

**AGENTE ESCLUSIVO**



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# 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-d<sub>17</sub>-2,3,4,5-tetrabromo[<sup>13</sup>C<sub>6</sub>]benzoate (MEHTBB)**

**Bis(2-Ethylhexyl-d<sub>17</sub>)-tetrabromo[<sup>13</sup>C<sub>6</sub>]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**

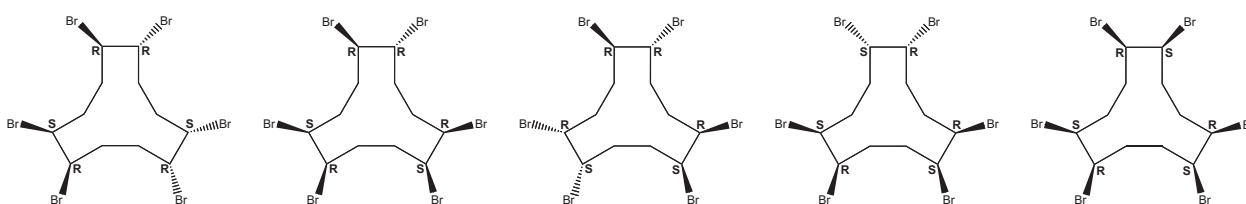


## NATIVE HEXABROMOCYCLODODECANE ISOMERS (HBCDs)

| Catalogue Number | Product (toluene solution)                         | Qty/Conc                   |
|------------------|--|----------------------------|
| <b>aHBCD</b>     | $\alpha$ -1,2,5,6,9,10-Hexabromocyclododecane      | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>bHBCD</b>     | $\beta$ -1,2,5,6,9,10-Hexabromocyclododecane       | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>gHBCD</b>     | $\gamma$ -1,2,5,6,9,10-Hexabromocyclododecane      | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>dHBCD</b>     | $\delta$ -1,2,5,6,9,10-Hexabromocyclododecane      | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>eHBCD</b>     | $\varepsilon$ -1,2,5,6,9,10-Hexabromocyclododecane | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>zHBCD</b>     | $\zeta$ -1,2,5,6,9,10-Hexabromocyclododecane       | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>etaHBCD</b>   | $\eta$ -1,2,5,6,9,10-Hexabromocyclododecane        | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>tHBCD</b>     | $\theta$ -1,2,5,6,9,10-Hexabromocyclododecane      | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>iHBCD</b>     | $\iota$ -1,2,5,6,9,10-Hexabromocyclododecane       | 1.2 ml 50 $\mu\text{g/ml}$ |
| <b>kHBCD</b>     | $\kappa$ -1,2,5,6,9,10-Hexabromocyclododecane      | 1.2 ml 50 $\mu\text{g/ml}$ |

## NATIVE HBCD ISOMERS: SOLUTION/MIXTURE

| Catalogue Number | Product (toluene solution)                            | Qty/Conc            |
|------------------|---|---------------------|
| <b>HBCD-MXA</b>  | Native Hexabromocyclododecane Isomer Solution/Mixture | 1.2 ml              |
|                  | $\alpha$ -1,2,5,6,9,10-Hexabromocyclododecane         | 10 $\mu\text{g/ml}$ |
|                  | $\beta$ -1,2,5,6,9,10-Hexabromocyclododecane          | 10 $\mu\text{g/ml}$ |
|                  | $\gamma$ -1,2,5,6,9,10-Hexabromocyclododecane         | 10 $\mu\text{g/ml}$ |



