

Biomarker Focus

PCA Standards and Analysis

Applications and Types of Categories

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.

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, **C₁₀-C₁₃ (short)**, **C₁₄-C₁₇ (medium)**, and **C₂₀-C₃₀ (long)**. They are further **sub-categorized** into their **weight content of chlorine**, 40-50%, 50-60% and 60-70%.

C₁₀-C₁₃ PCAs:

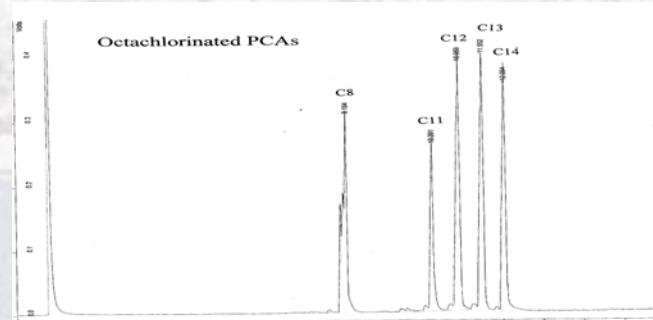
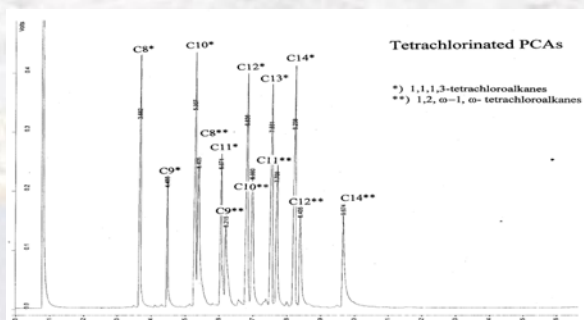
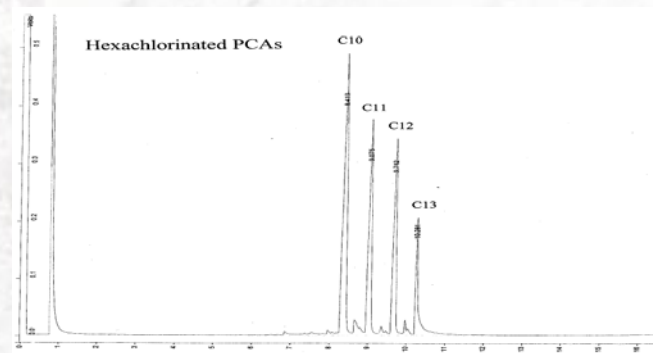
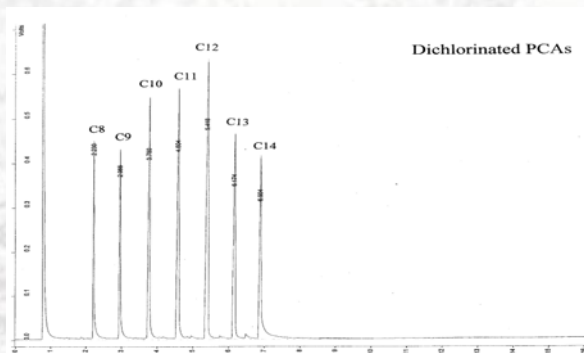
Listed as Priority Pollutants in the US, Canada, and Europe

In the US, **C₁₀-C₁₃ 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 C₁₀-C₁₃ 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.

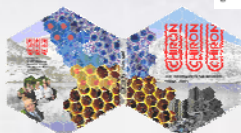
Analysis of PCAs

PCAs are analyzed by **GC using FID detector**, or more sophisticated by **high resolution gas chromatography/electron ionization-mass spectrometry (HRGC/EI-MS)**.

Chiron offers



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*Chiron has a wide range of PCAs on offer – from C₈-C₁₄.
These are sold separately or as kits - see next page for details.*

Reference Standards and Quantification Products on Offer

Chiron offers a range of **polychlorinated PCAs** in the categories mentioned on page 1.

The Chiron standards are **single molecule compounds** and are useful in the **quantification** and as a **standard for PCA determination**, for the dividing into the various classes, according to carbon length and chlorine content. The PCAs are C₈-C₁₄ alkanes with a chlorine weight content of 27-73 %.

