloro-3-biphenylol	1.2 ml 50 µg/ml
4H146	2,2',3,4',5,5'-Hexachloro-4-biphenylol	1.2 ml 50 µg/ml
3H153	2,2',4,4',5,5'-Hexachloro-3-biphenylol	1.2 ml 50 µg/ml
4H172	2,2',3,3',4',5,5'-Heptachloro-4-biphenylol	1.2 ml 50 µg/ml
3H180	2,2',3',4,4',5,5'-Heptachloro-3-biphenylol	1.2 ml 50 µg/ml
4H187	2,2',3,4',5,5',6-Heptachloro-4-biphenylol	1.2 ml 50 µg/ml

MASS-LABELLED CHLORINATED BIPHENYLS

Catalogue Number	Product
M4H12	 <p>3',4'-Dichloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>
M4H29	 <p>2',4',5'-Trichloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>
M4H61	 <p>2',3',4',5'-Tetrachloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>
M4H120	 <p>2',3,4',5,5'-Pentachloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>
M4H159	 <p>2',3,3',4',5,5'-Hexachloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>
M4H172	 <p>2,2',3,3',4',5,5'-Heptachloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>
M4H187	 <p>2,2',3,4',5,5',6-Heptachloro-4-[¹³C₁₂]biphenylol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>

MASS-LABELLED CHLORINATED BIPHENYLS: SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
MHPCB-MXA	Mass-Labelled Chlorinated Biphenyl Solution/Mixture	1.2 ml
3',4'-Dichloro-4-[¹³ C ₁₂]biphenylol	M4H12	5 µg/ml
2',4',5'-Trichloro-4-[¹³ C ₁₂]biphenylol	M4H29	5 µg/ml
2',3',4',5'-Tetrachloro-4-[¹³ C ₁₂]biphenylol	M4H61	5 µg/ml
2',3,4',5,5'-Pentachloro-4-[¹³ C ₁₂]biphenylol	M4H120	5 µg/ml
2',3,3',4',5,5'-Hexachloro-4-[¹³ C ₁₂]biphenylol	M4H159	5 µg/ml
2,2',3,3',4',5,5'-Heptachloro-4-[¹³ C ₁₂]biphenylol	M4H172	5 µg/ml
2,2',3,4',5,5',6-Heptachloro-4-[¹³ C ₁₂]biphenylol	M4H187	5 µg/ml



MHPCB-MXA; HRGC/LRMS TIC Chromatogram

NATIVE METHOXY-CHLOROBIPHENYLS (MeO-PCBs)

Catalogue Number	Product (nonane solution)	Qty/Conc
4PM79	3,3',4',5-Tetrachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4PM97	2,2',3,4',5'-Pentachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4PM101	2,2',4,5,5'-Pentachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4M107	2,3,3',4',5-Pentachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4PM108	2,3,3',4,5'-Pentachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
3M118	2,3',4,4',5-Pentachloro-3-methoxybiphenyl	1.2 ml 50 µg/ml
4PM120	2,3',4,5,5'-Pentachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4PM127	3,3',4,5,5'-Pentachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4PM130	2,2',3,3',4',5-Hexachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4M134	2,2',3,3',5,6-Hexachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
3PM138	2,2',3',4,4',5-Hexachloro-3-methoxybiphenyl	1.2 ml 50 µg/ml
4M146	2,2',3,4',5,5'-Hexachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
33PDM155	2,2',4,4',6,6'-Hexachloro-3,3'-dimethoxybiphenyl	1.2 ml 50 µg/ml
4PM159	2,3,3',4,5,5'-Hexachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4M162	2,3,3',4',5,5'-Hexachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4M163	2,3,3',4',5,6-Hexachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4PM172	2,2',3,3',4,5,5'-Heptachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4M177	2,2',3,3',4',5,6-Heptachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4M178	2,2',3,3',5,5',6-Heptachloro-4-methoxybiphenyl	1.2 ml 48.5 µg/ml
3PM180	2,2',3,4,4',5,5'-Heptachloro-3'-methoxybiphenyl	1.2 ml 50 µg/ml
3PM182	2,2',3,4,4',5,6'-Heptachloro-3'-methoxybiphenyl	1.2 ml 50 µg/ml
3PM183	2,2',3',4,4',5,6'-Heptachloro-3-methoxybiphenyl	1.2 ml 50 µg/ml
3PM184	2,2',3,4,4',6,6'-Heptachloro-3'-methoxybiphenyl	1.2 ml 50 µg/ml
4M187	2,2',3,4',5,5',6-Heptachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4M193	2,3,3',4',5,5',6-Heptachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4PM198	2,2',3,3',4,5,5',6-Octachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4PM199	2,2',3,3',4',5,5',6-Octachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4PM200	2,2',3,3',4,5,6,6'-Octachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml
4PM201	2,2',3,3',4',5,6,6'-Octachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
4M202	2,2',3,3',5,5',6,6'-Octachloro-4-methoxybiphenyl	1.2 ml 50 µg/ml
44PDM202	2,2',3,3',5,5',6,6'-Octachloro-4,4'-dimethoxybiphenyl	1.2 ml 50 µg/ml
3PM203	2,2',3,4,4',5,5',6-Octachloro-3'-methoxybiphenyl	1.2 ml 50 µg/ml
4PM208	2,2',3,3',4,5,5',6,6'-Nonachloro-4'-methoxybiphenyl	1.2 ml 50 µg/ml

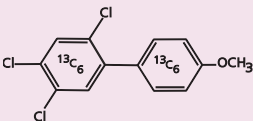
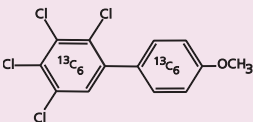
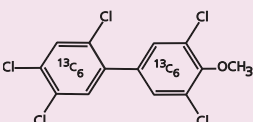
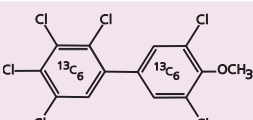
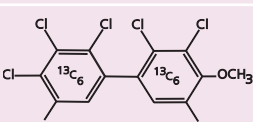
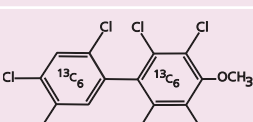
NATIVE METHOXY-CHLOROBIPHENYLS: SOLUTION/MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
MPCB-MXA	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
2,3,4,5-Tetrachloro-4'-methoxybiphenyl	4PM61	5 µg/ml
2,3',4,5,5'-Pentachloro-4'-methoxybiphenyl	4PM120	5 µg/ml
2,2',4,4',6,6'-Hexachloro-3,3'-dimethoxybiphenyl	33PDM155	5 µg/ml
2,2',3,4,4',6,6'-Heptachloro-3'-methoxybiphenyl	3PM184	5 µg/ml
2,2',3,3',5,5',6,6'-Octachloro-4-methoxybiphenyl	4M202	5 µg/ml
MPCB-MXB	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
3,3',4',5-Tetrachloro-4-methoxybiphenyl	4PM79	5 µg/ml
2,2',4,5,5'-Pentachloro-4'-methoxybiphenyl	4PM101	5 µg/ml
2,2',3,3',5,6-Hexachloro-4-methoxybiphenyl	4M134	5 µg/ml
2,2',3,3',5,5',6-Heptachloro-4-methoxybiphenyl	4M178	4.85 µg/ml
2,2',3,3',4',5,6,6'-Octachloro-4-methoxybiphenyl	4PM201	5 µg/ml
MPCB-MXC	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
2,3,4,4',5-Pentachloro-2'-methoxybiphenyl	2PM114	5 µg/ml
2,2',3,4',5,5'-Hexachloro-4-methoxybiphenyl	4M146	5 µg/ml
2,2',3,4,4',5,6'-Heptachloro-3'-methoxybiphenyl	3PM182	5 µg/ml
2,2',3,4,4',5,5',6-Octachloro-3'-methoxybiphenyl	3PM203	5 µg/ml
2,2',3,3',4,5,5',6,6'-Nonachloro-4'-methoxybiphenyl	4PM208	5 µg/ml
MPCB-MXD	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
2,3',4,4',5-Pentachloro-3-methoxybiphenyl	3M118	5 µg/ml
2,2',3',4,4',5-Hexachloro-3-methoxybiphenyl	3PM138	5 µg/ml
2,2',3',4,4',5,6'-Heptachloro-3-methoxybiphenyl	3PM183	5 µg/ml
2,2',3,3',4,5,5',6-Octachloro-4'-methoxybiphenyl	4PM198	5 µg/ml
MPCB-MXE	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
2,3,3',4,5'-Pentachloro-4'-methoxybiphenyl	4PM108	5 µg/ml
2,2',3,3',4',5-Hexachloro-4-methoxybiphenyl	4PM130	5 µg/ml
2,2',3,4',5,5',6-Heptachloro-4-methoxybiphenyl	4M187	5 µg/ml
2,2',3,3',4',5,5',6-Octachloro-4-methoxybiphenyl	4PM199	5 µg/ml
MPCB-MXF	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
2,3,3',4',5-Pentachloro-4-methoxybiphenyl	4M107	5 µg/ml
2,3,3',4',5,6-Hexachloro-4-methoxybiphenyl	4M163	5 µg/ml
2,2',3,3',4',5,6-Heptachloro-4-methoxybiphenyl	4M177	5 µg/ml
2,2',3,3',4,5,6,6'-Octachloro-4'-methoxybiphenyl	4PM200	5 µg/ml

NATIVE METHOXY-CHLOROBIPHENYLS: SOLUTION/MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
MPCB-MXG	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
	2,2',3,4',5'-Pentachloro-4-methoxybiphenyl	4PM97
	2,3,3',4,5,5'-Hexachloro-4'-methoxybiphenyl	4PM159
	2,2',3,4,4',5,5'-Heptachloro-3'-methoxybiphenyl	3PM180
	2,2',3,3',5,5',6,6'-Octachloro-4,4'-dimethoxybiphenyl	44PDM202
MPCB-MXH	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
	3,3',4,5,5'-Pentachloro-4'-methoxybiphenyl	4PM127
	2,2',3,3',4,5,5'-Heptachloro-4'-methoxybiphenyl	4PM172
MPCB-MXI	Native Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
	2,3,3',4',5,5'-Hexachloro-4-methoxybiphenyl	4M162
	2,3,3',4',5,5',6-Heptachloro-4-methoxybiphenyl	4M193

MASS-LABELLED METHOXY-CHLOROBIPHENYLS

Catalogue Number	Product
M4M29	 <p>2,4,5-Trichloro-4'-methoxy[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
M4M61	 <p>2,3,4,5-Tetrachloro-4'-methoxy[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
M4M120	 <p>2,3',4,5,5'-Pentachloro-4'-methoxy[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
M4M159	 <p>2,3,3',4,5,5'-Hexachloro-4'-methoxy[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
M4M172	 <p>2,2',3,3',4,5,5'-Heptachloro-4'-methoxy[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>
M4M187	 <p>2,2',3,4',5,5',6-Heptachloro-4-methoxy[¹³C₁₂]biphenyl 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene</p>

* Unless stated otherwise, Isotopic Purities of these compounds are 99% or greater.

MASS-LABELLED METHOXY-CHLOROBIPHENYLS: SOLUTION/MIXTURE

Catalogue Number	Product (toluene solution)	Qty/Conc
MMPCB-MXA	Mass-Labelled Chlorinated Methoxybiphenyl Solution/Mixture	1.2 ml
	2,4,5-Trichloro-4'-methoxy[¹³ C ₁₂]biphenyl	M4M29
	2,3,4,5-Tetrachloro-4'-methoxy[¹³ C ₁₂]biphenyl	M4M61
	2,3',4,5,5'-Pentachloro-4'-methoxy[¹³ C ₁₂]biphenyl	M4M120
	2,3,3',4,5,5'-Hexachloro-4'-methoxy[¹³ C ₁₂]biphenyl	M4M159
	2,2',3,3',4,5,5'-Heptachloro-4'-methoxy[¹³ C ₁₂]biphenyl	M4M172
	2,2',3,4',5,5',6-Heptachloro-4-methoxy[¹³ C ₁₂]biphenyl	M4M187

NATIVE CHLORINATED BIPHENYLENES (PCBPs)

Chlorinated Biphenylenes have been detected in samples taken in the aftermath of PCB fires. It is thought that they may be formed as the result of incomplete combustion of the PCBs.

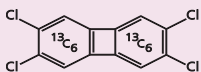
In microsomal enzyme studies, the 2,3,6,7-tetrachlorobiphenylene has shown similar potency to that of 2,3,7,8-tetrachlorodibenzo-p-dioxin in its toxicological effects.

Catalogue Number	Product (nonane solution)	Qty/Conc
CBP-2	2-Chlorobiphenylene	1.2 ml 50 µg/ml
CBP-23	2,3-Dichlorobiphenylene	1.2 ml 50 µg/ml
CBP-236	2,3,6-Trichlorobiphenylene	1.2 ml 50 µg/ml
CBP-2367	2,3,6,7-Tetrachlorobiphenylene	1.2 ml 50 µg/ml

NATIVE CHLORINATED BIPHENYLENES FOR TOXICOLOGICAL STUDIES

Catalogue Number	Product (DMSO solution)	Qty/Conc
CBP-2-D	2-Chlorobiphenylene	1.2 ml 1 x 10 ⁻⁴ M
CBP-23-D	2,3-Dichlorobiphenylene	1.2 ml 1 x 10 ⁻⁴ M
CBP-236-D	2,3,6-Trichlorobiphenylene	1.2 ml 1 x 10 ⁻⁴ M
CBP-2367-D	2,3,6,7-Tetrachlorobiphenylene	1.2 ml 1 x 10 ⁻⁴ M

MASS-LABELLED CHLORINATED BIPHENYLENE

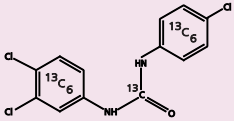
Catalogue Number	Product
MPCBP-2367	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>2,3,6,7-Tetrachloro[¹³C₁₂]biphenylene</p> <p>1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic Purity 99% or greater</p> </div> </div>

NATIVE TRICLOCARBAN

Triclocarban, like Triclosan, is an antimicrobial additive used in a variety of personal care products.

Catalogue Number	Product (methanol solution)	Qty/Conc
TCC	N-(4-chlorophenyl)-N'-(3,4-dichlorophenyl)urea	1.2 ml 50 µg/ml

MASS-LABELLED TRICLOCARBAN

Catalogue Number	Product
MTCC	 <p>N-(4-chloro¹³C₆]phenyl)-N'-(3,4-dichloro¹³C₆]phenyl)¹³C]urea 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; Isotopic Purity 99% or greater</p>

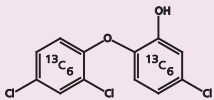
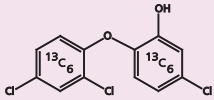
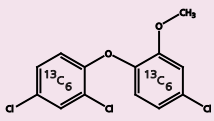
NATIVE TRICLOSAN AND METHYL TRICLOSAN

Triclosan is a widely used antibacterial and antifungal agent that has been incorporated into many common consumer products including toothpastes, deodorants, antibacterial soaps, and detergents.

The increasing use of these products over the last 30 years has led to Triclosan, and its biotransformation product, Methyl Triclosan, being found in the environment.

