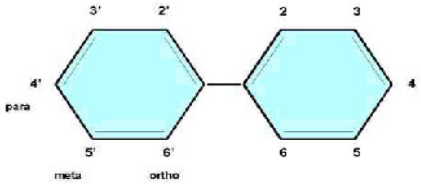
DAT Facts™

EPA Method 1668A

The DAT laboratory has been engaged in the analysis of congener specific PCB analysis using 1668A as part of the laboratories products development for soil and water analysis as well as stack emission analysis. The laboratory performed the initial performance validation of 1668A in conjunction with EPA office of water and also in 2001 as part of a Risk Burn program. The laboratory offers EPA Method 1668A as well as products for other chlorinated compounds such as PCDD/PCDF by high-resolution mass spectrometry.

The CBs that can be determined by this Method are the 12 polychlorinated biphenyls (PCBs) designated as the toxic by the World Health Organization (WHO) and also refereed to as the "Dirty Dozen" plus the remaining 197 CBs, of which 125 are resolved during the analysis and determined as individual congeners. The remaining 70 congeners are determined as mixtures of isomers due to co-elution. The 12 PCBs designated as toxic by WHO and defined as dioxin like and the earliest and latest eluted congener at each level of chlorination are determined by the isotope dilution quantitation technique, the remaining congeners are determined by the internal standard quantitation technique. PCB toxicity equivalent (TEQ_{pcb}) for the Toxics in a sample are expressed as toxicity equivaleny factors TEFs and allow the unique determination of 19 of 21 CBs of interest to the National Oceanic and Atmospheric Administration (NOAA). The table below lists the 12 WHO Toxic CBs, the LOC CBs and window locating CBs.



Structure of Polychlorinated Biphenyl (PCB) Molecule

PCB #	Congener	PCB #	Congener
# 1	2-MonoCB	# 126	3,3',4,4',5-PentaCB-WHO
# 3	4-MonoCB	# 155	2,2',4,4',6,6'-HexaCB
# 4	2,2'-DiCB	# 167	2,3',4,4',5,5'-HexaCB-WHO
# 15	4,4'-DiCB	# 156	2,3,3',4,4',5-HexaCB-WHO
# 19	2',2',6-TriCB	# 157	2,3,3',4,4',5'-HexaCB-WHO
# 37	3,4,4'-TriCB	# 169	3,3',4,4',5,5'-HexaCB-WHO
# 54	2,2',6,6'-TetraCB	# 188	2,2',3,4',5,6,6'-HeptaCB
# 77	3,3',4,4'-TetraCB-WHO	# 189	2,3,3',4,4',5,5'-HeptaCB-WHO
# 81	3,4,4',5-TetraCB-WHO	# 202	2,2',3,3',5,5',6,6'-OctaCB
# 104	2,2',4,6,6'-PentaCB	# 205	2,3,3',4,4',5,5',6-OctaCB
# 105	2,3,3',4,4'-PentaCB-WHO	# 206	2,2',3,3',4,4',5,5',6-NonaCB
# 114	2,3,4,4',5-PentaCB-WHO	# 208	2,2',3,3',4,5,5',6,6'-NonaCB
# 118	2,3',4,4',5-PentaCB-WHO	# 209	DecaCB
# 123	2',3,4,4',5-PentaCB-WHO		

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This method also allows estimation of homolog totals by level of chlorination (LOC) and estimation of total CBs in a sample by summation of the concentrations of the CB congeners and congener groups.

The DAT laboratory is a NELAC certified laboratory and is certified by the State of Ohio and EPA Region 5.
The Laboratory consists of a 10.000 sq ft facility. The instrumentation used for high-resolution mass spectrometry consists of a VG-AutoSpec-Ultima M, VG- AutoSpec-ProSpec and a VG-70-70 SEQ.

The founder of DAT, Dr. Mitchum, led the development of regulatory methods while leading the Quality Assurance Division at the EMSL, US EPA. The validation of these methods has enabled the methodology to be broadly applied throughout EPA regulatory programs.