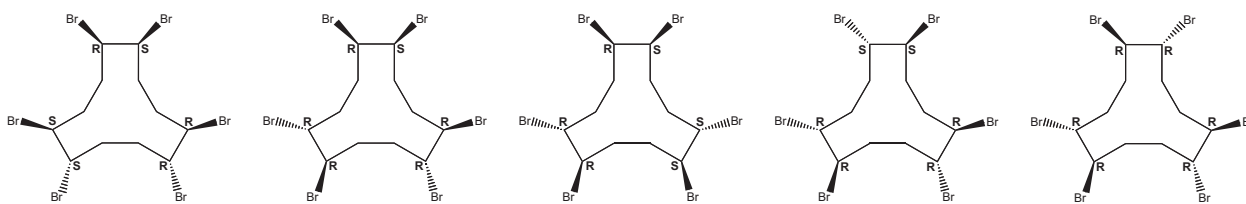
**alpha**

**beta**

**gamma**

**delta**

**epsilon**



**zeta**

**eta**

**theta**

**iota**

**kappa**

## <sup>13</sup>C-LABELLED HEXABROMOCYCLODODECANE ISOMERS

| Catalogue Number | Product (toluene solution)   | Qty/Conc        |
|------------------|--|-----------------|
| <b>MaHBCD</b>    | $\alpha$ -1,2,5,6,9,10-Hexabromo[ <sup>13</sup> C <sub>12</sub> ]cyclododecane | 1.2 ml 50 µg/ml |
| <b>MbHBCD</b>    | $\beta$ -1,2,5,6,9,10-Hexabromo[ <sup>13</sup> C <sub>12</sub> ]cyclododecane  | 1.2 ml 50 µg/ml |
| <b>MgHBCD</b>    | $\gamma$ -1,2,5,6,9,10-Hexabromo[ <sup>13</sup> C <sub>12</sub> ]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        |
|------------------|---|-----------------|
| <b>DaHBCD</b>    | $\alpha$ -1,2,5,6,9,10-Hexabromocyclododecane-d <sub>18</sub> | 1.2 ml 50 µg/ml |
| <b>DbHBCD</b>    | $\beta$ -1,2,5,6,9,10-Hexabromocyclododecane-d <sub>18</sub>  | 1.2 ml 50 µg/ml |
| <b>DgHBCD</b>    | $\gamma$ -1,2,5,6,9,10-Hexabromocyclododecane-d <sub>18</sub> | 1.2 ml 50 µg/ml |

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

## <sup>13</sup>C-LABELLED HBCD ISOMERS: SOLUTION/MIXTURE

| Catalogue Number | Product (toluene solution)   | Qty/Conc |
|------------------|--|----------|
| <b>MHBCD-MXA</b> | Mass-Labelled Hexabromocyclododecane Isomer Solution/Mixture                   | 1.2 ml   |
|                  | $\alpha$ -1,2,5,6,9,10-Hexabromocyclo[ <sup>13</sup> C <sub>12</sub> ]dodecane | 10 µg/ml |
|                  | $\beta$ -1,2,5,6,9,10-Hexabromocyclo[ <sup>13</sup> C <sub>12</sub> ]dodecane  | 10 µg/ml |
|                  | $\gamma$ -1,2,5,6,9,10-Hexabromocyclo[ <sup>13</sup> C <sub>12</sub> ]dodecane | 10 µg/ml |

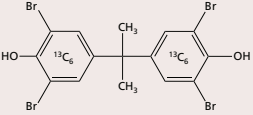
## PENTABROMOCYCLODODECENE (PBCD)

| Catalogue Number | Product (toluene solution)   | Qty/Conc        |
|------------------|--|-----------------|
| <b>PBCD</b>      | <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        |
|------------------|---------------------------------|-----------------|
| <b>TBBPA</b>     | 3,3',5,5'-Tetrabromobisphenol-A | 1.2 ml 50 µg/ml |

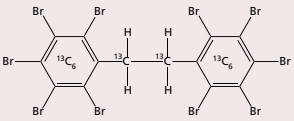
## MASS-LABELLED TETRABROMOBISPHENOL-A

| Catalogue Number | Product   |
|------------------|---|
| <b>MTBBPA</b>    |  <p>3,3',5,5'-Tetrabromobisphenol-A [rings; <sup>13</sup>C<sub>12</sub>]<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;<br/>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 |

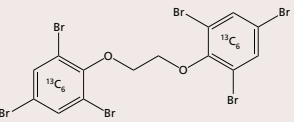
## MASS-LABELLED DECABROMODIPHENYLETHANE

| Catalogue Number | Product   |
|------------------|---|
| MDBDPE           |  <p>1,2-Bis(pentabromophenyl)ethane [<sup>13</sup>C<sub>14</sub>]<br/>1.2 ml; 25 µg/ml (±1.2 µg/ml); in toluene;<br/>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[<sup>13</sup>C<sub>6</sub>]phenoxy)ethane<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in nonane;<br/>Isotopic purity; 99% or greater</p> |

## HEXABROMOBENZENE (HBBZ)

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

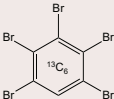
## MASS-LABELLED HEXABROMOBENZENE

| Catalogue Number | Product  |
|------------------|--|
| MHBBZ            |  <p>Hexabromo[<sup>13</sup>C<sub>6</sub>]benzene<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>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            |  Pentabromo[ <sup>13</sup> C <sub>6</sub> ]benzene<br>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br>Isotopic purity; 99% or greater |