Catalogue Number	Product (nonane solution)	Qty/Conc
TCS	5-Chloro-2-(2,4-dichlorophenoxy)phenol	1.2 ml 50 µg/ml
TCS-M	5-Chloro-2-(2,4-dichlorophenoxy)phenol (in methanol)	1.2 ml 50 µg/ml
MeTCS	5-Chloro-2-(2,4-dichlorophenoxy)anisole	1.2 ml 50 µg/ml

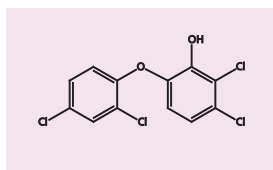
MASS-LABELLED TRICLOSAN AND METHYL TRICLOSAN

Catalogue Number	Product
MTCS	 <p>5-Chloro-2-(2,4-dichloro¹³C₆]phenoxy)¹³C₆]phenol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic Purity 99% or greater</p>
MTCS-M	 <p>5-Chloro-2-(2,4-dichloro¹³C₆]phenoxy)¹³C₆]phenol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol; Isotopic Purity 99% or greater</p>
MMeTCS	 <p>5-Chloro-2-(2,4-dichloro¹³C₆]phenoxy)[1,2,3,4,5,6-¹³C₆]anisole 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane; Isotopic Purity 99% or greater</p>

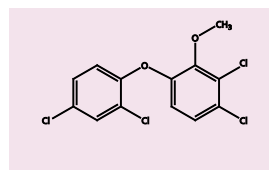
CHLORINATED DERIVATIVES OF TRICLOSAN AND METHYL TRICLOSAN

The reaction of Triclosan with free chlorine in water, or during wastewater treatment processes, may result in the formation of further chlorinated Triclosan isomers.

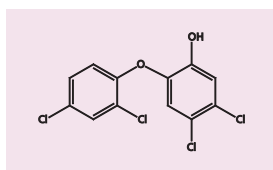
Catalogue Number	Product (nonane solution)		Qty/Conc
6TCS	2,3-Dichloro-6-(2,4-dichlorophenoxy)phenol	(6-Chlorotriclosan)	1.2 ml 50 µg/ml
6MeTCS	2,3-Dichloro-6-(2,4-dichlorophenoxy)anisole	(6-Chloro-methyltriclosan)	1.2 ml 50 µg/ml
4TCS	4,5-Dichloro-2-(2,4-dichlorophenoxy)phenol	(4-Chlorotriclosan)	1.2 ml 50 µg/ml
4MeTCS	4,5-Dichloro-2-(2,4-dichlorophenoxy)anisole	(4-Chloro-methyltriclosan)	1.2 ml 50 µg/ml
46TCS	2,3,4-Trichloro-6-(2,4-dichlorophenoxy)phenol	(4,6-Dichlorotriclosan)	1.2 ml 50 µg/ml
46MeTCS	2,3,4-Trichloro-6-(2,4-dichlorophenoxy)anisole	(4,6-Dichloro-methyltriclosan)	1.2 ml 50 µg/ml



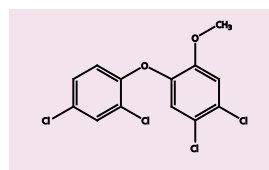
2,3-Dichloro-6-(2,4-dichlorophenoxy)phenol



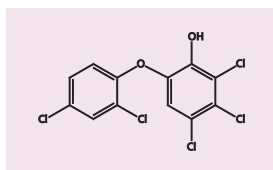
2,3-Dichloro-6-(2,4-dichlorophenoxy)anisole



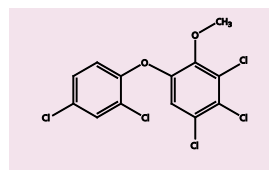
4,5-Dichloro-2-(2,4-dichlorophenoxy)phenol



4,5-Dichloro-2-(2,4-dichlorophenoxy)anisole



2,3,4-Trichloro-6-(2,4-dichlorophenoxy)phenol

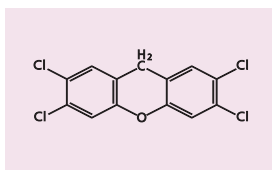


2,3,4-Trichloro-6-(2,4-dichlorophenoxy)anisole

NATIVE CHLOROANTHENE

The tetrachloroxanthene was originally suspected to be an environmental contaminant due to pulp bleaching.

Catalogue Number	Product (toluene solution)	Qty/Conc
XE-2367-S	2,3,6,7-Tetrachloroxanthene	1.2 ml 50 µg/ml



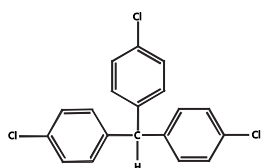
2,3,6,7-Tetrachloroxanthene

TRIS(4-CHLOROPHENYL)METHANE AND TRIS(4-CHLOROPHENYL)METHANOL; NATIVE AND MASS-LABELLED

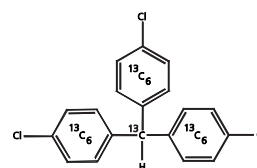
These two compounds have been found in a variety of environmental samples including fish, marine mammals and birds.

It is possible that they may originate from DDT or other agrochemicals.

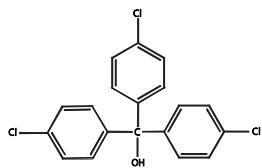
Catalogue Number	Product (nonane solution)	Qty/Conc
T4CPM	Tris(4-chlorophenyl)methane	1.2 ml 50 µg/ml
T4CPME	Tris(4-chlorophenyl)methanol	1.2 ml 50 µg/ml
MT4CPM	Tris(4-chlorophenyl)methane- ¹³ C ₁₉ ; 99 atom% ¹³ C ₁₉	1.2 ml 50 µg/ml
MT4CPME	Tris(4-chlorophenyl)methanol- ¹³ C ₁₉ ; 99 atom% ¹³ C ₁₉	1.2 ml 50 µg/ml



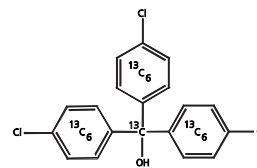
Tris(4-chlorophenyl)methane



Tris(4-chlorophenyl)methane-¹³C₁₉



Tris(4-chlorophenyl)methanol



Tris(4-chlorophenyl)methanol-¹³C₁₉

NATIVE CHLORINATED NAPHTHALENES (PCNs)

Catalogue Number	Product (nonane solution)	Qty/Conc
PN-2S	2-Chloronaphthalene	1.2 ml 50 µg/ml
PN-6S	1,5-Dichloronaphthalene	1.2 ml 50 µg/ml
PN-12S	2,7-Dichloronaphthalene	1.2 ml 50 µg/ml
PN-13S	1,2,3-Trichloronaphthalene	1.2 ml 50 µg/ml
PN-27S	1,2,3,4-Tetrachloronaphthalene	1.2 ml 50 µg/ml
PN-28S	1,2,3,5-Tetrachloronaphthalene	1.2 ml 50 µg/ml
PN-31S	1,2,3,8-Tetrachloronaphthalene	1.2 ml 50 µg/ml
PN-46S	1,4,5,8-Tetrachloronaphthalene (96% pure)	1.2 ml 48 µg/ml
PN-48S	2,3,6,7-Tetrachloronaphthalene	1.2 ml 50 µg/ml
PN-50S	1,2,3,4,6-Pentachloronaphthalene	1.2 ml 50 µg/ml
PN-52S	1,2,3,5,7-Pentachloronaphthalene	1.2 ml 50 µg/ml
PN-53S	1,2,3,5,8-Pentachloronaphthalene	1.2 ml 50 µg/ml
PN-66S	1,2,3,4,6,7-Hexachloronaphthalene	1.2 ml 50 µg/ml
PN-69S	1,2,3,5,7,8-Hexachloronaphthalene	1.2 ml 50 µg/ml
PN-72S	1,2,4,5,7,8-Hexachloronaphthalene	1.2 ml 50 µg/ml
PN-73S	1,2,3,4,5,6,7-Heptachloronaphthalene	1.2 ml 50 µg/ml
PN-75S	Octachloronaphthalene	1.2 ml 50 µg/ml

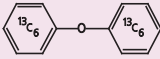
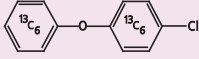
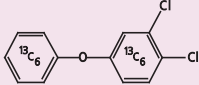
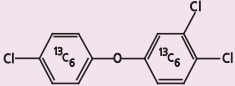
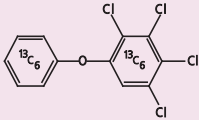
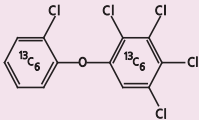
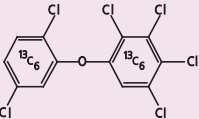
NATIVE CHLORINATED NAPHTHALENES: SOLUTION/MIXTURES

Catalogue Number	Product (nonane solution)	Qty/Conc
PCN-MXA	Native PCN Solution/Mixture	1.2 ml
	IUPAC	
2-Chloronaphthalene	2	5 µg/ml
1,5-Dichloronaphthalene	6	5 µg/ml
1,2,3-Trichloronaphthalene	13	5 µg/ml
1,2,3,5-Tetrachloronaphthalene	28	5 µg/ml
1,2,3,5,7-Pentachloronaphthalene	52	5 µg/ml
1,2,3,4,6,7-Hexachloronaphthalene	66	5 µg/ml
1,2,3,4,5,6,7-Heptachloronaphthalene	73	5 µg/ml
Octachloronaphthalene	75	5 µg/ml
PCN-MXC	Native PCN Solution/Mixture	1.2 ml
	IUPAC	
1,2,3,4-Tetrachloronaphthalene	27	5 µg/ml
1,2,5,6-Tetrachloronaphthalene	36	4.5 µg/ml
1,4,5,8-Tetrachloronaphthalene	46	4.8 µg/ml
2,3,6,7-Tetrachloronaphthalene	48	4.9 µg/ml
1,2,3,4,6-Pentachloronaphthalene	50	5 µg/ml
1,2,3,5,8-Pentachloronaphthalene	53	5 µg/ml
1,2,3,5,7,8-Hexachloronaphthalene	69	5 µg/ml
1,2,4,5,7,8-Hexachloronaphthalene	72	5 µg/ml

NATIVE CHLORINATED DIPHENYL ETHERS (PCDEs)

Catalogue Number	Product (nonane solution)	Qty/Conc
DPE-0	Diphenyl ether	1.2 ml 50 µg/ml
DPE-3	4-Chlorodiphenyl ether	1.2 ml 50 µg/ml
DPE-15	4,4'-Dichlorodiphenyl ether	1.2 ml 50 µg/ml
DPE-28	2,4,4'-Trichlorodiphenyl ether	1.2 ml 50 µg/ml
DPE-74	2,4,4',5-Tetrachlorodiphenyl ether	1.2 ml 50 µg/ml
DPE-77	3,3',4,4'-Tetrachlorodiphenyl ether	1.2 ml 50 µg/ml
DPE-99	2,2',4,4',5-Pentachlorodiphenyl ether	1.2 ml 50 µg/ml
DPE-209	Decachlorodiphenyl ether	1.2 ml 50 µg/ml

MASS-LABELLED CHLORINATED DIPHENYL ETHERS

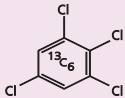
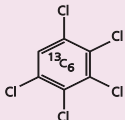
Catalogue Number	Product
MCDE-0	 <p>[¹³C₁₂]Diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-3	 <p>4-Chloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-12	 <p>3,4-Dichloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-37	 <p>3,4,4'-Trichloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-61	 <p>2,3,4,5-Tetrachloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-86	 <p>2,2',3,4,5-Pentachloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-141	 <p>2,2',3,4,5,5'-Hexachloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCDE-180	 <p>2,2',3,4,4',5,5'-Heptachloro[¹³C₁₂]diphenyl ether 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

* Unless stated otherwise, Isotopic Purities of these compounds are 99% or greater.

NATIVE CHLOROBENZENES: SOLUTION/MIXTURE

Catalogue Number	Product (isooctane solution)	Qty/Conc
CBS	Native Chlorobenzene Solution/Mixture	1.2 ml
Chlorobenzene		100 µg/ml
1,2-Dichlorobenzene		100 µg/ml
1,3-Dichlorobenzene		100 µg/ml
1,4-Dichlorobenzene		100 µg/ml
1,2,3-Trichlorobenzene		100 µg/ml
1,2,4-Trichlorobenzene		100 µg/ml
1,3,5-Trichlorobenzene		100 µg/ml
1,2,3,4-Tetrachlorobenzene		100 µg/ml
1,2,3,5-Tetrachlorobenzene		100 µg/ml
1,2,4,5-Tetrachlorobenzene		100 µg/ml
Pentachlorobenzene		100 µg/ml
Hexachlorobenzene		100 µg/ml

MASS-LABELLED CHLOROBENZENES

Catalogue Number	Product
MBZ-1235	 1,2,3,5-Tetrachloro[¹³ C ₆]benzene 1.2 ml; 100 µg/ml (±5.0 µg/ml); in isooctane
MCBZ-12345	 1,2,3,4,5-Pentachloro[¹³ C ₆]benzene 1.2 ml; 100 µg/ml (±5.0 µg/ml); in isooctane

* Unless stated otherwise, Isotopic Purities of these compounds are 99% or greater.

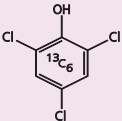
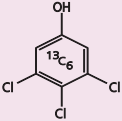
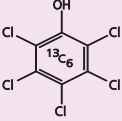
MASS-LABELLED CHLOROBENZENES: SOLUTION/MIXTURE

Catalogue Number	Product (isooctane solution)	Qty/Conc
MCBS	Mass-Labelled Chlorobenzene Solution/Mixture	1.2 ml
Chloro[¹³ C ₆]benzene		100 µg/ml
1,4-Dichloro[¹³ C ₆]benzene		100 µg/ml
1,2,3-Trichloro[¹³ C ₆]benzene		100 µg/ml
1,2,3,4-Tetrachloro[¹³ C ₆]benzene		100 µg/ml
Pentachloro[¹³ C ₆]benzene		100 µg/ml
Hexachloro[¹³ C ₆]benzene		100 µg/ml

NATIVE CHLOROPHENOLS: SOLUTION/MIXTURE

Catalogue Number	Product (isooctane solution)	Qty/Conc
CPS	Native Chlorophenol Solution/Mixture	1.2 ml
2-Chlorophenol		100 µg/ml
3-Chlorophenol		100 µg/ml
4-Chlorophenol		100 µg/ml
2,3-Dichlorophenol		100 µg/ml
2,4-Dichlorophenol		100 µg/ml
2,5-Dichlorophenol		100 µg/ml
2,6-Dichlorophenol		100 µg/ml
3,4-Dichlorophenol		100 µg/ml
3,5-Dichlorophenol		100 µg/ml
2,3,4-Trichlorophenol		100 µg/ml
2,3,5-Trichlorophenol		100 µg/ml
2,3,6-Trichlorophenol		100 µg/ml
2,4,5-Trichlorophenol		100 µg/ml
2,4,6-Trichlorophenol		100 µg/ml
3,4,5-Trichlorophenol		100 µg/ml
2,3,4,5-Tetrachlorophenol		100 µg/ml
2,3,4,6-Tetrachlorophenol		100 µg/ml
2,3,5,6-Tetrachlorophenol		100 µg/ml
Pentachlorophenol		100 µg/ml