The compounds are **di-, tetra-, hexa- or octachlorinated** compounds:

Catalogue number	Molecular formula	Compound name	% Weight of Cl
1664,8	C ₈ H ₁₆ Cl ₂	1,2-Dichlorooctane	38,7
1665,9	C ₉ H ₁₈ Cl ₂	1,2-Dichlorononane	36,0
1666,10	C ₁₀ H ₂₀ Cl ₂	1,2-Dichlorodecane	33,6
1667,11	C ₁₁ H ₂₂ Cl ₂	1,2-Dichloroundecane	31,5
1668,12	C ₁₂ H ₂₄ Cl ₂	1,2-Dichlorododecane	29,6
1663,12	C ₁₂ H ₂₄ Cl ₂	1,12-Dichlorododecane	29,6
1669,13	C ₁₃ H ₂₆ Cl ₂	1,2-Dichlorotridecane	28,0
1670,14	C ₁₄ H ₂₈ Cl ₂	1,2-Dichlorotetradecane	26,5
1879,8		Dichloroalkane Kit (8 samples above, 1 vial each)	
1672,8	C ₈ H ₁₄ Cl ₄	1,2,7,8-Tetrachlorooctane	56,3
1660,8	C ₈ H ₁₄ Cl ₄	1,1,1,3-Tetrachlorooctane	56,3
1673,9	C ₉ H ₁₆ Cl ₄	1,2,8,9-Tetrachlorononane	53,3
1661,9	C ₉ H ₁₆ Cl ₄	1,1,1,3-Tetrachlorononane	53,3
1671,10	C ₁₀ H ₁₈ Cl ₄	1,2,9,10-Tetrachlorodecane	50,6
1662,10	C ₁₀ H ₁₈ Cl ₄	1,1,1,3-Tetrachlorodecane	50,6
1674,11	C ₁₁ H ₂₀ Cl ₄	1,2,10,11-Tetrachloroundecane	48,2
1649,11	C ₁₁ H ₂₀ Cl ₄	1,1,1,3-Tetrachloroundecane	48,2
1675,12	C ₁₂ H ₂₂ Cl ₄	1,2,11,12-Tetrachlorododecane	46,0
1651,12	C ₁₂ H ₂₂ Cl ₄	1,1,1,3-Tetrachlorododecane	46,0
1653,13	C ₁₃ H ₂₄ Cl ₄	1,1,1,3-Tetrachlorotridecane	44,0
1677,14	C ₁₄ H ₂₆ Cl ₄	1,2,13,14-Tetrachlorotetradecane	42,2
1676,14	C ₁₄ H ₂₆ Cl ₄	1,1,1,3-Tetrachlorotetradecane	42,2
1880,13		Tetrachloroalkane Kit (13 samples above, 1 vial each)	
1658,9	C ₉ H ₁₄ Cl ₆	1,1,1,3,8,9-Hexachlorononane	63,5
1659,10	C ₁₀ H ₁₆ Cl ₆	1,1,1,3,9,10-Hexachlorodecane	61,0
1650,11	C ₁₁ H ₁₈ Cl ₆	1,1,1,3,10,11-Hexachloroundecane	58,6
1652,12	C ₁₂ H ₂₀ Cl ₆	1,1,1,3,11,12-Hexachlorododecane	56,4
1654,13	C ₁₃ H ₂₂ Cl ₆	1,1,1,3,12,13-Hexachlorotridecane	54,4
1881,5		Hexachloroalkane Kit (5 samples above, 1 vial each)	
1656,8	C ₈ H ₁₀ Cl ₈	1,1,1,3,6,8,8,8-Octachlorooctane	72,8
1622,10	C ₁₀ H ₁₄ Cl ₈	1,1,1,3,8,10,10,10-Octachlorodecane	67,9
1623,11	C ₁₁ H ₁₆ Cl ₈	1,1,1,3,9,11,11,11-Octachloroundecane	65,7
1624,12	C ₁₂ H ₁₈ Cl ₈	1,1,1,3,10,12,12,12-Octachlorododecane	63,6
1625,13	C ₁₃ H ₂₀ Cl ₈	1,1,1,3,11,13,13,13-Octachlorotridecane	61,7
1678,14	C ₁₄ H ₂₂ Cl ₈	1,1,1,3,12,14,14,14-Octachlorotetradecane	59,8
1882,6		Octachloroalkane Kit (6 samples above, 1 vial each)	
1883,8		C₈-C₉ PCA Kit (8 samples, 1 vial each)	
1884,20		C₁₀-C₁₃ PCA Kit (20 samples, 1 vial each)	
1885,4		C₁₄ PCA Kit (4 samples, 1 vial each)	

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