DRAFT Calculation of Volatile Petroleum Hydrocarbons in Solids, Waters, or Air (Vapour) – VPH

Parameters

Volatile Petroleum Hydrocarbons in water - VPHw
Volatile Petroleum Hydrocarbons in solids - VPHs
Volatile Petroleum Hydrocarbons in air (vapour) – VPHv

Analyte Symbols and EMS Codes

Analyte Symbol	Approx MDL	EMS Code
VPHw	100 ug/L	VPH-F099
VPHs	10 mg/kg	VPH-F100
VPHv	100 ug/m^3 *	refer to MOE EMS website

*MDL for VPHv varies with analytical technique used and with air volume sampled.

Note that the above EMS codes are for results corrected for BTEX, styrene, n-hexane, and n-decane (as defined below for each parameter).

Analytical Method

Refer to the following VH precursor methods:

Volatile Hydrocarbons in Water by GC/FID
Volatile Hydrocarbons in Solids by GC/FID
Volatile Hydrocarbons in Air - Vapour by GC-FID / GC-MS

Units

Waters: mg/L
Soils: mg/kg (dry weight)

Method Summary

Volatile Petroleum Hydrocarbons (VPH) is a calculated parameter. VPH is determined by subtracting analytical results for specified discrete parameters (which are regulated separately under the BC CSR) from Volatile Hydrocarbons (VH) results.

VH and all subtracted discrete parameter results must be analyzed using applicable Director-approved methods from the BC Environmental Laboratory Manual.

The Procedure section lists the different discrete compounds which are excluded from waters, solids, and air (vapour) matrices.

Procedure

Calculate VPH as follows:

$VPHs = VHs_{6\text{-}10} - \Sigma$ [BTEX, styrene]
$VPHw = VHw_{6\text{-}10} - \Sigma$ [BTEX, styrene]
$VPHv = VHv_{6\text{-}13} - \Sigma$ [BTEX, styrene, n-hexane, n-decane]

where BTEX = benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene

Where practical, laboratories should use the same sample extract or aliquot to determine both VH and BTEX. This minimizes the potential error in the final VPH result that could otherwise occur due to the normal variability of sub-sampling.

It is strongly recommended that all BTEX, styrene, n-hexane, and n-decane results be determined by GC/MS. Less selective detectors like Photo-Ionization Detectors (PIDs) or Flame Ionization Detectors (FIDs) are far more susceptible to interferences, but may be used where appropriate, for example:

a) field testing (see below).
b) for samples where no significant interferences are apparent.

For the calculation of VPH, treat as zero any discrete substance results that are reported as less than detection limit (no subtraction).

When the sum of parameters to be subtracted from VH is small compared to the magnitude of VH (e.g. < 1/3 VH), use the reported detection limit for VH as the detection limit for VPH.

When the sum of parameters to be subtracted from VH is large (e.g. > 1/3 VH), the measurement uncertainties of the component parameters can influence the resulting detection limit. Consult the QA/QC section of the BC Lab Manual for guidance on when and how to increase reporting limits (Guidelines for Analytical Parameters Determined by Calculation – Parameters Determined by Subtraction).

Co-Reporting Requirements

Designated regulated substances, as defined below, are allowed (and required) to be subtracted from VH concentrations to arrive at VPH concentrations, because these substances are regulated independently. Consequently, it is required that the subtracted substances must be co-reported to BC MOE where VPH results are used for compliance purposes.

BC MOE Co-Reporting Requirements for VPH parameters are as follows:

VPHs	benzene	VPHv	benzene
	ethylbenzene		ethylbenzene
	styrene		n-decane
	toluene		n-hexane
	xylenes (m,p,& o)		styrene
VPHw	benzene		toluene
	ethylbenzene		xylenes (m,p,& o)
	styrene		
	toluene		
	xylenes (m,p,& o)		

Revision History

March 6, 2015	Revised to include subtraction of styrene for VPHv and VPHw. Added and defined new co-reporting requirements.
June 19, 2009	VPHv added. Text simplified. Additional detection limit guidance added (reference to QA/QC section, calculated parameters).
Dec 31, 2000	Incorporated into main BC Laboratory Manual, EMS codes added, former methods superceded.
July 1999	Finalization of method based on results of a vetting round robin.
1998-1999	Revision of historical hydrocarbon methods by ASL (now ALS) under contract to BC MELP and with guidance from the BCLQAAC Technical Committee (now BCELTAC).
March 1997	Initial publication of version 1.0 of VPH in water method.