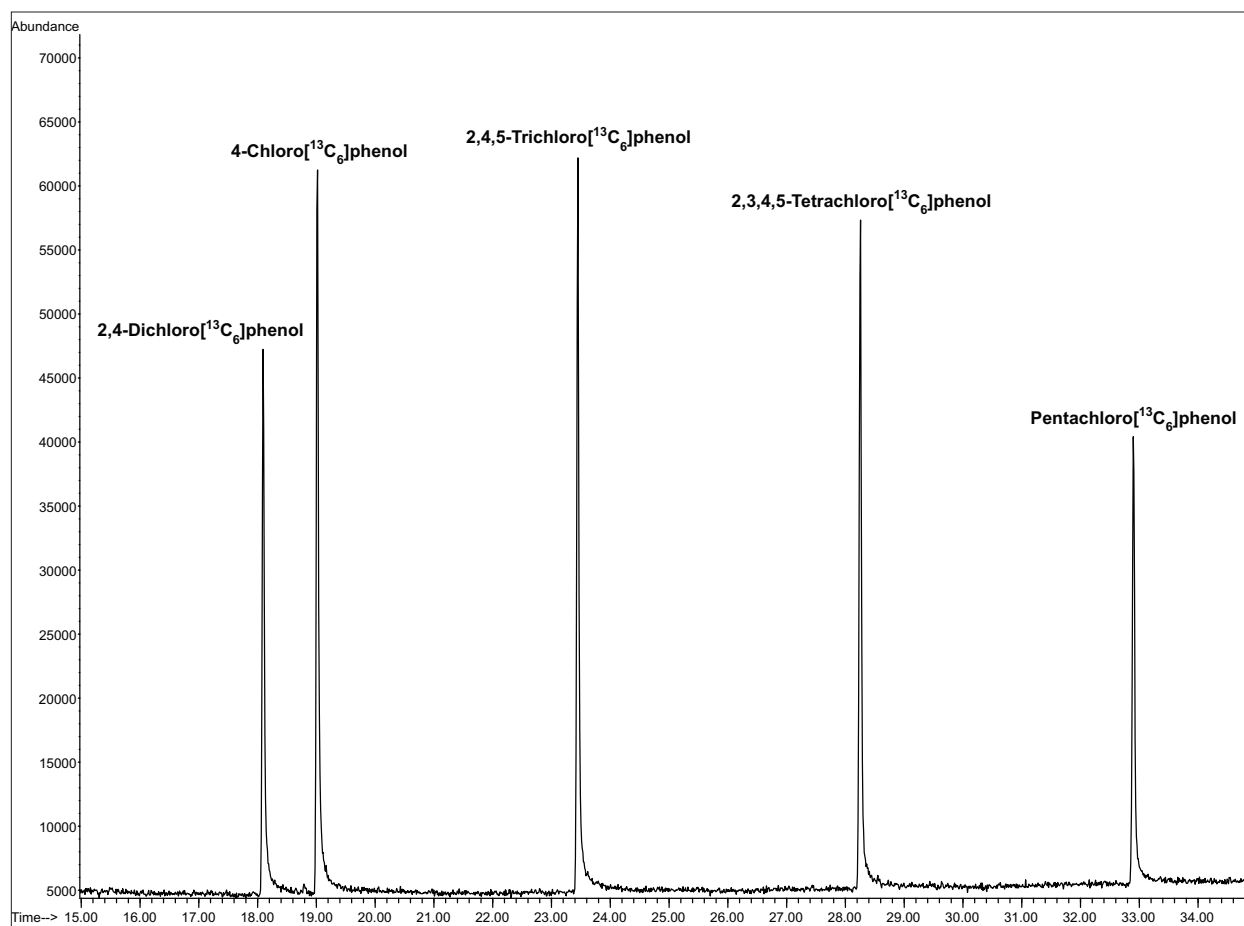
MASS-LABELLED CHLOROPHENOLS

Catalogue Number	Product
MCP-246	 <p>2,4,6-Trichloro[¹³C₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in isooctane</p>
MCP-345	 <p>3,4,5-Trichloro[¹³C₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in isooctane</p>
MCP-23456	 <p>Pentachloro[¹³C₆]phenol 1.2 ml; 100 µg/ml (±5.0 µg/ml); in isooctane</p>

* Unless stated otherwise, Isotopic Purities of these compounds are 99% or greater.

MASS-LABELLED CHLOROPHENOLS: SOLUTION/MIXTURE

Catalogue Number	Product (isooctane solution)	Qty/Conc
MCPS	Mass-Labelled Chlorophenol Solution/Mixture	1.2 ml
4-Chloro[¹³ C ₆]phenol		100 µg/ml
2,4-Dichloro[¹³ C ₆]phenol		100 µg/ml
2,4,5-Trichloro[¹³ C ₆]phenol		100 µg/ml
2,3,4,5-Tetrachloro[¹³ C ₆]phenol		100 µg/ml
Pentachloro[¹³ C ₆]phenol		100 µg/ml



MCPS; HRMS/LRMS TIC Chromatogram (30m DB-5 column: 0.25 mm id, 0.25 µm film thickness).

NATIVE MELAMINE AND CYANURIC ACID

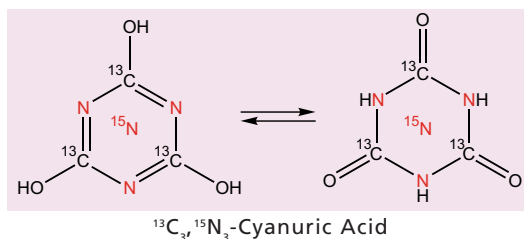
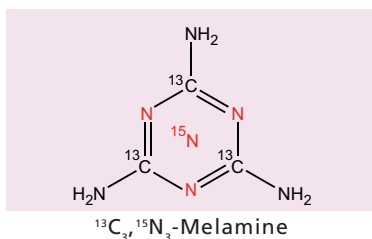
Catalogue Number	Product (water solution)	Qty/Conc
MEL	Melamine	1.2 ml 100 µg/ml
CYA	Cyanuric Acid	1.2 ml 100 µg/ml

MASS-LABELLED MELAMINE

Catalogue Number	Product (water solution)	Qty/Conc
M3-MEL	$^{13}\text{C}_3$ -Melamine	1.2 ml 100 µg/ml
M6-MEL	$^{13}\text{C}_3, ^{15}\text{N}_3$ -Melamine	1.2 ml 100 µg/ml

MASS-LABELLED CYANURIC ACID

Catalogue Number	Product (water solution)	Qty/Conc
M3-CYA	$^{13}\text{C}_3$ -Cyanuric Acid	1.2 ml 100 µg/ml
M6-CYA	$^{13}\text{C}_3, ^{15}\text{N}_3$ -Cyanuric Acid	1.2 ml 100 µg/ml

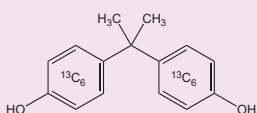


NATIVE BISPHENOL-A

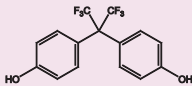
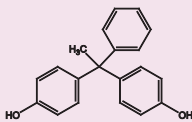
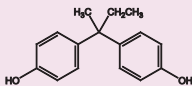
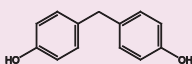
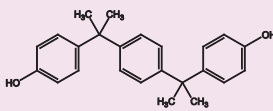
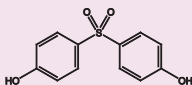
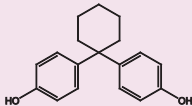
Catalogue Number	Product (methanol solution)	Qty/Conc
BPA	2,2-Bis(4-hydroxyphenyl)propane	1.2 ml 50 µg/ml

MASS-LABELLED BISPHENOL-A

Catalogue Number	Product
MBPA	2,2-Bis(4-hydroxy- $^{13}\text{C}_6$ -phenyl)propane 1.2 ml; 50 µg/ml (± 2.5 µg/ml); in methanol; Isotopic Purity 99% or greater [$^{13}\text{C}_{12}$ -rings]



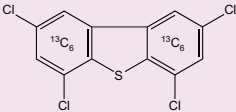
NATIVE BISPHENOL ANALOGUES

Catalogue Number	Product
BPAF	 <p>2,2-Bis(4-hydroxyphenyl)hexafluoropropane 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>
BPAP	 <p>4,4'-(1-Phenylethylidene)bisphenol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>
BPB	 <p>2,2-Bis(4-hydroxyphenyl)butane 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>
BPF	 <p>4,4'-Dihydroxydiphenylmethane 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>
BPP	 <p>4,4'-(1,4-Phenylenediisopropylidene)bisphenol 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>
BPS	 <p>Bis(4-hydroxyphenyl) sulfone 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>
BPZ	 <p>1,1-Bis(4-hydroxyphenyl)cyclohexane 1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol</p>

NATIVE TETRACHLORODIBENZOTHIOPHENES

Catalogue Number	Product (toluene solution)	Qty/Conc
TCDT-83	2,3,7,8-Tetrachlorodibenzothiophene	1.2 ml 50 µg/ml
TCDT-85	2,4,6,8-Tetrachlorodibenzothiophene	1.2 ml 50 µg/ml

MASS-LABELLED TETRACHLORODIBENZOTHIOPHENE

Catalogue Number	Product
MTCDT-85	 <p>2,4,6,8-Tetrachloro[¹³C₁₂]dibenzothiophene 1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene; Isotopic Purity 99% or greater</p>

NATIVE CHLORINATED CARBAZOLES

Catalogue Number	Product (nonane solution)	Qty/Conc
CCZ-3	3-Chloro-9H-carbazole	1.2 ml 50 µg/ml
CCZ-36	3,6-Dichloro-9H-carbazole	1.2 ml 50 µg/ml
CCZ-1368	1,3,6,8-Tetrachloro-9H-carbazole	1.2 ml 50 µg/ml
CCZ-2367	2,3,6,7-Tetrachloro-9H-carbazole	1.2 ml 50 µg/ml

NATIVE BROMINATED CARBAZOLES

Catalogue Number	Product (nonane solution)	Qty/Conc
BCZ-3	3-Bromo-9H-carbazole	1.2 ml 50 µg/ml
BCZ-27	2,7-Dibromo-9H-carbazole	1.2 ml 50 µg/ml
BCZ-36	3,6-Dibromo-9H-carbazole	1.2 ml 50 µg/ml
BCZ-136	1,3,6-Tribromo-9H-carbazole	1.2 ml 50 µg/ml
BCZ-1368	1,3,6,8-Tetrabromo-9H-carbazole	1.2 ml 50 µg/ml

NATIVE BROMO/CHLORO CARBAZOLES

Catalogue Number	Product (nonane solution)	Qty/Conc
1-B-36-CCZ	1-Bromo-3,6-dichloro-9H-carbazole	1.2 ml 50 µg/ml
18-B-36-CCZ	1,8-Dibromo-3,6-dichloro-9H-carbazole	1.2 ml 50 µg/ml

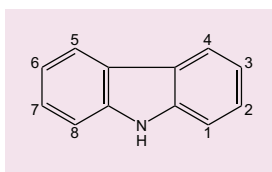
NATIVE HALOGENATED CARBAZOLES: SOLUTION/MIXTURE

Catalogue Number	Product (nonane solution)	Qty/Conc
CBCZ-MXB	Native Halogenated Carbazoles Solution/Mixture	1.2 ml
3-Chloro-9H-carbazole		2.5 µg/ml
3,6-Dichloro-9H-carbazole		2.5 µg/ml
1,3,6,8-Tetrachloro-9H-carbazole		2.5 µg/ml
2,3,6,7-Tetrachloro-9H-carbazole		2.5 µg/ml
3-Bromo-9H-carbazole		2.5 µg/ml
2,7-Dibromo-9H-carbazole		2.5 µg/ml
3,6-Dibromo-9H-carbazole		2.5 µg/ml
1,3,6-Tribromo-9H-carbazole		2.5 µg/ml
1,3,6,8-Tetrabromo-9H-carbazole		2.5 µg/ml
1-Bromo-3,6-dichloro-9H-carbazole		2.5 µg/ml
1,8-Dibromo-3,6-dichloro-9H-carbazole		2.5 µg/ml

MASS-LABELLED CHLORINATED CARBAZOLES

Catalogue Number	Product
MCCZ-36	 <p>3,6-Dichloro-9H-[¹³C₁₂]carbazole 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>
MCCZ-1368	 <p>1,3,6,8-Tetrachloro-9H-[¹³C₁₂]carbazole 1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane</p>

* Unless stated otherwise, Isotopic Purities of these compounds are 99% or greater.



General Structure and Numbering System for Carbazoles



Ingrid O'Gorman
South River, Ontario, Canada

APPENDIX

Some of the information provided in this Appendix can also be found in our **Reference and Handling Guide: GC/MS Characterization and Analysis of Selected Halogenated Aromatic Compounds**, which is available separately in hard copy and is also posted on our website. On the following pages you will find:

Guidelines for the Use and Handling of Wellington Products

General Structure and Numbering System of Selected Aromatic Hydrocarbons

Number of Possible Isomers for Selected Halogenated Aromatic Compounds

Molecular Weights for Selected Chlorinated and Brominated Aromatic Hydrocarbons

Exact Mass & Relative Ion Abundance of Selected Chlorinated Aromatic Hydrocarbons

Molecular Ion Clusters for Chlorinated Aromatic Hydrocarbons & Brominated Aromatic Hydrocarbons

Exact Mass & Relative Ion Abundance of Selected Brominated Aromatic Hydrocarbons

Systematic Numbering of Chlorinated Dibenzo-p-dioxins, Chlorinated Dibenzofurans, Chlorinated Biphenyls, and Chlorinated Naphthalenes

We have also prepared a **Reference and Handling Guide for Perfluoroalkyl Compounds**, which can be downloaded from our website, and a more concise **Quick Reference Guide for Perfluoroalkyl Compounds**, which is available in hard copy.

If you would like to receive copies of either Reference Guide, please contact us or one of our distributors. In addition, if you have any ideas on how we can improve these Reference Guides, or if you have suggestions for future guides, please contact us.



GUIDELINES FOR THE USE AND HANDLING OF WELLINGTON PRODUCTS

HAZARDS

The majority of our products are halogenated aromatic hydrocarbons in solution in organic solvents such as nonane, toluene and isooctane. Although the maximum concentration is 100 µg/ml, that is 0.01% (w/v), these compounds must be considered toxic and potentially carcinogenic and should be handled accordingly.

With all of our products due care should be exercised to prevent human contact and ingestion. The absence of a toxicity warning for any of our products must not be interpreted as an indication that there is no possible health hazard.



NOTE:

THESE MATERIALS SHOULD ONLY BE USED BY PERSONNEL TRAINED IN THE HANDLING OF HAZARDOUS CHEMICALS.

ALL PROCEDURES SHOULD BE PERFORMED IN A FUME HOOD AND SUITABLE GLOVES, EYE PROTECTION AND CLOTHING SHOULD BE WORN AT ALL TIMES.

RECEIPT, INSPECTION, HANDLING AND STORAGE

Unless crystalline material is provided, all of our reference standard solutions come in flame-sealed, pre-scored amber glass ampoules. Upon receipt, inspect the ampoules for breakage and leakage and then store them upright until needed. The ampoules can be stored at ambient temperature until opened unless other storage requirements are stated on the Certificate of Analysis.

Prior to opening, allow the solution to drain into the bottom of the ampoule, lightly tapping the ampoule if necessary. Using the plastic ampoule collar provided, hold the ampoule upright and snap the top off, breaking away from the body.

Transfer the solution to an amber glass container that can be tightly sealed for storage. To prevent evaporation of the solvent, it is suggested that this solution, and subsequent mixtures and/or dilutions, be stored at refrigerator temperatures.

GUIDELINES FOR THE USE AND HANDLING OF WELLINGTON PRODUCTS

DISPOSAL

All waste materials generated during the use of these solutions should be treated as hazardous in accordance with national and regional regulations. A licensed disposal company should be employed. Some options for the destruction of these materials include high temperature incineration, photolysis, or chemical treatment using reagents such as sodium naphthalene or KPEG reagent. Literature references for some of these methods can be provided upon request.

ACCURACY

Each of our stock solutions is prepared from crystalline material that has been well characterized as to its structure and purity.

The crystalline material is weighed using microbalances that are externally calibrated using NIST-traceable weights. Solutions are prepared by completely dissolving the crystalline material in ultrapure, distilled-in-glass solvents. The volumetric flasks used for this purpose, and the pipets used for subsequent preparation of dilutions and mixtures, are all of class A tolerance and NIST-traceable.

The maximum percent relative combined uncertainty for solution preparation is calculated to be $\pm 5\%$.

INTERLABORATORY CERTIFICATION

Wellington continues to submit its standards for independent interlaboratory testing and certification. Since 1991, our standards have been tested in 30 international round-robins.

