



## BMF 10 - Polychlorinated alkanes (SCCP)

### Applications

Polychloro-*n*-alkanes (PCAs) or chlorinated paraffins are a class of industrial chemicals used as high-temperature lubricants in metal-working machinery and as flame retardant plasticizers in vinyl plastics. Less common applications include the use as flame retardants in rubber, paints, adhesives and as sealants.



### "SCCP", "MCCP", "LCCP"

Industrially, the PCAs are synthesized by direct chlorination of *n*-alkane feedstock with molecular chlorine at elevated temperatures and pressures, and sometimes in the presence of UV-light. PCAs fall into three categories, C<sub>10</sub>-C<sub>13</sub> (short, "SCCP"), C<sub>14</sub>-C<sub>17</sub> (medium, "MCCP"), and C<sub>18</sub>-C<sub>30</sub> (long, "LCCP"). They are further sub-categorized into their weight content of chlorine, 40-50%, 50-60% and 60-70%.

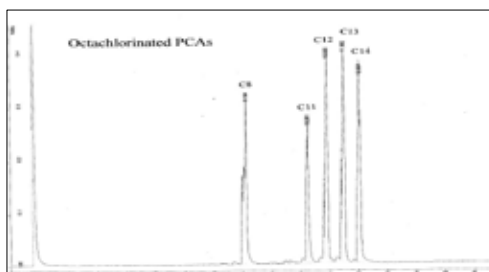
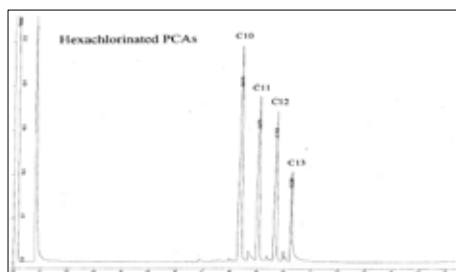
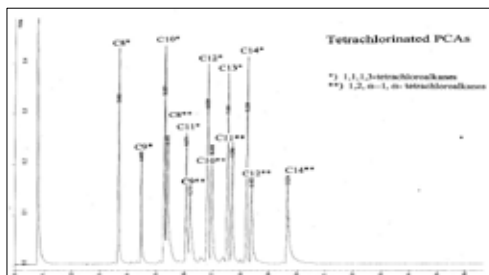
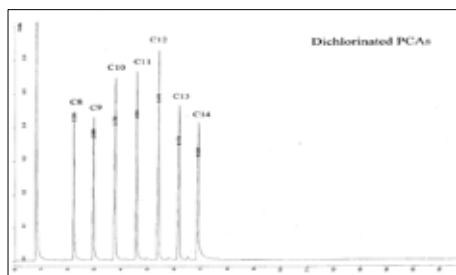
### C<sub>10</sub>-C<sub>13</sub> PCA ("SCCPs" short-chain-chlorinated-paraffines): Listed as Priority Pollutants in the US, Canada, and Europe

In the US, C<sub>10</sub>-C<sub>13</sub> PCAs have been placed on the US Environmental Protection Agency (EPA) Toxic Release Inventory, in Canada they are classified as "Track 1" Priority Toxic substances under the Canadian Environmental Protection Act, and in Europe the C<sub>10</sub>-C<sub>13</sub> PCAs are included on the list of priority substances in the field of water policy submitted by the Commission of European Communities for the European Parliament and Council Decision.

### Analysis of PCAs

PCAs are analyzed by GC using ECD detector, or more sophisticated by high resolution gas chromatography/electron capture negative ion-mass spectrometry (HRGC/ECNI-MS).

Chiron offers a broad range of single polychlorinated PCAs as reference materials. They are useful in the quantification and as standards for PCA determination, for dividing PCAs into various classes according to carbon length and chlorine content. PCAs are C<sub>8</sub>-C<sub>20</sub> alkanes with a chlorine weight content of 27-73%.