## PENTABROMOETHYLBENZENE (PBEB)

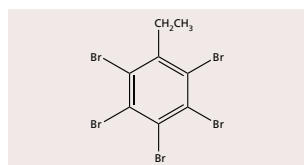
| Catalogue Number | Product (toluene solution) | Qty/Conc        |
|------------------|----------------------------|-----------------|
| PBEB             | Pentabromoethylbenzene     | 1.2 ml 50 µg/ml |

## PENTABROMOTOLUENE (PBT)

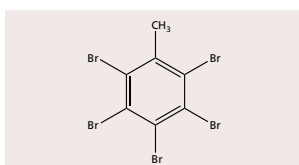
| Catalogue Number | Product (toluene solution) | Qty/Conc        |
|------------------|----------------------------|-----------------|
| PBT              | Pentabromotoluene          | 1.2 ml 50 µg/ml |

## TETRABROMO-P-XYLENE (pTBX)

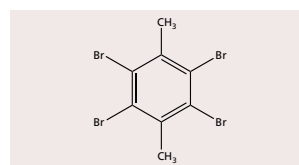
| Catalogue Number | Product (toluene solution)  | Qty/Conc        |
|------------------|-----------------------------|-----------------|
| pTBX             | 2,3,5,6-Tetrabromo-p-xylene | 1.2 ml 50 µg/ml |



Pentabromoethylbenzene



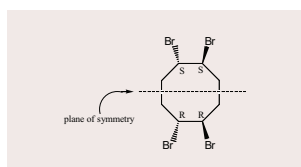
Pentabromotoluene



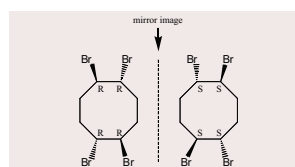
2,3,5,6-Tetrabromo-p-xylene

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

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



aTBCO



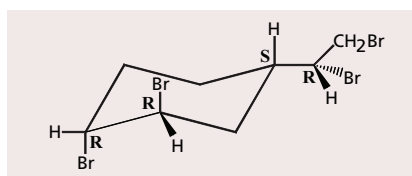
bTBCO

## TETRABROMOETHYLCYCLOHEXANE (TBECH)

| Catalogue Number | Product (toluene solution)  | Qty/Conc        |
|------------------|---|-----------------|
| <b>bTBECH</b>    | <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 |
| <b>gTBECH</b>    | <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 |

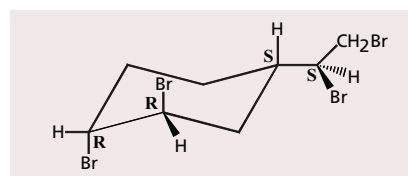
## TETRABROMOETHYLCYCLOHEXANE ISOMERIC SOLUTION/MIXTURES

| Catalogue Number | Product (toluene solution)  | Qty/Conc |
|------------------|---|----------|
| <b>abTBECH</b>   | 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 |
| <b>gdTBECH</b>   | 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 |



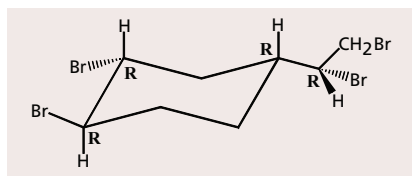
aTBECH

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



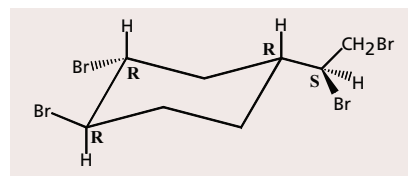
bTBECH

*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

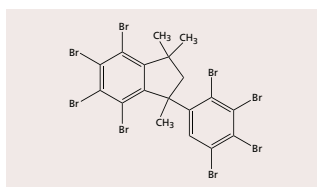


dTBECH

*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        |
|------------------|--|-----------------|
| <b>OBIND</b>     | 4,5,6,7-Tetrabromo-1,1,3-trimethyl-3-(2,3,4,5-tetrabromophenyl)-indane | 1.2 ml 50 µg/ml |

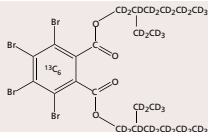


OBIND

## 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 |

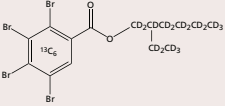
## BIS(2-ETHYLHEXYL-d<sub>17</sub>)TETRABROMO[<sup>13</sup>C<sub>6</sub>]PHTHALATE (MBEHTBP)

| Catalogue Number | Product   |
|------------------|---|
| MBEHTBP          |  <p>Bis(2-ethylhexyl-d<sub>17</sub>)tetrabromo[<sup>13</sup>C<sub>6</sub>]phthalate<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater (<sup>13</sup>C<sub>6</sub>); 98% or greater (<sup>2</sup>H<sub>34</sub>)</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-d<sub>17</sub>-2,3,4,5-TETRABROMO[<sup>13</sup>C<sub>6</sub>]BENZOATE (MEHTBB)