To date, solutions of the compounds listed below have been repeatedly tested and the approximate total number of analyses are given.

- 2,3,7,8 - substituted PCDDs and PCDFs1500 HRMS analyses
- Dioxin-like (WHO) PCB congeners1000 HRMS analyses
- PBDEs200 HRMS analyses
- PFCs200 LCMS analyses

The overall averages of the data received for all of the compounds were found to be well within $\pm 10\%$ of the design values.

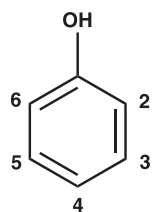
EXPIRY DATE/SHELF LIFE

In order to accurately determine the shelf life of products such as ours, testing must reveal significant degradation or loss in concentration of the particular analyte. In comparing freshly prepared solutions to older solutions by GC/MS or LC/MS, we have not detected any significant changes. Many of these older solutions were prepared and ampouled more than 15 years ago. Thus our stability studies, as they should, remain ongoing.

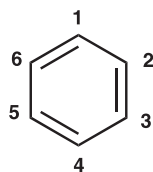
For our products where the expiry date on the C of A states, "stability studies ongoing", we consider that our reference standard solutions retain their accuracy for a period of 5 years from delivery in the unopened ampoule.

NOTE: The predominant degradation pathway for our compounds is likely photolysis and thus protection from light is critical.

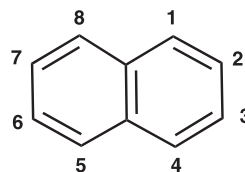
GENERAL STRUCTURE AND NUMBERING SYSTEM OF SELECTED AROMATIC HYDROCARBONS



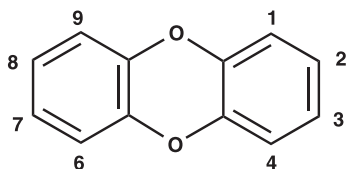
phenol



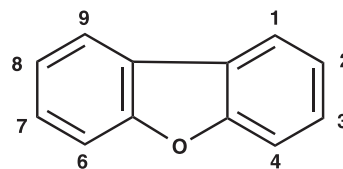
benzene



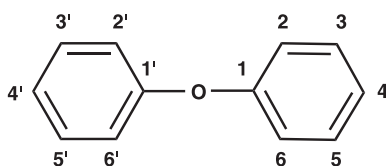
naphthalene



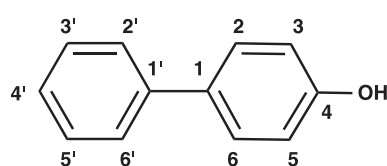
dibenzo-p-dioxin



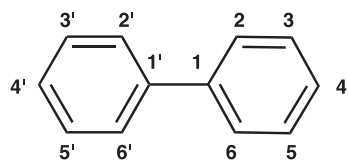
dibenzofuran



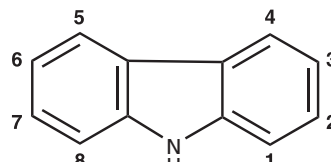
diphenyl ether



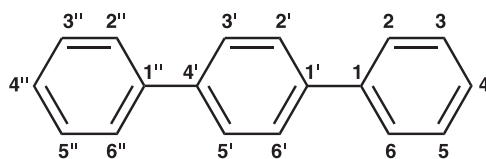
4-hydroxybiphenyl



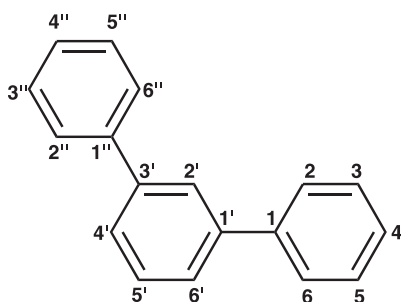
biphenyl



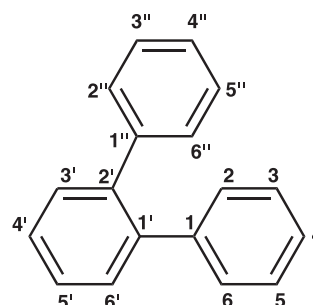
carbazole



p-terphenyl



m-terphenyl



o-terphenyl

NUMBER OF POSSIBLE ISOMERS FOR SELECTED HALOGENATED AROMATIC COMPOUNDS

# of X	Terphenyl			Biphenyl	Biphenylol	Dibenzo-p-dioxin	Dibenzofuran	Naphthalene	Benzene	Phenol
	ortho	meta	para							
1	5	6	4	3	19	2	4	2	1	3
2	28	28	21	12	64	10	16	10	3	6
3	80	87	55	24	136	14	28	14	3	6
4	211	211	139	42	198	22	38	22	3	3
5	355	382	226	46	198	14	28	14	1	1
6	544	544	351	42	136	10	16	10	1	
7	596	638	358	24	64	2	4	2		
8	544	544	351	12	19	1	1	1		
9	355	382	226	3	3					
10	211	211	139	1						
11	80	87	55							
12	28	28	21							
13	5	6	4							
14	1	1	1							

X= Halogen (does not apply to mixed halogenated compounds)
For diphenyl ethers use the biphenyl values

MOLECULAR WEIGHTS FOR SELECTED CHLORINATED AND BROMINATED AROMATIC HYDROCARBONS

# of Cl/Br	PCTs	PCBs	PCDEs	PCDDs	PCDFs	PCNs	CBs	CPs	PBBs	PBDEs	PBDDs	PBDFs
0	230.31	154.21	170.21	184.19	168.19	128.17	78.11	94.11	154.21	170.21	184.19	168.19
1	264.75	188.66	204.66	218.64	202.64	162.62	112.56	128.56	233.11	249.11	263.09	247.09
2	299.20	223.10	239.10	253.08	237.09	197.06	147.00	163.00	312.00	328.00	341.99	325.99
3	333.64	257.55	273.55	287.53	271.53	231.51	181.45	197.45	390.90	406.90	420.88	404.88
4	368.09	291.99	307.99	321.97	305.98	265.95	215.89	231.89	469.80	485.80	499.78	483.78
5	402.53	326.44	342.44	356.42	340.42	300.40	250.34	266.34	548.69	564.69	578.67	562.68
6	436.98	360.88	376.88	390.86	374.87	334.84	284.78		627.59	643.59	657.57	641.57
7	471.42	395.33	411.33	425.31	409.31	369.29			706.48	722.48	736.47	720.47
8	505.87	429.77	445.77	459.75	443.76	403.73			785.38	801.38	815.36	799.36
9	540.31	464.22	480.22						864.28	880.28		
10	574.76	498.66	514.66						943.17	959.17		
11	609.20											
12	643.65											
13	678.09											
14	712.54											

Note: The molecular weight for PCHBs ($C_{12}H_{9-n}Cl_nOH$) is the same as the PCDEs ($C_{12}H_{10-n}Cl_nO$), but the maximum # of Chlorines is one less for the PCHBs.

PCTs = polychlorinated terphenyls, PCBs = polychlorinated biphenyls, PCDEs = polychlorinated diphenyl ethers
PCHBs = polychlorinated hydroxybiphenyls (biphenylols), PCDDs = polychlorinated dibenzo-p-dioxins,
PCDFs = polychlorinated dibenzofurans, PCNs = polychlorinated naphthalenes, CBs = chlorobenzenes, CPs = chlorophenols,
PBBs = polybrominated biphenyls, PBDEs = polybrominated diphenyl ethers,
PBDDs = polybrominated dibenzo-p-dioxins, PBDFs = polybrominated dibenzofurans

EXACT MASS & RELATIVE ION ABUNDANCE OF SELECTED CHLORINATED AROMATIC HYDROCARBONS

# of Cl	PCTs			PCBs			PCHBs			PCDDs		
	¹² C ₁₈	C ₁₈ H _{14-n} Cl _n	¹³ C ₁₈	¹² C ₁₂	C ₁₂ H _{10-n} Cl _n	¹³ C ₁₂	¹² C ₁₂	C ₁₂ H _{9-n} Cl _n OH	¹³ C ₁₂	¹² C ₁₂	C ₁₂ H _{8-n} Cl _n O ₂	¹³ C ₁₂
	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass
0	230.1096	100	248.1699	154.0783	100	166.1185	170.0732	100	182.1134	184.0524	100	196.0927
1	264.0706	100	282.1310	188.0393	100	200.0795	204.0342	100	216.0745	218.0135	100	230.0537
	266.0676	34.4	284.1280	190.0363	33.2	202.0766	206.0312	33.5	218.0715	220.0105	33.7	232.0508
2	298.0316	100	316.0920	222.0003	100	234.0406	237.9952	100	250.0355	251.9745	100	264.0147
	300.0287	66.8	318.0890	223.9974	65.6	236.0376	239.9923	65.9	252.0325	253.9715	66.1	266.0118
	302.0257	11.8	320.0861	225.9944	11.0	238.0347	241.9893	11.2	254.0296	255.9686	11.3	268.0088
3	331.9926	100	350.0530	255.9613	100	268.0016	271.9562	100	283.9965	285.9355	100	297.9758
	333.9897	99.2	352.0501	257.9584	98.0	269.9986	273.9533	98.2	285.9936	287.9326	98.5	299.9728
	335.9867	33.4	354.0471	259.9554	32.3	271.9957	275.9503	32.5	287.9906	289.9296	32.7	301.9699
	337.9838	4.0	356.0442	261.9525	3.7	273.9927	277.9474	3.7	289.9877	291.9267	3.8	303.9669
4	365.9537	76.0	384.0141	289.9224	76.7	301.9626	305.9173	76.5	317.9575	319.8965	76.4	331.9368
	367.9507	100	386.0111	291.9194	100	303.9597	307.9143	100	319.9546	321.8936	100	333.9339
	369.9478	49.8	388.0082	293.9165	49.1	305.9567	309.9114	49.3	321.9516	323.8906	49.4	335.9309
	371.9448	11.3	390.0052	295.9135	10.8	307.9538	311.9084	10.9	323.9487	325.8877	11.0	337.9280
5	399.9147	61.0	417.9751	323.8834	61.4	335.9237	339.8783	61.3	351.9186	353.8576	61.3	365.8978
	401.9117	100	419.9721	325.8804	100	337.9207	341.8754	100	353.9156	355.8546	100	367.8949
	403.9088	66.0	421.9692	327.8775	65.3	339.9178	343.8724	65.4	355.9127	357.8517	65.5	369.8919
	405.9058	22.0	423.9662	329.8745	21.4	341.9148	345.8695	21.5	357.9097	359.8487	21.6	371.8890
6	433.8757	50.9	451.9361	357.8444	51.2	369.8847	373.8393	51.2	385.8796	387.8186	51.1	399.8589
	435.8728	100	453.9332	359.8415	100	371.8817	375.8364	100	387.8766	389.8156	100	401.8559
	437.8698	82.1	455.9302	361.8385	81.5	373.8788	377.8334	81.6	389.8737	391.8127	81.7	403.8530
	439.8669	36.2	457.9273	363.8356	35.5	375.8758	379.8305	35.6	391.8707	393.8097	35.8	405.8500
7	467.8367	43.7	485.8971	391.8054	43.9	403.8457	407.8004	43.9	419.8406	421.7796	43.9	433.8199
	469.8338	100	487.8942	393.8025	100	405.8428	409.7974	100	421.8377	423.7767	100	435.8169
	471.8308	98.3	489.8912	395.7995	97.7	407.8398	411.7945	97.8	423.8347	425.7737	97.9	437.8140
	473.8279	53.9	491.8883	397.7966	53.1	409.8369	413.7915	53.3	425.8318	427.7708	53.4	439.8110
	475.8249	17.9	493.8853	399.7936	17.4	411.8339	415.7886	17.5	427.8288	429.7678	17.6	441.8081
8	501.7978	33.5	519.8582	425.7665	33.8	437.8067	441.7614	33.7	453.8016	455.7407	33.7	467.7809
	503.7948	87.4	521.8552	427.7635	87.8	439.8038	443.7584	87.7	455.7987	457.7377	87.6	469.7780
	505.7919	100	523.8523	429.7606	100	441.8008	445.7555	100	457.7957	459.7348	100	471.7750
	507.7889	65.6	525.8493	431.7576	65.2	443.7979	447.7525	65.2	459.7928	461.7318	65.3	473.7721
	509.7860	27.0	527.8464	433.7547	26.6	445.7949	449.7496	26.7	461.7898	463.7289	26.8	475.7691
9	535.7588	26.1	553.8192	459.7275	26.3	471.7678	475.7224	26.3	487.7627			
	537.7559	76.5	555.8162	461.7246	76.9	473.7648	477.7195	76.8	489.7597			
	539.7529	100	557.8133	463.7216	100	475.7619	479.7165	100	491.7568			
	541.7500	76.4	559.8103	465.7187	75.9	477.7589	481.7136	76.0	493.7538			
	543.7470	37.6	561.8074	467.7157	37.1	479.7560	483.7106	37.2	495.7509			
10	569.7198	20.9	587.7802	493.6885	21.1	505.7288						
	571.7169	68.1	589.7773	495.6856	68.4	507.7258						
	573.7139	100	591.7743	497.6826	100	509.7229						
	575.7110	87.2	593.7714	499.6797	86.7	511.7199						
	577.7080	50.0	595.7684	501.6767	49.4	513.7170						
11	603.6809	17.1	621.7412									
	605.6779	61.3	623.7383									
	607.6750	100	625.7353									
	609.6720	98.0	627.7324									
	611.6691	64.1	629.7294									
	613.6661	29.4	631.7265									
12	637.6419	13.1	655.7023									
	639.6389	51.3	657.6993									
	641.6360	92.0	659.6964									
	643.6330	100	661.6934									
	645.6301	73.5	663.6905									
	647.6271	38.5	665.6875									
13	671.6029	10.1	689.6633									
	673.6000	42.8	691.6604									
	675.5970	83.7	693.6574									
	677.5941	100	695.6545									
	679.5911	81.6	697.6515									
	681.5882	48.0	699.6486									
14	705.5639	8.0	723.6243									
	707.5610	36.3	725.6214									
	709.5580	76.7	727.6184									
	711.5551	100	729.6155									
	713.5521	89.7	731.6125									
	715.5492	58.6	733.6096									