## PCAs according to carbon chain length

Cat. No.	Compound	Molecular formula	% Weight of Cl
<b>C8-C9 PCAs</b>			
1664.8-K-IO	1,2-Dichlorooctane	C <sub>8</sub> H <sub>16</sub> Cl <sub>2</sub>	38,7
1660.8-K-IO	1,1,1,3-Tetrachlorooctane	C <sub>8</sub> H <sub>14</sub> Cl <sub>4</sub>	56,3
1672.8-K-IO	1,2,7,8-Tetrachlorooctane	C <sub>8</sub> H <sub>14</sub> Cl <sub>4</sub>	56,3
1656.8-K-IO	1,1,1,3,6,8,8,8-Octachlorooctane	C <sub>8</sub> H <sub>10</sub> Cl <sub>8</sub>	72,8
1665.9-K-IO	1,2-Dichlorononane	C <sub>9</sub> H <sub>18</sub> Cl <sub>2</sub>	36,0
1661.9-K-IO	1,1,1,3-Tetrachlorononane	C <sub>9</sub> H <sub>16</sub> Cl <sub>4</sub>	53,3
1673.9-K-IO	1,2,8,9-Tetrachlorononane	C <sub>9</sub> H <sub>16</sub> Cl <sub>4</sub>	53,3
1658.9-K-IO	1,1,1,3,8,9-Hexachlorononane	C <sub>9</sub> H <sub>16</sub> Cl <sub>4</sub>	65,6
<b>C10-C13 PCAs (SCCPs)</b>			
1666.10-K-IO	1,2-Dichlorodecane	C <sub>10</sub> H <sub>20</sub> Cl <sub>2</sub>	33,6
1662.10-K-IO	1,1,1,3-Tetrachlorodecane	C <sub>10</sub> H <sub>18</sub> Cl <sub>4</sub>	50,6
1671.10-K-IO	1,2,9,10-Tetrachlorodecane	C <sub>10</sub> H <sub>18</sub> Cl <sub>4</sub>	50,6
1659.10-K-IO	1,1,1,3,9,10-Hexachlorodecane, isomer mixture	C <sub>10</sub> H <sub>16</sub> Cl <sub>6</sub>	61,0
1622.10-K-IO	1,1,1,3,8,10,10,10-Octachlorodecane	C <sub>10</sub> H <sub>14</sub> Cl <sub>8</sub>	67,9
1667.11-K-IO	1,2-Dichloroundecane	C <sub>11</sub> H <sub>22</sub> Cl <sub>2</sub>	31,5
1649.11-K-IO	1,1,1,3-Tetrachloroundecane	C <sub>11</sub> H <sub>20</sub> Cl <sub>4</sub>	48,2
1674.11-K-IO	1,2,10,11-Tetrachloroundecane	C <sub>11</sub> H <sub>20</sub> Cl <sub>4</sub>	48,2
1650.11-K-IO	1,1,1,3,10,11-Hexachloroundecane, isomer mixture	C <sub>11</sub> H <sub>18</sub> Cl <sub>6</sub>	58,6
1623.11-K-IO	1,1,1,3,9,11,11,11-Octachloroundecane	C <sub>11</sub> H <sub>16</sub> Cl <sub>8</sub>	65,7
1668.12-K-IO	1,2-Dichlorododecane	C <sub>12</sub> H <sub>24</sub> Cl <sub>2</sub>	29,6
1663.12-K-IO	1,12-Dichlorododecane	C <sub>12</sub> H <sub>24</sub> Cl <sub>2</sub>	29,6
1651.12-K-IO	1,1,1,3-Tetrachlorododecane	C <sub>12</sub> H <sub>22</sub> Cl <sub>4</sub>	46,0
1675.12-K-IO	1,2,11,12-Tetrachlorododecane	C <sub>12</sub> H <sub>22</sub> Cl <sub>4</sub>	46,0
1652.12-K-IO	1,1,1,3,11,12-Hexachlorododecane, isomer mixture	C <sub>12</sub> H <sub>22</sub> Cl <sub>4</sub>	46,0
1624.12-K-IO	1,1,1,3,10,12,12,12-Octachlorododecane	C <sub>12</sub> H <sub>18</sub> Cl <sub>8</sub>	63,6
1669.13-K-IO	1,2-Dichlorotridecane	C <sub>13</sub> H <sub>26</sub> Cl <sub>2</sub>	28,0
1653.13-K-IO	1,1,1,3-Tetrachlorotridecane	C <sub>13</sub> H <sub>24</sub> Cl <sub>4</sub>	44,0
1654.13-K-IO	1,1,1,3,12,13-Hexachlorotridecane, isomer mixture	C <sub>13</sub> H <sub>22</sub> Cl <sub>6</sub>	54,4
1625.13-K-IO	1,1,1,3,11,13,13,13-Octachlorotridecane	C <sub>13</sub> H <sub>20</sub> Cl <sub>8</sub>	61,7
<b>C14+ PCAs (MCCPs and LCCPs)</b>			
1670.14-K-IO	1,2-Dichlorotetradecane	C <sub>14</sub> H <sub>28</sub> Cl <sub>2</sub>	26,5
1676.14-K-IO	1,1,1,3-Tetrachlorotetradecane	C <sub>14</sub> H <sub>26</sub> Cl <sub>4</sub>	42,2
1677.14-K-IO	1,2,13,14-Tetrachlorotetradecane	C <sub>14</sub> H <sub>26</sub> Cl <sub>4</sub>	42,2
1678.14-K-IO	1,1,1,3,12,12,12,14-Octachlorotetradecane	C <sub>14</sub> H <sub>22</sub> Cl <sub>8</sub>	59,8
8506.15-K-IO	1,1,1,3,14,15-Hexachloropentadecane	C <sub>15</sub> H <sub>26</sub> Cl <sub>6</sub>	52,5
8507.16-K-IO	1,1,1,3,14,16,16,16-Octachlorohexadecane	C <sub>16</sub> H <sub>26</sub> Cl <sub>8</sub>	56,6
8508.17-K-IO	1,1,1,3,15,17,17,17-Octachloroheptadecane	C <sub>17</sub> H <sub>28</sub> Cl <sub>8</sub>	55,0
2051.18-10K-DC	1-Chlorooctadecane	C <sub>18</sub> H <sub>39</sub> Cl	12,2
8509.18-K-IO	1,1,1,3,16,18,18,18-Octachlorooctadecane	C <sub>18</sub> H <sub>32</sub> Cl <sub>8</sub>	53,6
8510.19-K-IO	1,1,1,3,17,19,19,19-Octachlorononadecane	C <sub>19</sub> H <sub>34</sub> Cl <sub>8</sub>	52,2
8511.20-K-IO	1,1,1,3,18,20,20,20-Octachloroeicosane	C <sub>20</sub> H <sub>36</sub> Cl <sub>8</sub>	50,9