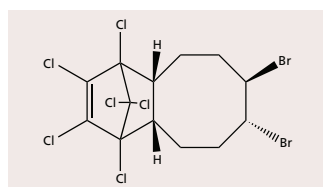
| Catalogue Number | Product  |
|------------------|--|
| MEHTBB           |  <p>2-Ethylhexyl-d<sub>17</sub>-2,3,4,5-tetrabromo[<sup>13</sup>C<sub>6</sub>]benzoate<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater (<sup>13</sup>C<sub>6</sub>); 98% or greater (<sup>2</sup>H<sub>17</sub>)</p> |

## HEXACHLOROCYCLOPENTENYL-DIBROMOCYCLOOCTANE (HCDBCO)

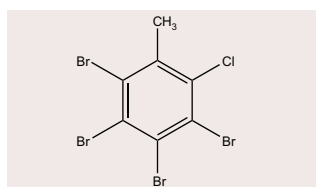
| Catalogue Number | Product (toluene solution)   | Qty/Conc        |
|------------------|--|-----------------|
| HCDBCO           | <i>rac</i> -(1 <i>R</i> ,2 <i>R</i> ,5 <i>R</i> ,6 <i>R</i> ,9 <i>S</i> ,10 <i>S</i> )-5,6-dibromo-1,10,11,12,13,13-hexachlorotricyclo[8.2.1.0 <sup>2,9</sup> ]tridec-11-ene | 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

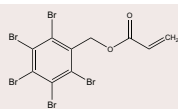


## PENTABROMOBENZYL ACRYLATE

### 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

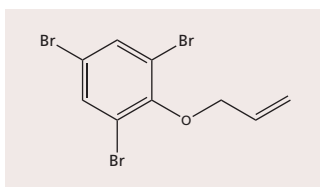
2,3-Dibromopropyl 2,4,6-tribromophenyl ether

1.2 ml 50 µg/ml

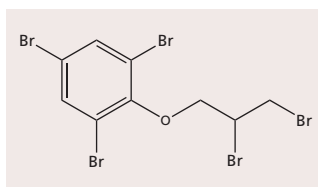
BATE

2-Bromoallyl 2,4,6-tribromophenyl ether

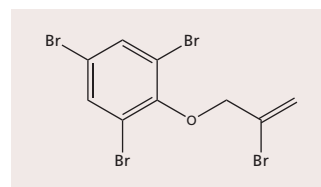
1.2 ml 50 µg/ml



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

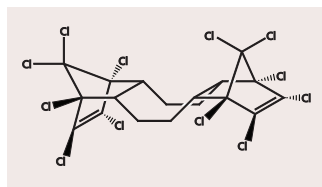
Cl10 Dechlorane Plus®

1.2 ml 50 µg/ml

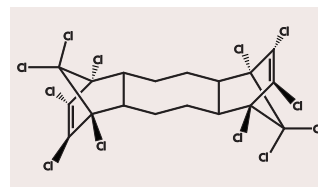
aCl11DP

Cl11 Dechlorane Plus®

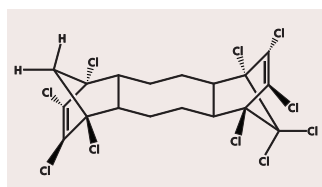
1.2 ml 50 µg/ml



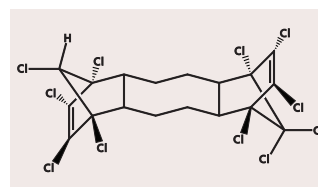
*syn*-Dechlorane Plus®



*anti*-Dechlorane Plus®



*anti*-Cl10 Dechlorane Plus®



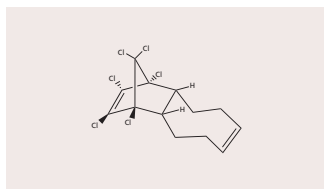
*anti*-Cl11 Dechlorane Plus®

## DECHLORANE PLUS® MONO ADDUCTS

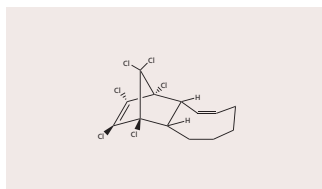
| Catalogue Number | Product (toluene solution)       | Qty/Conc        |
|------------------|----------------------------------|-----------------|
| <b>DPMA</b>      | Dechlorane Plus® Mono adduct     | 1.2 ml 50 µg/ml |
| <b>1,3-DPMA</b>  | 1,3-Dechlorane Plus® Mono adduct | 1.2 ml 50 µg/ml |