EXACT MASS & RELATIVE ION ABUNDANCE OF SELECTED CHLORINATED AROMATIC HYDROCARBONS

# of Cl	PCDFs			PCNs			CBs			CPs		
	¹² C ₁₂	C ₁₂ H _{8-n} Cl _n O	¹³ C ₁₂	¹² C ₁₀	C ₁₀ H _{8-n} Cl _n	¹³ C ₁₀	¹² C ₆	C ₆ H _{6-n} Cl _n	¹³ C ₆	¹² C ₆	C ₆ H _{5-n} Cl _n OH	¹³ C ₆
	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass
0	168.0575	100	180.0978	128.0626	100	138.0962	78.0470	100	84.0671	94.0419	100	100.0620
1	202.0185	100	214.0588	162.0236	100	172.0572	112.0080	100	118.0281	128.0029	100	134.0230
	204.0156	33.5	216.0559	164.0207	33.0	174.0542	114.0050	32.6	120.0252	129.9999	32.8	136.0201
2	235.9796	100	248.0198	195.9847	100	206.0182	145.9690	100	151.9891	161.9639	100	167.9841
	237.9766	65.8	250.0169	197.9817	65.4	208.0153	147.9661	65.0	153.9862	163.9610	65.2	169.9811
	239.9737	11.2	252.0139	199.9788	10.9	210.0123	149.9631	10.6	155.9832	165.9580	10.8	171.9782
3	269.9406	100	281.9809	229.9457	100	239.9792	179.9300	100	185.9502	195.9249	100	201.9451
	271.9376	98.2	283.9779	231.9427	97.8	241.9763	181.9271	97.4	187.9472	197.9220	97.6	203.9421
	273.9347	32.5	285.9750	233.9398	32.0	243.9733	183.9241	31.7	189.9443	199.9190	31.9	205.9392
	275.9317	3.7	287.9720	235.9368	3.6	245.9704	185.9212	3.5	191.9413	201.9161	3.5	207.9362
4	303.9016	76.5	315.9419	263.9067	76.8	273.9403	213.8911	77.1	219.9112	229.8860	76.9	235.9061
	305.8987	100	317.9389	265.9038	100	275.9373	215.8881	100	221.9082	231.8830	100	237.9032
	307.8957	49.2	319.9360	267.9008	49.0	277.9344	217.8852	48.7	223.9053	233.8801	48.8	239.9002
	309.8928	10.9	321.9330	269.8979	10.7	279.9314	219.8822	10.6	225.9023	235.8771	10.7	241.8973
5	337.8627	61.3	349.9029	297.8677	61.5	307.9013	247.8521	61.7	253.8722	263.8470	61.6	269.8671
	339.8597	100	351.9000	299.8648	100	309.8983	249.8491	100	255.8693	265.8441	100	271.8642
	341.8568	65.4	353.8970	301.8618	65.1	311.8954	251.8462	64.9	257.8663	267.8411	65.0	273.8612
	343.8538	21.5	355.8941	303.8589	21.3	313.8924	253.8432	21.1	259.8634	269.8382	21.2	275.8583
6	371.8237	51.2	383.8639	331.8288	51.3	341.8623	281.8131	51.4	287.8332			
	373.8207	100	385.8610	333.8258	100	343.8594	283.8102	100	289.8303			
	375.8178	81.6	387.8580	335.8229	81.3	345.8564	285.8072	81.1	291.8273			
	377.8148	35.6	389.8551	337.8199	35.3	347.8535	287.8043	35.1	293.8244			
7	405.7847	43.9	417.8250	365.7898	44.0	375.8233						
	407.7818	100	419.8220	367.7868	100	377.8204						
	409.7788	97.8	421.8191	369.7839	97.5	379.8174						
	411.7759	53.3	423.8161	371.7809	52.9	381.8145						
	413.7729	17.5	425.8132	373.7780	17.3	383.8115						
8	439.7457	33.7	451.7860	399.7508	33.9	409.7844						
	441.7428	87.7	453.7830	401.7479	87.9	411.7814						
	443.7398	100	455.7801	403.7449	100	413.7785						
	445.7369	65.2	457.7771	405.7420	65.0	415.7755						
	447.7339	26.7	459.7742	407.7390	26.5	417.7726						

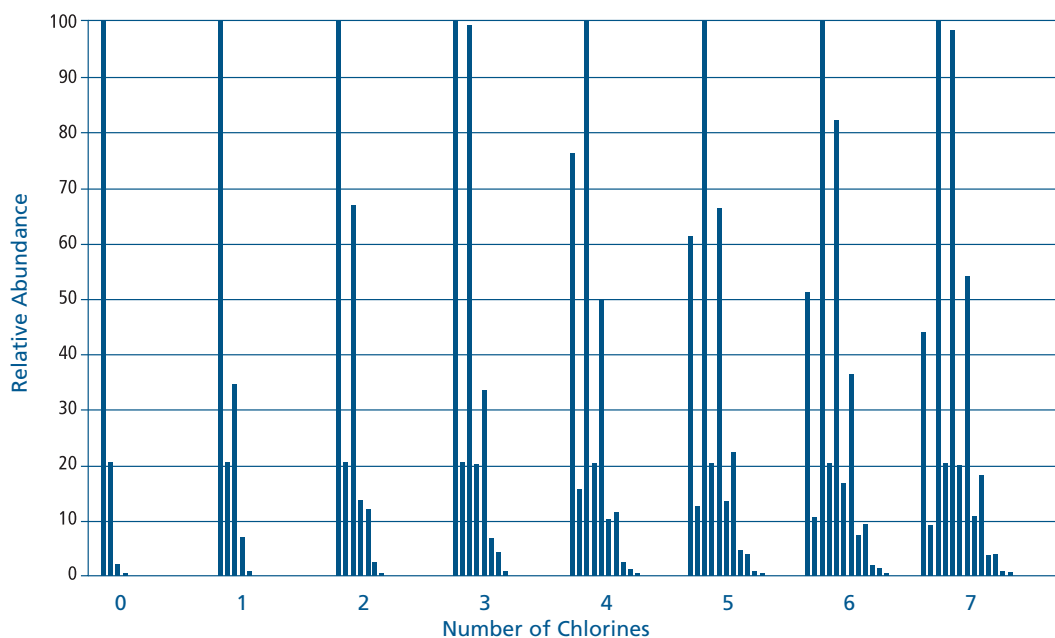
- PCTs** = polychlorinated terphenyls
PCBs = polychlorinated biphenyls
PCHBs = polychlorinated hydroxybiphenyls
PCDDs = polychlorinated dibenzo-p-dioxins
PCDFs = polychlorinated dibenzofurans
PCNs = polychlorinated naphthalenes
CBs = chlorobenzenes
CPs = chlorophenols

Accurate masses: ¹²C=12.000000, ¹³C=13.003355, ¹H=1.007825, ³⁵Cl= 34.968853, ³⁷Cl=36.965903, ¹⁶O=15.994915

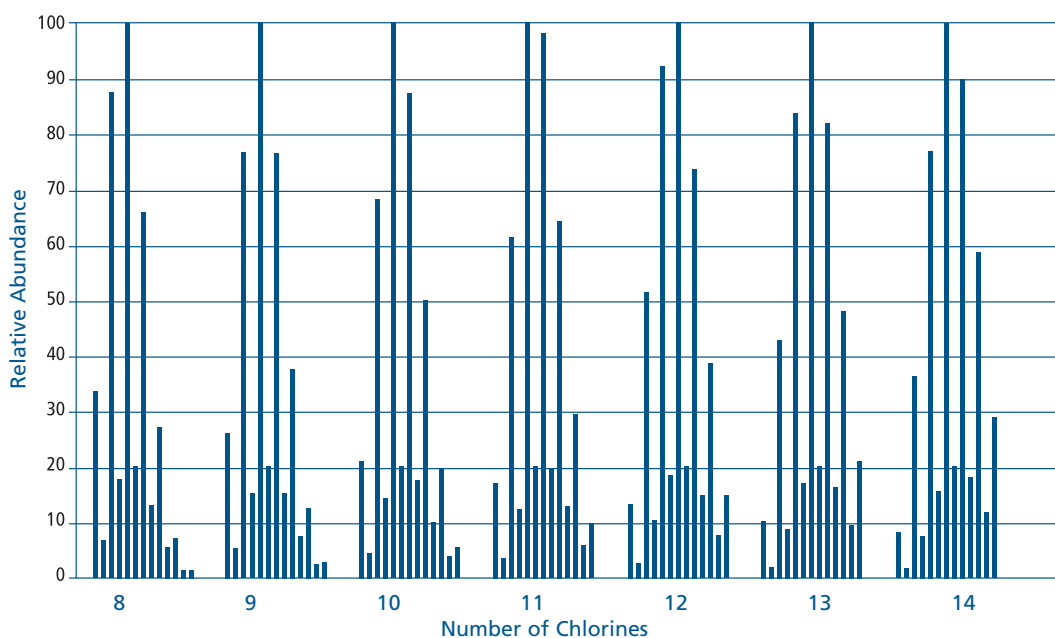
Relative abundances of isotopes were determined using the method described in: Pretsch,Clerc,Seibl,Simon, Tables of Spectral Data for Structure Determination of Organic Compounds, Springer-Verlag, 1983.

The following natural isotopic abundances were used in all calculations: ¹²C=98.89%, ¹³C=1.11%, ¹H=99.985%, ²H=0.015%, ³⁵Cl=75.53%, ³⁷Cl=24.47%, ¹⁶O=99.759%, ¹⁷O=0.037%, ¹⁸O=0.204%.

MOLECULAR ION CLUSTERS FOR CHLORINATED AROMATIC HYDROCARBONS

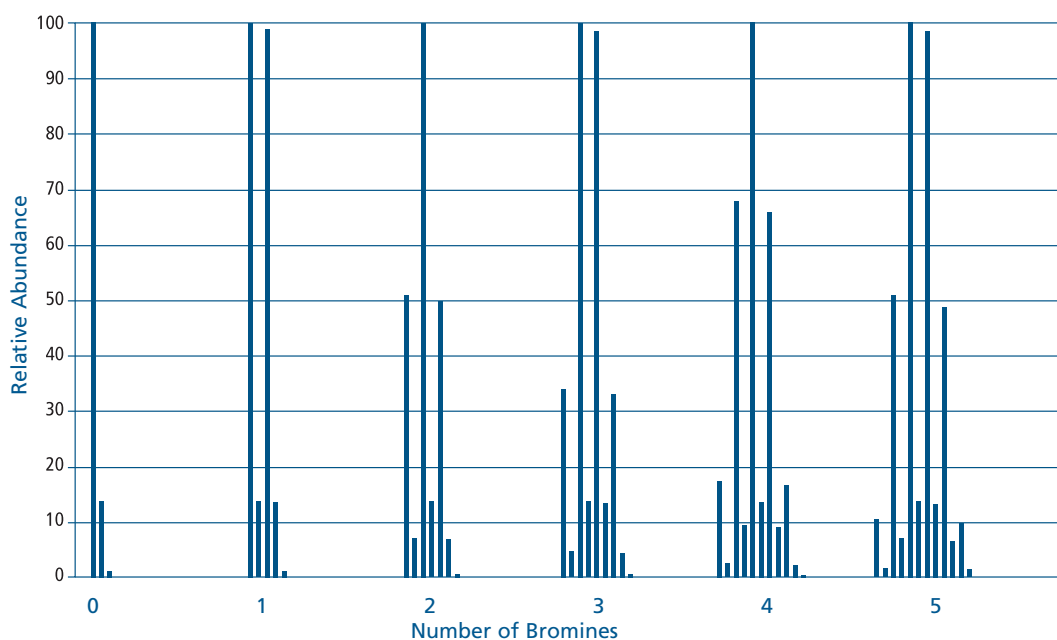


MOLECULAR ION CLUSTERS FOR CHLORINATED AROMATIC HYDROCARBONS

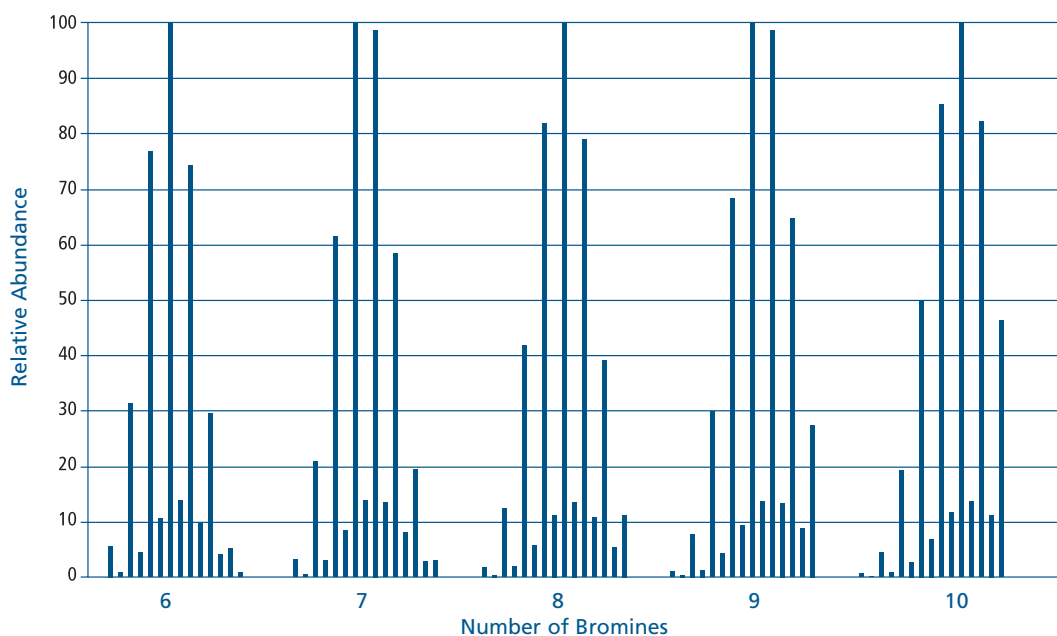


Ions shown are M, M+1, M+2, M+3, M+4, M+5, M+6, M+7, M+8, M+9, M+10, M+11, M+12, and are representative of chlorinated terphenyls ($C_{18}H_{14-n}Cl_n$)

MOLECULAR ION CLUSTERS FOR BROMINATED AROMATIC HYDROCARBONS



MOLECULAR ION CLUSTERS FOR BROMINATED AROMATIC HYDROCARBONS



Ions shown are M, M+1, M+2, M+3, M+4, M+5, M+6, M+7, M+8, M+9, M+10, M+11, M+12, M+13, M+14 and are representative of brominated diphenyl ethers ($C_{12}H_{10-n}Br_nO$)