Reference materials are available in various concentrations (e.g. 100µg/mL and 1000µg/mL) and solvents. Please inquire (also for other PCAs).





## PCAs according to degree of chlorination

Cat.No.	Compound name	Molecular formula	% Weight of Cl
<b>Dichloroalkanes</b>			
1664.8-K-IO	1,2-Dichlorooctane	C <sub>8</sub> H <sub>16</sub> Cl <sub>2</sub>	38,7
1665.9-K-IO	1,2-Dichlorononane	C <sub>9</sub> H <sub>18</sub> Cl <sub>2</sub>	36,0
1666.10-K-IO	1,2-Dichlorodecane	C <sub>10</sub> H <sub>20</sub> Cl <sub>2</sub>	33,6
1667.11-K-IO	1,2-Dichloroundecane	C <sub>11</sub> H <sub>22</sub> Cl <sub>2</sub>	31,5
1668.12-K-IO	1,2-Dichlorododecane	C <sub>12</sub> H <sub>24</sub> Cl <sub>2</sub>	29,6
1663.12-K-IO	1,12-Dichlorododecane	C <sub>12</sub> H <sub>24</sub> Cl <sub>2</sub>	29,6
1669.13-K-IO	1,2-Dichlorotridecane	C <sub>13</sub> H <sub>26</sub> Cl <sub>2</sub>	28,0
1670.14-K-IO	1,2-Dichlorotetradecane	C <sub>14</sub> H <sub>28</sub> Cl <sub>2</sub>	26,5
<b>Tetrachloroalkanes</b>			
1660.8-K-IO	1,1,1,3-Tetrachlorooctane	C <sub>8</sub> H <sub>14</sub> Cl <sub>4</sub>	56,3
1672.8-K-IO	1,2,7,8-Tetrachlorooctane	C <sub>8</sub> H <sub>14</sub> Cl <sub>4</sub>	56,3
1661.9-K-IO	1,1,1,3-Tetrachlorononane	C <sub>9</sub> H <sub>16</sub> Cl <sub>4</sub>	53,3
1673.9-K-IO	1,2,8,9-Tetrachlorononane	C <sub>9</sub> H <sub>16</sub> Cl <sub>4</sub>	53,3
1662.10-K-IO	1,1,1,3-Tetrachlorodecane	C <sub>10</sub> H <sub>18</sub> Cl <sub>4</sub>	50,6
1671.10-K-IO	1,2,9,10-Tetrachlorodecane	C <sub>10</sub> H <sub>18</sub> Cl <sub>4</sub>	50,6
1649.11-K-IO	1,1,1,3-Tetrachloroundecane	C <sub>11</sub> H <sub>20</sub> Cl <sub>4</sub>	48,2
1674.11-K-IO	1,2,10,11-Tetrachloroundecane	C <sub>11</sub> H <sub>20</sub> Cl <sub>4</sub>	48,2
1675.12-K-IO	1,2,11,12-Tetrachlorododecane	C <sub>12</sub> H <sub>22</sub> Cl <sub>4</sub>	46,0
1651.12-K-IO	1,1,1,3-Tetrachlorododecane	C <sub>12</sub> H <sub>22</sub> Cl <sub>4</sub>	46,0
1653.13-K-IO	1,1,1,3-Tetrachlorotridecane	C <sub>13</sub> H <sub>24</sub> Cl <sub>4</sub>	44,0
1677.14-K-IO	1,2,13,14-Tetrachlorotetradecane	C <sub>14</sub> H <sub>26</sub> Cl <sub>4</sub>	42,2