## EXPERIMENTAL FLAME RETARDANTS (EFRs)

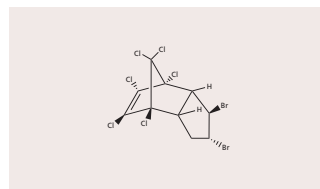
| Catalogue Number | Product (toluene solution)   | Qty/Conc        |
|------------------|------------------------------|-----------------|
| <b>DBCD</b>      | Dibromochlordene             | 1.2 ml 50 µg/ml |
| <b>Dec-601</b>   | Dechlorane 601               | 1.2 ml 50 µg/ml |
| <b>Dec-602</b>   |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



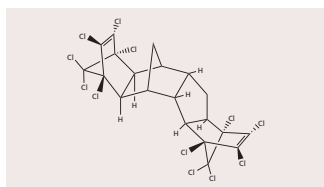
DPMA



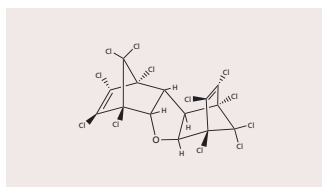
1,3-DPMA



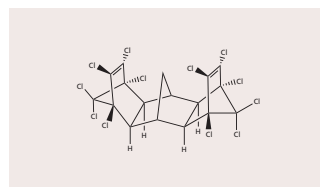
DBCD



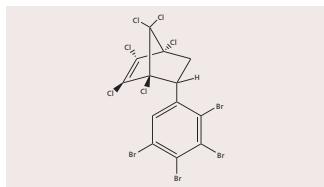
Dec-601



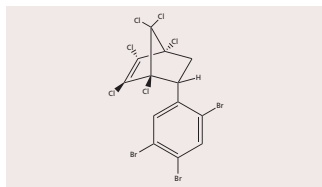
Dec-602



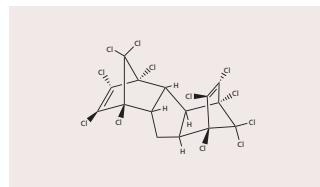
Dec-603



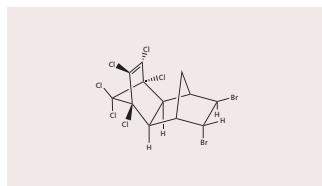
Dec-604



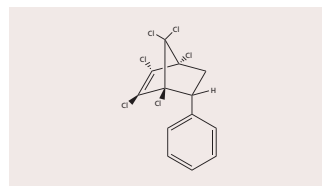
Dec-604CB



CPlus

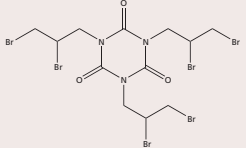


DBALD



HCPN

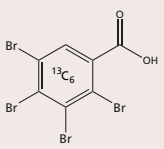
## TRIS(2,3-DIBROMOPROPYL)ISOCYANURATE

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

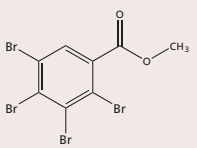
## 2,3,4,5-TETRABROMOBENZOIC ACID (TBBA)

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

## <sup>13</sup>C-LABELLED TETRABROMOBENZOIC ACID (TBBA)

| Catalogue Number | Product   |
|------------------|---|
| MTBBA            |  <p>2,3,4,5-Tetrabromobenzoic acid [<sup>13</sup>C<sub>6</sub>-ring]<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in methanol;<br/>Isotopic purity; 99% or greater</p> |

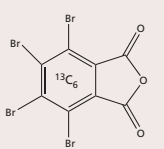
## METHYL-2,3,4,5-TETRABROMOBENZOATE (MeTBBA)