EXACT MASS & RELATIVE ION ABUNDANCE OF SELECTED BROMINATED AROMATIC HYDROCARBONS

# of Br	PBBs			PBDEs			PBDDs			PBDFs		
	¹² C ₁₂	C ₁₂ H _{10-n} Br _n	¹³ C ₁₂	¹² C ₁₂	C ₁₂ H _{10-n} Br _n O	¹³ C ₁₂	¹² C ₁₂	C ₁₂ H _{8-n} Br _n O ₂	¹³ C ₁₂	¹² C ₁₂	C ₁₂ H _{8-n} Br _n O	¹³ C ₁₂
	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass	Exact Mass	Relative Abundance	Exact Mass
0	154.0783	100	166.1185	170.0732	100	182.1134	184.0524	100	196.0927	168.0575	100	180.0978
1	231.9887	100	244.0290	247.9836	100	260.0239	261.9629	100	274.0032	245.9680	100	258.0083
	233.9867	98.7	246.0270	249.9816	98.9	262.0219	263.9609	99.1	276.0012	247.9660	98.9	260.0063
2	309.8992	50.9	321.9395	325.8941	50.8	337.9344	339.8734	50.8	351.9136	323.8785	50.8	335.9187
	311.8972	100	323.9375	327.8921	100	339.9324	341.8714	100	353.9116	325.8765	100	337.9167
	313.8952	49.6	325.9355	329.8901	49.7	341.9304	343.8694	49.9	355.9096	327.8745	49.7	339.9147
3	387.8097	34.0	399.8499	403.8046	33.9	415.8449	417.7839	33.9	429.8241	401.7889	33.9	413.8292
	389.8077	100	401.8479	405.8026	100	417.8429	419.7819	100	431.8221	403.7869	100	415.8272
	391.8057	98.4	403.8459	407.8006	98.6	419.8409	421.7799	98.7	433.8201	405.7849	98.6	417.8252
	393.8037	32.7	405.8439	409.7986	32.8	421.8389	423.7779	33.0	435.8181	407.7829	32.8	419.8232
4	465.7202	17.3	477.7604	481.7151	17.3	493.7553	495.6943	17.3	507.7346	479.6994	17.3	491.7397
	467.7182	67.9	479.7584	483.7131	67.8	495.7533	497.6923	67.8	509.7326	481.6974	67.8	493.7377
	469.7162	100	481.7564	485.7111	100	497.7513	499.6903	100	511.7306	483.6954	100	495.7357
	471.7142	65.7	483.7544	487.7091	65.8	499.7493	501.6883	65.9	513.7286	485.6934	65.8	497.7337
	473.7122	16.4	485.7524	489.7071	16.5	501.7473	503.6863	16.6	515.7266	487.6914	16.5	499.7317
5	543.6306	10.4	555.6709	559.6255	10.4	571.6658	573.6048	10.4	585.6451	557.6099	10.4	569.6502
	545.6286	51.0	557.6689	561.6235	50.9	573.6638	575.6028	50.9	587.6431	559.6079	50.9	571.6482
	547.6266	100	559.6669	563.6215	100	575.6618	577.6008	100	589.6411	561.6059	100	573.6462
	549.6246	98.3	561.6649	565.6195	98.4	577.6598	579.5988	98.5	591.6391	563.6039	98.4	575.6442
	551.6226	48.5	563.6629	567.6175	48.7	579.6578	581.5968	48.8	593.6371	565.6019	48.7	577.6422
	553.6206	9.7	565.6609	569.6155	9.8	581.6558	583.5948	9.9	595.6351	567.5999	9.8	579.6402
6	621.5411	5.3	633.5814	637.5360	5.3	649.5763	651.5153	5.3	663.5555	635.5204	5.3	647.5606
	623.5391	31.2	635.5794	639.5340	31.1	651.5743	653.5133	31.1	665.5535	637.5184	31.1	649.5586
	625.5371	76.4	637.5774	641.5320	76.4	653.5723	655.5113	76.3	667.5515	639.5164	76.4	651.5566
	627.5351	100	639.5754	643.5300	100	655.5703	657.5093	100	669.5495	641.5144	100	653.5546
	629.5331	73.8	641.5734	645.5280	73.9	657.5683	659.5073	73.9	671.5475	643.5124	73.9	655.5526
	631.5311	29.2	643.5714	647.5260	29.3	659.5663	661.5053	29.4	673.5455	645.5104	29.3	657.5506
7	699.4516	3.0	711.4918	715.4465	3.0	727.4868	729.4258	3.0	741.4660	713.4308	3.0	725.4711
	701.4496	20.8	713.4898	717.4445	20.8	729.4848	731.4238	20.8	743.4640	715.4288	20.8	727.4691
	703.4476	61.2	715.4878	719.4425	61.1	731.4828	733.4218	61.1	745.4620	717.4268	61.1	729.4671
	705.4456	100	717.4858	721.4405	100	733.4808	735.4198	100	747.4600	719.4248	100	731.4651
	707.4436	98.2	719.4838	723.4385	98.3	735.4788	737.4178	98.4	749.4580	721.4228	98.3	733.4631
	709.4416	58.0	721.4818	725.4365	58.1	737.4768	739.4158	58.2	751.4560	723.4208	58.1	735.4611
8	777.3621	1.5	789.4023	793.3570	1.5	805.3972	807.3362	1.5	819.3765	791.3413	1.5	803.3816
	779.3601	12.1	791.4003	795.3550	12.1	807.3952	809.3342	12.1	821.3745	793.3393	12.1	805.3796
	781.3581	41.6	793.3983	797.3530	41.5	809.3932	811.3322	41.5	823.3725	795.3373	41.5	807.3776
	783.3561	81.5	795.3963	799.3510	81.5	811.3912	813.3302	81.4	825.3705	797.3353	81.5	809.3756
	785.3541	100	797.3943	801.3490	100	813.3892	815.3282	100	827.3685	799.3333	100	811.3736
	787.3521	78.6	799.3923	803.3470	78.7	815.3872	817.3262	78.7	829.3665	801.3313	78.7	813.3716
	789.3501	38.7	801.3903	805.3450	38.8	817.3852	819.3242	38.9	831.3645	803.3293	38.8	815.3696
9	855.2725	0.9	867.3128	871.2674	0.9	883.3077						
	857.2705	7.6	869.3108	873.2654	7.6	885.3057						
	859.2685	29.7	871.3088	875.2634	29.7	887.3037						
	861.2665	68.0	873.3068	877.2614	68.0	889.3017						
	863.2645	100	875.3048	879.2594	100	891.2997						
	865.2625	98.1	877.3028	881.2574	98.2	893.2977						
	867.2605	64.3	879.3008	883.2554	64.4	895.2957						
	869.2585	27.2	881.2988	885.2534	27.3	897.2937						
10	933.1830	0.4	945.2233	949.1779	0.4	961.2182						
	935.1810	4.3	947.2213	951.1759	4.3	963.2162						
	937.1790	19.0	949.2193	953.1739	18.9	965.2142						
	939.1770	49.5	951.2173	955.1719	49.5	967.2122						
	941.1750	85.0	953.2153	957.1699	84.9	969.2102						
	943.1730	100	955.2133	959.1679	100	971.2082						
	945.1710	81.8	957.2113	961.1659	81.9	973.2062						
	947.1690	46.0	959.2093	963.1639	46.0	975.2042						
	949.1670	17.0	961.2073	965.1619	17.1	977.2022						

PBBs = polybrominated biphenyls
PBDEs = polybrominated diphenyl ethers
PBDDs = polybrominated dibenzo-p-dioxins
PBDFs = polybrominated dibenzofurans

Accurate masses: ¹²C=12.000000, ¹³C=13.003355, ¹H=1.007825, ⁷⁹Br= 78.918300, ⁸¹Br=80.916300, ¹⁶O=15.994915

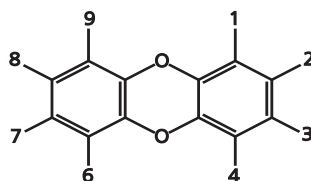
Relative abundances of isotopes were determined using the method described in: Pretsch, Clerc, Seibl, Simon, Tables of Spectral Data for Structure Determination of Organic Compounds, Springer-Verlag, 1983.

The following natural isotopic abundances were used in all calculations: ¹²C=98.89%, ¹³C=1.11%, ¹H=99.985%, ²H=0.015%, ⁷⁹Br=50.54%, ⁸¹Br=49.46%, ¹⁶O=99.759%, ¹⁷O=0.037%, ¹⁸O=0.204%.

SYSTEMATIC NUMBERING OF CHLORINATED DIBENZO-p-DIOXINS

ID Number*	Congener	CAS Number
1	1-Chlorodibenzo-p-dioxin	39227-53-7
2	2-Chlorodibenzo-p-dioxin	39227-54-8
3	1,2-Dichlorodibenzo-p-dioxin	54536-18-4
4	1,3-Dichlorodibenzo-p-dioxin	50585-39-2
5	1,4-Dichlorodibenzo-p-dioxin	54536-19-5
6	1,6-Dichlorodibenzo-p-dioxin	58178-38-0
7	1,7-Dichlorodibenzo-p-dioxin	82291-26-7
8	1,8-Dichlorodibenzo-p-dioxin	82291-27-8
9	1,9-Dichlorodibenzo-p-dioxin	82291-28-9
10	2,3-Dichlorodibenzo-p-dioxin	29446-15-9
11	2,7-Dichlorodibenzo-p-dioxin	33857-26-0
12	2,8-Dichlorodibenzo-p-dioxin	38964-22-6
13	1,2,3-Trichlorodibenzo-p-dioxin	54536-17-3
14	1,2,4-Trichlorodibenzo-p-dioxin	39227-58-2
15	1,2,6-Trichlorodibenzo-p-dioxin	82291-29-0
16	1,2,7-Trichlorodibenzo-p-dioxin	82291-30-3
17	1,2,8-Trichlorodibenzo-p-dioxin	82291-31-4
18	1,2,9-Trichlorodibenzo-p-dioxin	82291-32-5
19	1,3,6-Trichlorodibenzo-p-dioxin	82291-33-6
20	1,3,7-Trichlorodibenzo-p-dioxin	67028-17-5
21	1,3,8-Trichlorodibenzo-p-dioxin	82306-61-4
22	1,3,9-Trichlorodibenzo-p-dioxin	82306-62-5
23	1,4,6-Trichlorodibenzo-p-dioxin	82306-63-6
24	1,4,7-Trichlorodibenzo-p-dioxin	82306-64-7
25	1,7,8-Trichlorodibenzo-p-dioxin	82306-65-8
26	2,3,7-Trichlorodibenzo-p-dioxin	33857-28-2
27	1,2,3,4-Tetrachlorodibenzo-p-dioxin	30746-58-8
28	1,2,3,6-Tetrachlorodibenzo-p-dioxin	71669-25-5
29	1,2,3,7-Tetrachlorodibenzo-p-dioxin	67028-18-6
30	1,2,3,8-Tetrachlorodibenzo-p-dioxin	53555-02-5
31	1,2,3,9-Tetrachlorodibenzo-p-dioxin	71669-26-6
32	1,2,4,6-Tetrachlorodibenzo-p-dioxin	71669-27-7

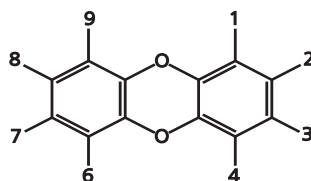
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZO-p-DIOXINS

ID Number*	Congener	CAS Number
33	1,2,4,7-Tetrachlorodibenzo-p-dioxin	71669-28-8
34	1,2,4,8-Tetrachlorodibenzo-p-dioxin	71669-29-9
35	1,2,4,9-Tetrachlorodibenzo-p-dioxin	71665-99-1
36	1,2,6,7-Tetrachlorodibenzo-p-dioxin	40581-90-6
37	1,2,6,8-Tetrachlorodibenzo-p-dioxin	67323-56-2
38	1,2,6,9-Tetrachlorodibenzo-p-dioxin	40581-91-7
39	1,2,7,8-Tetrachlorodibenzo-p-dioxin	34816-53-0
40	1,2,7,9-Tetrachlorodibenzo-p-dioxin	71669-23-3
41	1,2,8,9-Tetrachlorodibenzo-p-dioxin	62470-54-6
42	1,3,6,8-Tetrachlorodibenzo-p-dioxin	33423-92-6
43	1,3,6,9-Tetrachlorodibenzo-p-dioxin	71669-24-4
44	1,3,7,8-Tetrachlorodibenzo-p-dioxin	50585-46-1
45	1,3,7,9-Tetrachlorodibenzo-p-dioxin	62470-53-5
46	1,4,6,9-Tetrachlorodibenzo-p-dioxin	40581-93-9
47	1,4,7,8-Tetrachlorodibenzo-p-dioxin	40581-94-0
48	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
49	1,2,3,4,6-Pentachlorodibenzo-p-dioxin	67028-19-7
50	1,2,3,4,7-Pentachlorodibenzo-p-dioxin	39227-61-7
51	1,2,3,6,7-Pentachlorodibenzo-p-dioxin	71925-15-0
52	1,2,3,6,8-Pentachlorodibenzo-p-dioxin	71925-16-1
53	1,2,3,6,9-Pentachlorodibenzo-p-dioxin	82291-34-7
54	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4
55	1,2,3,7,9-Pentachlorodibenzo-p-dioxin	71925-17-2
56	1,2,3,8,9-Pentachlorodibenzo-p-dioxin	71925-18-3
57	1,2,4,6,7-Pentachlorodibenzo-p-dioxin	82291-35-8
58	1,2,4,6,8-Pentachlorodibenzo-p-dioxin	71998-76-0
59	1,2,4,6,9-Pentachlorodibenzo-p-dioxin	82291-36-9
60	1,2,4,7,8-Pentachlorodibenzo-p-dioxin	58802-08-7
61	1,2,4,7,9-Pentachlorodibenzo-p-dioxin	82291-37-0
62	1,2,4,8,9-Pentachlorodibenzo-p-dioxin	82291-38-1
63	1,2,3,4,6,7-Hexachlorodibenzo-p-dioxin	58200-66-1
64	1,2,3,4,6,8-Hexachlorodibenzo-p-dioxin	58200-67-2
65	1,2,3,4,6,9-Hexachlorodibenzo-p-dioxin	58200-68-3

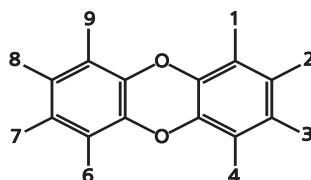
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZO-p-DIOXINS

ID Number*	Congener	CAS Number
66	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6
67	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7
68	1,2,3,6,7,9-Hexachlorodibenzo-p-dioxin	64461-98-9
69	1,2,3,6,8,9-Hexachlorodibenzo-p-dioxin	58200-69-4
70	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3
71	1,2,4,6,7,9-Hexachlorodibenzo-p-dioxin	39227-62-8
72	1,2,4,6,8,9-Hexachlorodibenzo-p-dioxin	58802-09-8
73	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9
74	1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin	58200-70-7
75	Octachlorodibenzo-p-dioxin	3268-87-9

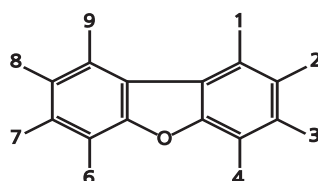
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZOFURANS

ID Number*	Congener	CAS Number
1	1-Chlorodibenzofuran	84761-86-4
2	2-Chlorodibenzofuran	51230-49-0
3	3-Chlorodibenzofuran	25074-67-3
4	4-Chlorodibenzofuran	74992-96-4
5	1,2-Dichlorodibenzofuran	64126-85-8
6	1,3-Dichlorodibenzofuran	94538-00-8
7	1,4-Dichlorodibenzofuran	94538-01-9
8	1,6-Dichlorodibenzofuran	74992-97-5
9	1,7-Dichlorodibenzofuran	94538-02-0
10	1,8-Dichlorodibenzofuran	81638-37-1
11	1,9-Dichlorodibenzofuran	70648-14-5

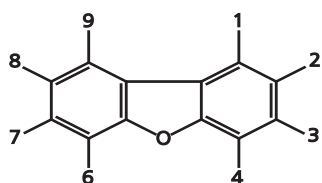
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZOFURANS

ID Number*	Congener	CAS Number
12	2,3-Dichlorodibenzofuran	64126-86-9
13	2,4-Dichlorodibenzofuran	
14	2,6-Dichlorodibenzofuran	60390-27-4
15	2,7-Dichlorodibenzofuran	74992-98-6
16	2,8-Dichlorodibenzofuran	5409-83-6
17	3,4-Dichlorodibenzofuran	94570-83-9
18	3,6-Dichlorodibenzofuran	74918-40-4
19	3,7-Dichlorodibenzofuran	58802-21-4
20	4,6-Dichlorodibenzofuran	
21	1,2,3-Trichlorodibenzofuran	83636-47-9
22	1,2,4-Trichlorodibenzofuran	24478-73-7
23	1,2,6-Trichlorodibenzofuran	64560-15-2
24	1,2,7-Trichlorodibenzofuran	83704-37-4
25	1,2,8-Trichlorodibenzofuran	83704-34-1
26	1,2,9-Trichlorodibenzofuran	83704-38-5
27	1,3,4-Trichlorodibenzofuran	82911-61-3
28	1,3,6-Trichlorodibenzofuran	83704-39-6
29	1,3,7-Trichlorodibenzofuran	64560-16-3
30	1,3,8-Trichlorodibenzofuran	76621-12-0
31	1,3,9-Trichlorodibenzofuran	83704-40-9
32	1,4,6-Trichlorodibenzofuran	82911-60-2
33	1,4,7-Trichlorodibenzofuran	83704-41-0
34	1,4,8-Trichlorodibenzofuran	64560-14-1
35	1,4,9-Trichlorodibenzofuran	70648-13-4
36	1,6,7-Trichlorodibenzofuran	83704-46-5
37	1,6,8-Trichlorodibenzofuran	82911-59-9
38	1,7,8-Trichlorodibenzofuran	58802-18-9
39	2,3,4-Trichlorodibenzofuran	57117-34-7
40	2,3,6-Trichlorodibenzofuran	57117-33-6
41	2,3,7-Trichlorodibenzofuran	58802-17-8
42	2,3,8-Trichlorodibenzofuran	57117-32-5
43	2,4,6-Trichlorodibenzofuran	58802-14-5
44	2,4,7-Trichlorodibenzofuran	83704-42-1
45	2,4,8-Trichlorodibenzofuran	54589-71-8