1676.14-K-IO	1,1,1,3-Tetrachlorotetradecane	C <sub>14</sub> H <sub>26</sub> Cl <sub>4</sub>	42,2
<b>Hexachloroalkanes</b>			
1658.9-K-IO	1,1,1,3,8,9-Hexachlorononane	C <sub>9</sub> H <sub>16</sub> Cl <sub>6</sub>	65,6
1659.10-K-IO	1,1,1,3,9,10-Hexachlorodecane	C <sub>10</sub> H <sub>16</sub> Cl <sub>6</sub>	61,0
1650.11-K-IO	1,1,1,3,10,11-Hexachloroundecane	C <sub>11</sub> H <sub>18</sub> Cl <sub>6</sub>	58,6
1652.12-K-IO	1,1,1,3,11,12-Hexachlorododecane	C <sub>12</sub> H <sub>22</sub> Cl <sub>6</sub>	46,0
1654.13-K-IO	1,1,1,3,12,13-Hexachlorotridecane	C <sub>13</sub> H <sub>22</sub> Cl <sub>6</sub>	54,4
8506.15-K-IO	1,1,1,3,14,15-Hexachloropentadecane	C <sub>15</sub> H <sub>26</sub> Cl <sub>6</sub>	52,5
<b>Octachloroalkanes</b>			
1656.8-K-IO	1,1,1,3,6,8,8,8-Octachlorooctane	C <sub>8</sub> H <sub>10</sub> Cl <sub>8</sub>	72,8
1622.10-K-IO	1,1,1,3,8,10,10,10-Octachlorodecane	C <sub>10</sub> H <sub>14</sub> Cl <sub>8</sub>	67,9
1623.11-K-IO	1,1,1,3,9,11,11,11-Octachloroundecane	C <sub>11</sub> H <sub>16</sub> Cl <sub>8</sub>	65,7
1624.12-K-IO	1,1,1,3,10,12,12,12-Octachlorododecane	C <sub>12</sub> H <sub>18</sub> Cl <sub>8</sub>	63,6
1625.13-K-IO	1,1,1,3,11,13,13,13-Octachlorotridecane	C <sub>13</sub> H <sub>20</sub> Cl <sub>8</sub>	61,7
1678.14-K-IO	1,1,1,3,12,14,14,14-Octachlorotetradecane	C <sub>14</sub> H <sub>22</sub> Cl <sub>8</sub>	59,8
8507.16-K-IO	1,1,1,3,14,16,16,16-Octachlorohexadecane	C <sub>16</sub> H <sub>26</sub> Cl <sub>8</sub>	56,6
8508.17-K-IO	1,1,1,3,15,17,17,17-Octachloroheptadecane	C <sub>17</sub> H <sub>28</sub> Cl <sub>8</sub>	55,0
8509.18-K-IO	1,1,1,3,16,18,18,18-Octachlorooctadecane	C <sub>18</sub> H <sub>32</sub> Cl <sub>8</sub>	53,6
8510.19-K-IO	1,1,1,3,17,19,19,19-Octachlorononadecane	C <sub>19</sub> H <sub>34</sub> Cl <sub>8</sub>	52,2
8511.20-K-IO	1,1,1,3,18,20,20,20-Octachloroeicosane	C <sub>20</sub> H <sub>36</sub> Cl <sub>8</sub>	50,9

Reference materials are available in various concentrations (e.g. 100µg/mL and 1000µg/mL) and solvents. Please inquire (also for other PCAs).