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

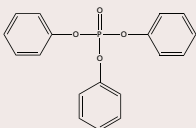
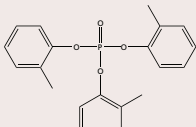
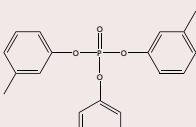
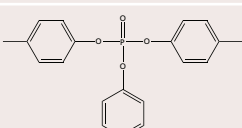
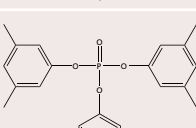
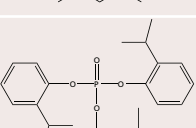
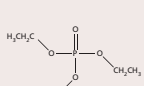
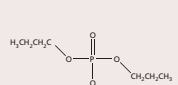
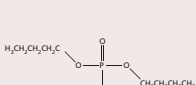
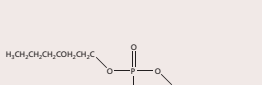
## TETRABROMOPHTHALIC ANHYDRIDE (TBPA<sub>n</sub>)

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

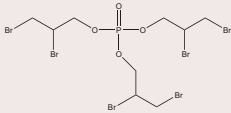
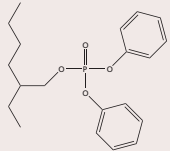
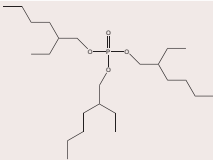
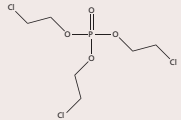
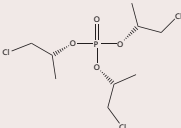
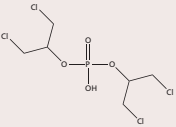
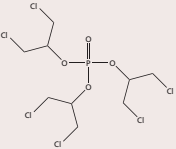
## <sup>13</sup>C-LABELLED TETRABROMOPHTHALIC ANHYDRIDE (MTBPAn)

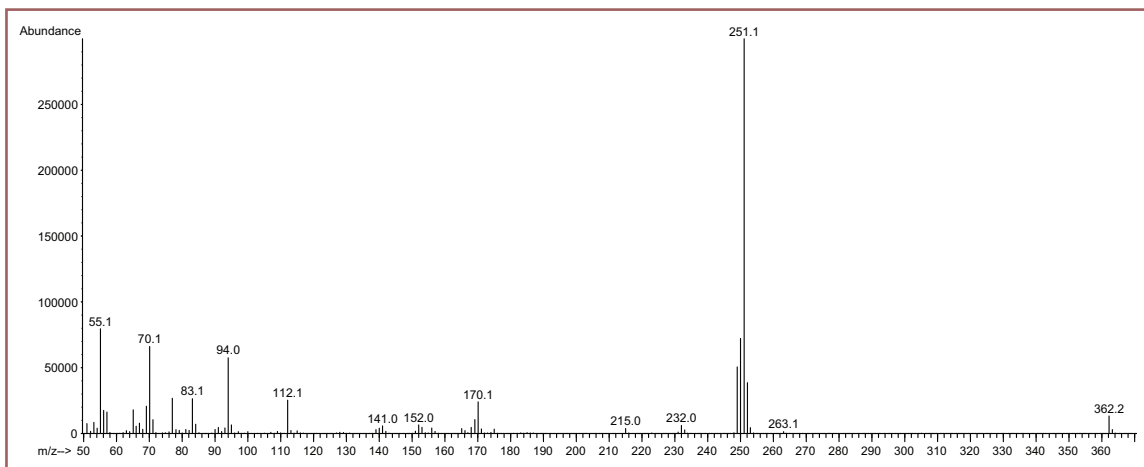
| Catalogue Number | Product  |
|------------------|--|
| MTBPAn           |  <p>Tetrabromo[<sup>13</sup>C<sub>6</sub>]phthalic anhydride<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater</p> |

## NATIVE ORGANOPHOSPHORUS COMPOUNDS

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

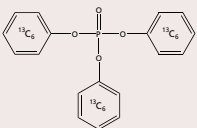
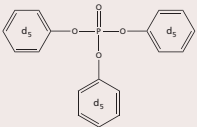
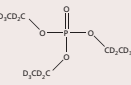
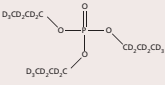
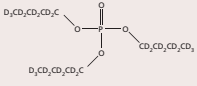
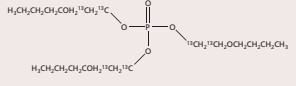
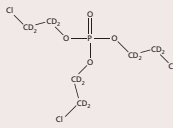
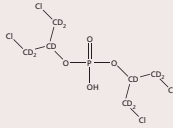
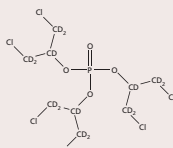
## NATIVE ORGANOPHOSPHORUS COMPOUNDS