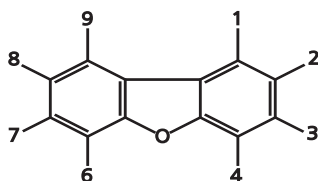
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZOFURANS

ID Number*	Congener	CAS Number
46	2,6,7-Trichlorodibenzofuran	83704-45-4
47	3,4,6-Trichlorodibenzofuran	83704-43-2
48	3,4,7-Trichlorodibenzofuran	83704-44-3
49	1,2,3,4-Tetrachlorodibenzofuran	24478-72-6
50	1,2,3,6-Tetrachlorodibenzofuran	83704-21-6
51	1,2,3,7-Tetrachlorodibenzofuran	83704-22-7
52	1,2,3,8-Tetrachlorodibenzofuran	62615-08-1
53	1,2,3,9-Tetrachlorodibenzofuran	83704-23-8
54	1,2,4,6-Tetrachlorodibenzofuran	71998-73-7
55	1,2,4,7-Tetrachlorodibenzofuran	83719-40-8
56	1,2,4,8-Tetrachlorodibenzofuran	64126-87-0
57	1,2,4,9-Tetrachlorodibenzofuran	83704-24-9
58	1,2,6,7-Tetrachlorodibenzofuran	83704-25-0
59	1,2,6,8-Tetrachlorodibenzofuran	83710-07-0
60	1,2,6,9-Tetrachlorodibenzofuran	70648-18-9
61	1,2,7,8-Tetrachlorodibenzofuran	58802-20-3
62	1,2,7,9-Tetrachlorodibenzofuran	83704-26-1
63	1,2,8,9-Tetrachlorodibenzofuran	70648-22-5
64	1,3,4,6-Tetrachlorodibenzofuran	83704-27-2
65	1,3,4,7-Tetrachlorodibenzofuran	70648-16-7
66	1,3,4,8-Tetrachlorodibenzofuran	92341-04-3
67	1,3,4,9-Tetrachlorodibenzofuran	83704-28-3
68	1,3,6,7-Tetrachlorodibenzofuran	57117-36-9
69	1,3,6,8-Tetrachlorodibenzofuran	71998-72-6
70	1,3,6,9-Tetrachlorodibenzofuran	83690-98-6
71	1,3,7,8-Tetrachlorodibenzofuran	57117-35-8
72	1,3,7,9-Tetrachlorodibenzofuran	64560-17-4
73	1,4,6,7-Tetrachlorodibenzofuran	66794-59-0
74	1,4,6,8-Tetrachlorodibenzofuran	82911-58-8
75	1,4,6,9-Tetrachlorodibenzofuran	70648-19-0
76	1,4,7,8-Tetrachlorodibenzofuran	83704-29-4
77	1,6,7,8-Tetrachlorodibenzofuran	83704-33-0
78	2,3,4,6-Tetrachlorodibenzofuran	83704-30-7
79	2,3,4,7-Tetrachlorodibenzofuran	83704-31-8

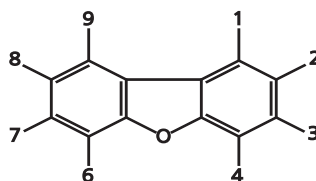
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZOFURANS

ID Number*	Congener	CAS Number
80	2,3,4,8-Tetrachlorodibenzofuran	83704-32-9
81	2,3,6,7-Tetrachlorodibenzofuran	57117-39-2
82	2,3,6,8-Tetrachlorodibenzofuran	57117-37-0
83	2,3,7,8-Tetrachlorodibenzofuran	51207-31-9
84	2,4,6,7-Tetrachlorodibenzofuran	57117-38-1
85	2,4,6,8-Tetrachlorodibenzofuran	58802-19-0
86	3,4,6,7-Tetrachlorodibenzofuran	57117-40-6
87	1,2,3,4,6-Pentachlorodibenzofuran	83704-47-6
88	1,2,3,4,7-Pentachlorodibenzofuran	83704-48-7
89	1,2,3,4,8-Pentachlorodibenzofuran	67517-48-0
90	1,2,3,4,9-Pentachlorodibenzofuran	83704-49-8
91	1,2,3,6,7-Pentachlorodibenzofuran	57117-42-7
92	1,2,3,6,8-Pentachlorodibenzofuran	83704-51-2
93	1,2,3,6,9-Pentachlorodibenzofuran	83704-52-3
94	1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6
95	1,2,3,7,9-Pentachlorodibenzofuran	83704-53-4
96	1,2,3,8,9-Pentachlorodibenzofuran	83704-54-5
97	1,2,4,6,7-Pentachlorodibenzofuran	83704-50-1
98	1,2,4,6,8-Pentachlorodibenzofuran	69698-57-3
99	1,2,4,6,9-Pentachlorodibenzofuran	70648-24-7
100	1,2,4,7,8-Pentachlorodibenzofuran	58802-15-6
101	1,2,4,7,9-Pentachlorodibenzofuran	71998-74-8
102	1,2,4,8,9-Pentachlorodibenzofuran	70648-23-6
103	1,2,6,7,8-Pentachlorodibenzofuran	69433-00-7
104	1,2,6,7,9-Pentachlorodibenzofuran	70872-82-1
105	1,3,4,6,7-Pentachlorodibenzofuran	83704-36-3
106	1,3,4,6,8-Pentachlorodibenzofuran	83704-55-6
107	1,3,4,6,9-Pentachlorodibenzofuran	70648-15-6
108	1,3,4,7,8-Pentachlorodibenzofuran	58802-16-7
109	1,3,4,7,9-Pentachlorodibenzofuran	70648-20-3
110	1,3,6,7,8-Pentachlorodibenzofuran	70648-21-4
111	1,4,6,7,8-Pentachlorodibenzofuran	83704-35-2
112	2,3,4,6,7-Pentachlorodibenzofuran	57117-43-8
113	2,3,4,6,8-Pentachlorodibenzofuran	67481-22-5

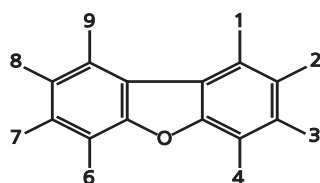
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED DIBENZOFURANS

ID Number*	Congener	CAS Number
114	2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4
115	1,2,3,4,6,7-Hexachlorodibenzofuran	79060-60-9
116	1,2,3,4,6,8-Hexachlorodibenzofuran	69698-60-8
117	1,2,3,4,6,9-Hexachlorodibenzofuran	91538-83-9
118	1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9
119	1,2,3,4,7,9-Hexachlorodibenzofuran	91538-84-0
120	1,2,3,4,8,9-Hexachlorodibenzofuran	92341-07-6
121	1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9
122	1,2,3,6,7,9-Hexachlorodibenzofuran	92341-06-5
123	1,2,3,6,8,9-Hexachlorodibenzofuran	
124	1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9
125	1,2,4,6,7,8-Hexachlorodibenzofuran	67562-40-7
126	1,2,4,6,7,9-Hexachlorodibenzofuran	75627-02-0
127	1,2,4,6,8,9-Hexachlorodibenzofuran	69698-59-5
128	1,3,4,6,7,8-Hexachlorodibenzofuran	71998-75-9
129	1,3,4,6,7,9-Hexachlorodibenzofuran	92341-05-4
130	2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5
131	1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4
132	1,2,3,4,6,7,9-Heptachlorodibenzofuran	70648-25-8
133	1,2,3,4,6,8,9-Heptachlorodibenzofuran	69698-58-4
134	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7
135	Octachlorodibenzofuran	39001-02-0

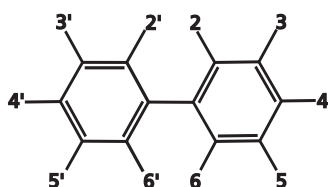
* Ballschmitter et. al.



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
1	2-Chlorobiphenyl	2051-60-7
2	3-Chlorobiphenyl	2051-61-8
3	4-Chlorobiphenyl	2051-62-9
4	2,2'-Dichlorobiphenyl	13029-08-8
5	2,3-Dichlorobiphenyl	16605-91-7
6	2,3'-Dichlorobiphenyl	25569-80-6
7	2,4-Dichlorobiphenyl	33284-50-3
8	2,4'-Dichlorobiphenyl	34883-43-7
9	2,5-Dichlorobiphenyl	34883-39-1
10	2,6-Dichlorobiphenyl	33146-45-1
11	3,3'-Dichlorobiphenyl	2050-67-1
12	3,4-Dichlorobiphenyl	2974-92-7
13	3,4'-Dichlorobiphenyl	2974-90-5
14	3,5-Dichlorobiphenyl	34883-41-5
15	4,4'-Dichlorobiphenyl	2050-68-2
16	2,2',3-Trichlorobiphenyl	38444-78-9
17	2,2',4-Trichlorobiphenyl	37680-66-3
18	2,2',5-Trichlorobiphenyl	37680-65-2
19	2,2',6-Trichlorobiphenyl	38444-73-4
20	2,3,3'-Trichlorobiphenyl	38444-84-7
21	2,3,4-Trichlorobiphenyl	55702-46-0
22	2,3,4'-Trichlorobiphenyl	38444-85-8
23	2,3,5-Trichlorobiphenyl	55720-44-0
24	2,3,6-Trichlorobiphenyl	55702-45-9
25	2,3',4-Trichlorobiphenyl	55712-37-3
26	2,3',5-Trichlorobiphenyl	38444-81-4
27	2,3',6-Trichlorobiphenyl	38444-76-7
28	2,4,4'-Trichlorobiphenyl	7012-37-5
29	2,4,5-Trichlorobiphenyl	15862-07-4
30	2,4,6-Trichlorobiphenyl	35693-92-6
31	2,4',5-Trichlorobiphenyl	16606-02-3
32	2,4',6-Trichlorobiphenyl	38444-77-8
33	2',3,4-Trichlorobiphenyl	38444-86-9

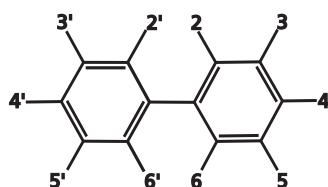
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
34	2',3,5-Trichlorobiphenyl	37680-68-5
35	3,3',4-Trichlorobiphenyl	37680-69-6
36	3,3',5-Trichlorobiphenyl	38444-87-0
37	3,4,4'-Trichlorobiphenyl	38444-90-5
38	3,4,5-Trichlorobiphenyl	53555-66-1
39	3,4',5-Trichlorobiphenyl	38444-88-1
40	2,2',3,3'-Tetrachlorobiphenyl	38444-93-8
41	2,2',3,4-Tetrachlorobiphenyl	52663-59-9
42	2,2',3,4'-Tetrachlorobiphenyl	36559-22-5
43	2,2',3,5-Tetrachlorobiphenyl	70362-46-8
44	2,2',3,5'-Tetrachlorobiphenyl	41464-39-5
45	2,2',3,6-Tetrachlorobiphenyl	70362-45-7
46	2,2',3,6'-Tetrachlorobiphenyl	41464-47-5
47	2,2',4,4'-Tetrachlorobiphenyl	2437-79-8
48	2,2',4,5-Tetrachlorobiphenyl	70362-47-9
49	2,2',4,5'-Tetrachlorobiphenyl	41464-40-8
50	2,2',4,6-Tetrachlorobiphenyl	62796-65-0
51	2,2',4,6'-Tetrachlorobiphenyl	68194-04-7
52	2,2',5,5'-Tetrachlorobiphenyl	35693-99-3
53	2,2',5,6'-Tetrachlorobiphenyl	41464-41-9
54	2,2',6,6'-Tetrachlorobiphenyl	15968-05-5
55	2,3,3',4-Tetrachlorobiphenyl	74338-24-2
56	2,3,3',4'-Tetrachlorobiphenyl	41464-43-1
57	2,3,3',5-Tetrachlorobiphenyl	70424-67-8
58	2,3,3',5'-Tetrachlorobiphenyl	41464-49-7
59	2,3,3',6-Tetrachlorobiphenyl	74472-33-6
60	2,3,4,4'-Tetrachlorobiphenyl	33025-41-1
61	2,3,4,5-Tetrachlorobiphenyl	33284-53-6
62	2,3,4,6-Tetrachlorobiphenyl	54230-22-7
63	2,3,4',5-Tetrachlorobiphenyl	74472-34-7
64	2,3,4',6-Tetrachlorobiphenyl	52663-58-8
65	2,3,5,6-Tetrachlorobiphenyl	33284-54-7
66	2,3',4,4'-Tetrachlorobiphenyl	32598-10-0
67	2,3',4,5-Tetrachlorobiphenyl	73575-53-8

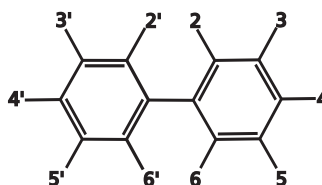
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
68	2,3',4,5'-Tetrachlorobiphenyl	73575-52-7
69	2,3',4,6-Tetrachlorobiphenyl	60233-24-1
70	2,3',4',5-Tetrachlorobiphenyl	32598-11-1
71	2,3',4',6-Tetrachlorobiphenyl	41464-46-4
72	2,3',5,5'-Tetrachlorobiphenyl	41464-42-0
73	2,3',5',6-Tetrachlorobiphenyl	74338-23-1
74	2,4,4',5-Tetrachlorobiphenyl	32690-93-0
75	2,4,4',6-Tetrachlorobiphenyl	32598-12-2
76	2',3,4,5-Tetrachlorobiphenyl	70362-48-0
77	3,3',4,4'-Tetrachlorobiphenyl	32598-13-3
78	3,3',4,5-Tetrachlorobiphenyl	70362-49-1
79	3,3',4,5'-Tetrachlorobiphenyl	41464-48-6
80	3,3',5,5'-Tetrachlorobiphenyl	33284-52-5
81	3,4,4',5-Tetrachlorobiphenyl	70362-50-4
82	2,2',3,3',4-Pentachlorobiphenyl	52663-62-4
83	2,2',3,3',5-Pentachlorobiphenyl	60145-20-2
84	2,2',3,3',6-Pentachlorobiphenyl	52663-60-2
85	2,2',3,4,4'-Pentachlorobiphenyl	65510-45-4
86	2,2',3,4,5-Pentachlorobiphenyl	55312-69-1
87	2,2',3,4,5'-Pentachlorobiphenyl	38380-02-8
88	2,2',3,4,6-Pentachlorobiphenyl	55215-17-3
89	2,2',3,4,6'-Pentachlorobiphenyl	73575-57-2
90	2,2',3,4',5-Pentachlorobiphenyl	68194-07-0
91	2,2',3,4',6-Pentachlorobiphenyl	68194-05-8
92	2,2',3,5,5'-Pentachlorobiphenyl	52663-61-3
93	2,2',3,5,6-Pentachlorobiphenyl	73575-56-1
94	2,2',3,5,6'-Pentachlorobiphenyl	73575-55-0
95	2,2',3,5',6-Pentachlorobiphenyl	38379-99-6
96	2,2',3,6,6'-Pentachlorobiphenyl	73575-54-9
97	2,2',3',4,5-Pentachlorobiphenyl	41464-51-1
98	2,2',3',4,6-Pentachlorobiphenyl	60233-25-2
99	2,2',4,4',5-Pentachlorobiphenyl	38380-01-7
100	2,2',4,4',6-Pentachlorobiphenyl	39485-83-1
101	2,2',4,5,5'-Pentachlorobiphenyl	37680-73-2

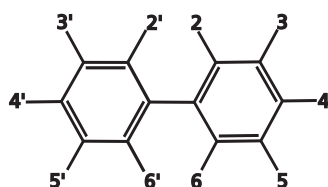
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
102	2,2',4,5,6'-Pentachlorobiphenyl	68194-06-9
103	2,2',4,5',6-Pentachlorobiphenyl	60145-21-3
104	2,2',4,6,6'-Pentachlorobiphenyl	56558-16-8
105	2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4
106	2,3,3',4,5-Pentachlorobiphenyl	70424-69-0
107 (BZ #108)	2,3,3',4,5'-Pentachlorobiphenyl	70362-41-3
108 (BZ #109)	2,3,3',4,6-Pentachlorobiphenyl	74472-35-8
109 (BZ #107)	2,3,3',4',5-Pentachlorobiphenyl	70424-68-9
110	2,3,3',4',6-Pentachlorobiphenyl	38380-03-9
111	2,3,3',5,5'-Pentachlorobiphenyl	39635-32-0
112	2,3,3',5,6-Pentachlorobiphenyl	74472-36-9
113	2,3,3',5',6-Pentachlorobiphenyl	68194-10-5
114	2,3,4,4',5-Pentachlorobiphenyl	74472-37-0
115	2,3,4,4',6-Pentachlorobiphenyl	74472-38-1
116	2,3,4,5,6-Pentachlorobiphenyl	18259-05-7
117	2,3,4',5,6-Pentachlorobiphenyl	68194-11-6
118	2,3',4,4',5-Pentachlorobiphenyl	31508-00-6
119	2,3',4,4',6-Pentachlorobiphenyl	56558-17-9
120	2,3',4,5,5'-Pentachlorobiphenyl	68194-12-7
121	2,3',4,5',6-Pentachlorobiphenyl	56558-18-0
122	2',3,3',4,5-Pentachlorobiphenyl	76842-07-4
123	2',3,4,4',5-Pentachlorobiphenyl	65510-44-3
124	2',3,4,5,5'-Pentachlorobiphenyl	70424-70-3
125	2',3,4,5,6'-Pentachlorobiphenyl	74472-39-2
126	3,3',4,4',5-Pentachlorobiphenyl	57465-28-8
127	3,3',4,5,5'-Pentachlorobiphenyl	39635-33-1
128	2,2',3,3',4,4'-Hexachlorobiphenyl	38380-07-3
129	2,2',3,3',4,5-Hexachlorobiphenyl	55215-18-4
130	2,2',3,3',4,5'-Hexachlorobiphenyl	52663-66-8
131	2,2',3,3',4,6-Hexachlorobiphenyl	61798-70-7
132	2,2',3,3',4,6'-Hexachlorobiphenyl	38380-05-1
133	2,2',3,3',5,5'-Hexachlorobiphenyl	35694-04-3
134	2,2',3,3',5,6-Hexachlorobiphenyl	52704-70-8
135	2,2',3,3',5,6'-Hexachlorobiphenyl	52744-13-5

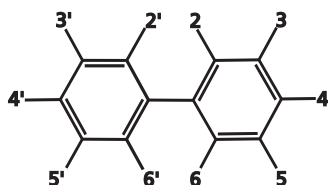
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
136	2,2',3,3',6,6'-Hexachlorobiphenyl	38411-22-2
137	2,2',3,4,4',5-Hexachlorobiphenyl	35694-06-5
138	2,2',3,4,4',5'-Hexachlorobiphenyl	35065-28-2
139	2,2',3,4,4',6-Hexachlorobiphenyl	56030-56-9
140	2,2',3,4,4',6'-Hexachlorobiphenyl	59291-64-4
141	2,2',3,4,5,5'-Hexachlorobiphenyl	52712-04-6
142	2,2',3,4,5,6-Hexachlorobiphenyl	41411-61-4
143	2,2',3,4,5,6'-Hexachlorobiphenyl	68194-15-0
144	2,2',3,4,5',6-Hexachlorobiphenyl	68194-14-9
145	2,2',3,4,6,6'-Hexachlorobiphenyl	74472-40-5
146	2,2',3,4',5,5'-Hexachlorobiphenyl	51908-16-8
147	2,2',3,4',5,6-Hexachlorobiphenyl	68194-13-8
148	2,2',3,4',5,6'-Hexachlorobiphenyl	74472-41-6
149	2,2',3,4',5',6-Hexachlorobiphenyl	38380-04-0
150	2,2',3,4',6,6'-Hexachlorobiphenyl	68194-08-1
151	2,2',3,5,5',6-Hexachlorobiphenyl	52663-63-5
152	2,2',3,5,6,6'-Hexachlorobiphenyl	68194-09-2
153	2,2',4,4',5,5'-Hexachlorobiphenyl	35065-27-1
154	2,2',4,4',5,6'-Hexachlorobiphenyl	60145-22-4
155	2,2',4,4',6,6'-Hexachlorobiphenyl	33979-03-2
156	2,3,3',4,4',5-Hexachlorobiphenyl	38380-08-4
157	2,3,3',4,4',5'-Hexachlorobiphenyl	69782-90-7
158	2,3,3',4,4',6-Hexachlorobiphenyl	74472-42-7
159	2,3,3',4,5,5'-Hexachlorobiphenyl	39635-35-3
160	2,3,3',4,5,6-Hexachlorobiphenyl	41411-62-5
161	2,3,3',4,5',6-Hexachlorobiphenyl	74472-43-8
162	2,3,3',4',5,5'-Hexachlorobiphenyl	39635-34-2
163	2,3,3',4',5,6-Hexachlorobiphenyl	74472-44-9
164	2,3,3',4',5',6-Hexachlorobiphenyl	74472-45-0
165	2,3,3',5,5',6-Hexachlorobiphenyl	74472-46-1
166	2,3,4,4',5,6-Hexachlorobiphenyl	41411-63-6
167	2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6
168	2,3',4,4',5',6-Hexachlorobiphenyl	59291-65-5
169	3,3',4,4',5,5'-Hexachlorobiphenyl	32774-16-6

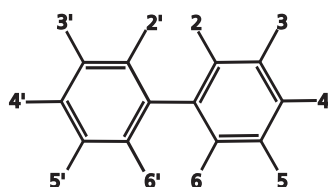
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	35065-30-6
171	2,2',3,3',4,4',6-Heptachlorobiphenyl	52663-71-5
172	2,2',3,3',4,5,5'-Heptachlorobiphenyl	52663-74-8
173	2,2',3,3',4,5,6-Heptachlorobiphenyl	68194-16-1
174	2,2',3,3',4,5,6'-Heptachlorobiphenyl	38411-25-5
175	2,2',3,3',4,5',6-Heptachlorobiphenyl	40186-70-7
176	2,2',3,3',4,6,6'-Heptachlorobiphenyl	52663-65-7
177	2,2',3,3',4',5,6-Heptachlorobiphenyl	52663-70-4
178	2,2',3,3',5,5',6-Heptachlorobiphenyl	52663-67-9
179	2,2',3,3',5,6,6'-Heptachlorobiphenyl	52663-64-6
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	35065-29-3
181	2,2',3,4,4',5,6-Heptachlorobiphenyl	74472-47-2
182	2,2',3,4,4',5,6'-Heptachlorobiphenyl	60145-23-5
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	52663-69-1
184	2,2',3,4,4',6,6'-Heptachlorobiphenyl	74472-48-3
185	2,2',3,4,5,5',6-Heptachlorobiphenyl	52712-05-7
186	2,2',3,4,5,6,6'-Heptachlorobiphenyl	74472-49-4
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	52663-68-0
188	2,2',3,4',5,6,6'-Heptachlorobiphenyl	74487-85-7
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9
190	2,3,3',4,4',5,6-Heptachlorobiphenyl	41411-64-7
191	2,3,3',4,4',5',6-Heptachlorobiphenyl	74472-50-7
192	2,3,3',4,5,5',6-Heptachlorobiphenyl	74472-51-8
193	2,3,3',4',5,5',6-Heptachlorobiphenyl	69782-91-8
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	35694-08-7
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	52663-78-2
196	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	42740-50-1
197	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	33091-17-7
198	2,2',3,3',4,5,5',6-Octachlorobiphenyl	68194-17-2
199 (BZ #201)	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	52663-75-9
200 (BZ #199)	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	52663-73-7
201 (BZ #200)	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	40186-71-8
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	2136-99-4
203	2,2',3,4,4',5,5',6-Octachlorobiphenyl	52663-76-0

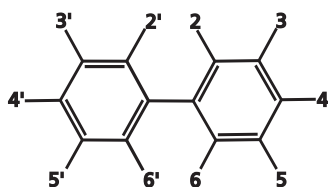
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED BIPHENYLS

ID Number*	Congener	CAS Number
204	2,2',3,4,4',5,6,6'-Octachlorobiphenyl	74472-52-9
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl	74472-53-0
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	40186-72-9
207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	52663-79-3
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	52663-77-1
209	Decachlorobiphenyl	2051-24-3

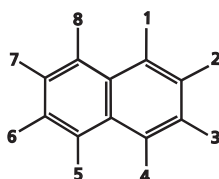
* IUPAC



SYSTEMATIC NUMBERING OF CHLORINATED NAPHTHALENES

ID Number*	Congener	CAS Number
1	1-Chloronaphthalene	90-13-1
2	2-Chloronaphthalene	91-58-7
3	1,2-Dichloronaphthalene	2050-69-3
4	1,3-Dichloronaphthalene	2198-75-6
5	1,4-Dichloronaphthalene	1825-31-6
6	1,5-Dichloronaphthalene	1825-30-5
7	1,6-Dichloronaphthalene	2050-72-8
8	1,7-Dichloronaphthalene	2050-73-9
9	1,8-Dichloronaphthalene	2050-74-0
10	2,3-Dichloronaphthalene	2050-75-1
11	2,6-Dichloronaphthalene	2065-70-5
12	2,7-Dichloronaphthalene	2198-77-8
13	1,2,3-Trichloronaphthalene	50402-52-3
14	1,2,4-Trichloronaphthalene	50402-51-2

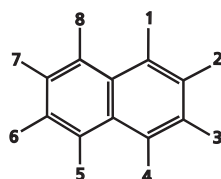
* Wiedmann and Ballschmitter



SYSTEMATIC NUMBERING OF CHLORINATED NAPHTHALENES

ID Number*	Congener	CAS Number
15	1,2,5-Trichloronaphthalene	55720-33-7
16	1,2,6-Trichloronaphthalene	51570-44-6
17	1,2,7-Trichloronaphthalene	55720-34-8
18	1,2,8-Trichloronaphthalene	55720-35-9
19	1,3,5-Trichloronaphthalene	51570-43-5
20	1,3,6-Trichloronaphthalene	55720-36-0
21	1,3,7-Trichloronaphthalene	55720-37-1
22	1,3,8-Trichloronaphthalene	55720-38-2
23	1,4,5-Trichloronaphthalene	2437-55-0
24	1,4,6-Trichloronaphthalene	2737-54-9
25	1,6,7-Trichloronaphthalene	55720-39-3
26	2,3,6-Trichloronaphthalene	55720-40-6
27	1,2,3,4-Tetrachloronaphthalene	20020-02-4
28	1,2,3,5-Tetrachloronaphthalene	53555-63-8
29	1,2,3,6-Tetrachloronaphthalene	
30	1,2,3,7-Tetrachloronaphthalene	55720-41-7
31	1,2,3,8-Tetrachloronaphthalene	149864-81-3
32	1,2,4,5-Tetrachloronaphthalene	6733-54-6
33	1,2,4,6-Tetrachloronaphthalene	51570-45-7
34	1,2,4,7-Tetrachloronaphthalene	67922-21-8
35	1,2,4,8-Tetrachloronaphthalene	6529-87-9
36	1,2,5,6-Tetrachloronaphthalene	67922-22-9
37	1,2,5,7-Tetrachloronaphthalene	67922-23-0
38	1,2,5,8-Tetrachloronaphthalene	149864-80-2
39	1,2,6,7-Tetrachloronaphthalene	149864-79-9
40	1,2,6,8-Tetrachloronaphthalene	67922-24-1
41	1,2,7,8-Tetrachloronaphthalene	149864-82-4
42	1,3,5,7-Tetrachloronaphthalene	53555-64-9
43	1,3,5,8-Tetrachloronaphthalene	31604-28-1
44	1,3,6,7-Tetrachloronaphthalene	55720-42-8
45	1,3,6,8-Tetrachloronaphthalene	150224-15-0
46	1,4,5,8-Tetrachloronaphthalene	3432-57-3
47	1,4,6,7-Tetrachloronaphthalene	55720-43-9
48	2,3,6,7-Tetrachloronaphthalene	

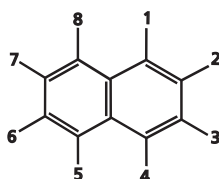
* Wiedmann and Ballschmitter



SYSTEMATIC NUMBERING OF CHLORINATED NAPHTHALENES

ID Number*	Congener	CAS Number
49	1,2,3,4,5-Pentachloronaphthalene	67922-25-2
50	1,2,3,4,6-Pentachloronaphthalene	67922-26-3
51	1,2,3,5,6-Pentachloronaphthalene	
52	1,2,3,5,7-Pentachloronaphthalene	53555-65-0
53	1,2,3,5,8-Pentachloronaphthalene	150224-24-1
54	1,2,3,6,7-Pentachloronaphthalene	150224-16-1
55	1,2,3,6,8-Pentachloronaphthalene	150224-23-0
56	1,2,3,7,8-Pentachloronaphthalene	150205-21-3
57	1,2,4,5,6-Pentachloronaphthalene	150224-20-7
58	1,2,4,5,7-Pentachloronaphthalene	150224-19-4
59	1,2,4,5,8-Pentachloronaphthalene	150224-25-2
60	1,2,4,6,7-Pentachloronaphthalene	150224-17-2
61	1,2,4,6,8-Pentachloronaphthalene	150224-22-9
62	1,2,4,7,8-Pentachloronaphthalene	
63	1,2,3,4,5,6-Hexachloronaphthalene	58877-88-6
64	1,2,3,4,5,7-Hexachloronaphthalene	67927-27-4
65	1,2,3,4,5,8-Hexachloronaphthalene	103426-93-3
66	1,2,3,4,6,7-Hexachloronaphthalene	103426-96-6
67	1,2,3,5,6,7-Hexachloronaphthalene	103426-97-7
68	1,2,3,5,6,8-Hexachloronaphthalene	103426-95-5
69	1,2,3,5,7,8-Hexachloronaphthalene	103426-94-4
70	1,2,3,6,7,8-Hexachloronaphthalene	
71	1,2,4,5,6,8-Hexachloronaphthalene	90948-28-0
72	1,2,4,5,7,8-Hexachloronaphthalene	103426-92-2
73	1,2,3,4,5,6,7-Heptachloronaphthalene	58863-14-2
74	1,2,3,4,5,6,8-Heptachloronaphthalene	58863-15-3
75	Octachloronaphthalene	2234-13-1

* Wiedmann and Ballschmitter





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ISO Guide 34:2009

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AR-1523

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Version No. 001 Issued: 02/19/2015



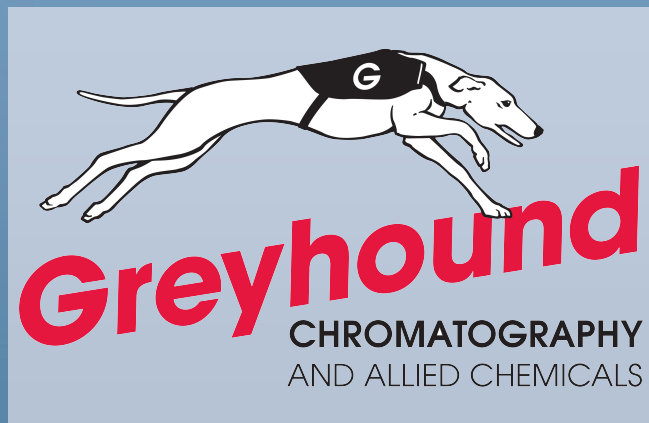
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