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

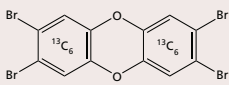
## MASS-LABELLED ORGANOPHOSPHORUS COMPOUNDS

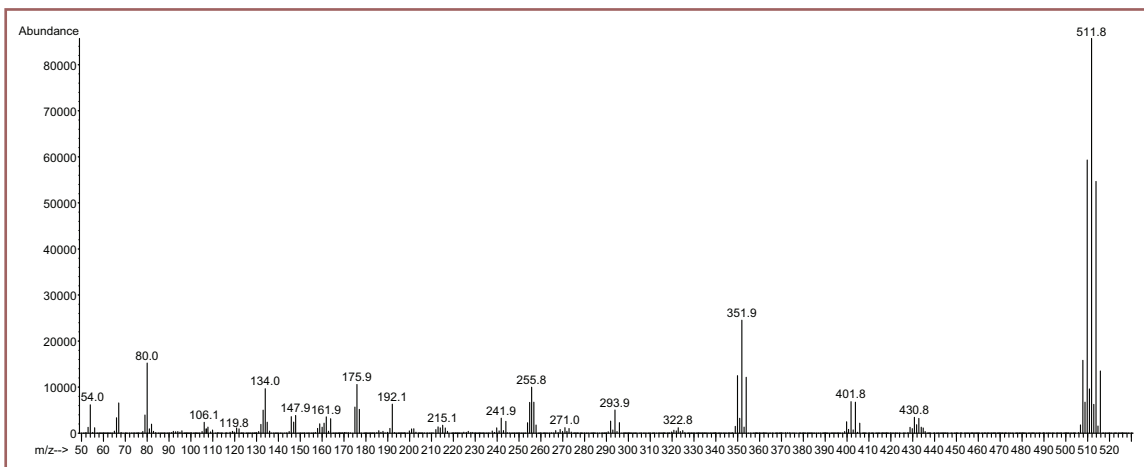
| Catalogue Number | Product  |
|------------------|--|
| <b>MTPP</b>      |  <p><sup>13</sup>C<sub>18</sub>-Triphenylphosphate<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater (<sup>13</sup>C<sub>18</sub>)</p>                   |
| <b>dTPP</b>      |  <p>Triphenylphosphate-d<sub>15</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>15</sub>)</p>                                 |
| <b>dTEP</b>      |  <p>Tri-ethyl phosphate-d<sub>15</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>15</sub>)</p>                                |
| <b>dTPrP</b>     |  <p>Tri-n-propyl phosphate-d<sub>21</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>21</sub>)</p>                             |
| <b>dTBP</b>      |  <p>Tri-n-butyl phosphate-d<sub>27</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>27</sub>)</p>                             |
| <b>MGTBEP</b>    |  <p>Tris(2-butoxy-[<sup>13</sup>C<sub>2</sub>]-ethyl) phosphate<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene<br/>Isotopic purity; 99% or greater (<sup>13</sup>C<sub>6</sub>)</p>      |
| <b>dTCEP</b>     |  <p>Tris(2-chloroethyl) phosphate-d<sub>12</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>12</sub>)</p>                    |
| <b>dBDCP</b>     |  <p>Bis(1,3-dichloro-2-propyl) phosphate-d<sub>10</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in <u>acetonitrile</u>;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>10</sub>)</p> |
| <b>dTDCPP</b>    |  <p>Tris(1,3-dichloro-2-propyl) phosphate-d<sub>15</sub><br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 98% or greater (<sup>2</sup>H<sub>15</sub>)</p>            |

## NATIVE BROMINATED DIBENZO-p-DIOXINS (PBDDs)

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

## MASS-LABELLED BROMINATED DIBENZO-p-DIOXIN

| Catalogue Number | Product   |
|------------------|---|
| <b>MBDD-2378</b> | <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">  </div> <div> <p>2,3,7,8-Tetrabromo[<sup>13</sup>C<sub>12</sub>]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.

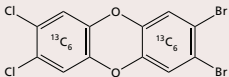
## NATIVE BROMINATED DIBENZOFURANS (PBDFs)

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

## NATIVE BROMO/CHLORO DIBENZO-p-DIOXINS

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

## MASS-LABELLED BROMO/CHLORO DIBENZO-p-DIOXIN

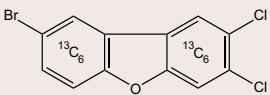
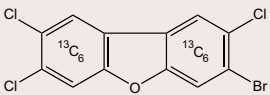
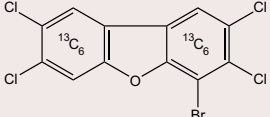
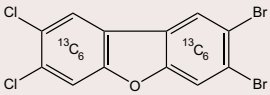
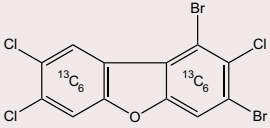
| Catalogue Number    | Product  |
|---------------------|--|
| <b>M23-B-78-CDD</b> | <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>2,3-Dibromo-7,8-dichloro[<sup>13</sup>C<sub>12</sub>]dibenzo-p-dioxin</p> <p>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;</p> <p>Isotopic purity; 99% or greater</p> </div> </div> |



## NATIVE BROMO/CHLORO DIBENZOFURANS

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

## MASS-LABELLED BROMO/CHLORO DIBENZOFURANS

| Catalogue Number     | Product  |
|----------------------|--|
| <b>M8-B-23-CDF</b>   |  <p>8-Bromo-2,3-dichloro[<sup>13</sup>C<sub>12</sub>]dibenzofuran<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater</p>          |
| <b>M3-B-278-CDF</b>  |  <p>3-Bromo-2,7,8-trichloro[<sup>13</sup>C<sub>12</sub>]dibenzofuran<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater</p>      |
| <b>M4-B-2378-CDF</b> |  <p>4-Bromo-2,3,7,8-tetrachloro[<sup>13</sup>C<sub>12</sub>]dibenzofuran<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater</p> |
| <b>M23-B-78-CDF</b>  |  <p>2,3-Dibromo-7,8-dichloro[<sup>13</sup>C<sub>12</sub>]dibenzofuran<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater</p>    |
| <b>M13-B-278-CDF</b> |  <p>1,3-Dibromo-2,7,8-trichloro[<sup>13</sup>C<sub>12</sub>]dibenzofuran<br/>1.2 ml; 50 µg/ml (±2.5 µg/ml); in toluene;<br/>Isotopic purity; 99% or greater</p> |

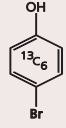
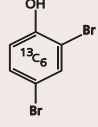
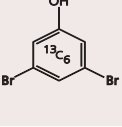
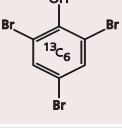
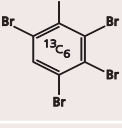
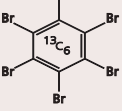
## NATIVE BROMOPHENOLS

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

## NATIVE BROMOPHENOLS: SOLUTION/MIXTURE

| Catalogue Number | Product (toluene solution)            | Qty/Conc |
|------------------|---------------------------------------|----------|
| <b>BRPS</b>      | 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   |
|-------------------|---|
| <b>MBRP-4</b>     | <br>4-Bromo[ <sup>13</sup> C <sub>6</sub> ]phenol<br>1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene            |
| <b>MBRP-24</b>    | <br>2,4-Dibromo[ <sup>13</sup> C <sub>6</sub> ]phenol<br>1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene        |
| <b>MBRP-35</b>    | <br>3,5-Dibromo[ <sup>13</sup> C <sub>6</sub> ]phenol<br>1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene        |
| <b>MBRP-246</b>   | <br>2,4,6-Tribromo[ <sup>13</sup> C <sub>6</sub> ]phenol<br>1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene     |
| <b>MBRP-2346</b>  | <br>2,3,4,6-Tetrabromo[ <sup>13</sup> C <sub>6</sub> ]phenol<br>1.2 ml; 100 µg/ml (±5.0 µg/ml); in toluene |
| <b>MBRP-23456</b> | <br>Pentabromo[ <sup>13</sup> C <sub>6</sub> ]phenol<br>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 |
|------------------|--|----------|
| <b>MBRPS</b>     | Mass-Labelled Bromophenols; Solution/Mixture             | 1.2 ml   |
|                  | 4-Bromo[ <sup>13</sup> C <sub>6</sub> ]phenol            | 5 µg/ml  |
|                  | 2,4-Dibromo[ <sup>13</sup> C <sub>6</sub> ]phenol        | 5 µg/ml  |
|                  | 2,4,6-Tribromo[ <sup>13</sup> C <sub>6</sub> ]phenol     | 5 µg/ml  |
|                  | 2,3,4,6-Tetrabromo[ <sup>13</sup> C <sub>6</sub> ]phenol | 5 µg/ml  |
|                  | Pentabromo[ <sup>13</sup> C <sub>6</sub> ]phenol         | 5 µg/ml  |