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METHOD STATEMENT VOC TARGETS BY PURGE AND TRAP

INTRODUCTION

The performance of this method is validated in accordance with internationally recognised procedures.
This procedure describes the determination of purgeable volatile organic compounds (VOC) in soils and waters by purge and trap gas chromatography mass spectrometry.

PRINCIPLE

Helium is passed through the sample, this carries the volatile components into a cold trap where they condense. At a predetermined time the trap is heated rapidly, the condensate evaporates and passes onto the head of Gas Chromatography (GC) column which separates the different components. The eluent from the GC column passes into the ion source of a mass spectrometer which, records mass spectra continually at a regular interval and with unit mass resolution.
A series of aqueous standards are analysed by this method and the data are used for reference and calibration. Deuterated internal standards are added to all samples, spikes and blanks prior to analysis. An adjustments is made to the results of the quantitation based on the recovery of these internal standards.
In instances where a compound is not present in the calibration materiel, a tentative identification and result is produced based upon a comparison of the mass spectra obtained with those found in the NIST mass spectral databases. Such tentative results are subject to confirmation by the analyst.

SOIL SAMPLES

0.1 to 5 g aliquots are immersed in 10 mls of deionised water, spiked with the internal standards then analysed.

WATER SAMPLES

A 1 to 10 ml aliquot is removed directly from the sample vessel, spiked with the internal standards, then analysed.

PERFORMANCE CHARACTERISTICS

SUBSTANCES DETERMINED

A range of volatile hydrophobic organic compounds, ranging in boiling points from circa -10 C to 200 C. Standard target suite includes chlorinated solvents, 'BTEX' and other priority pollutants.
Note that the purging process is extremely inefficient for hydrophilic compounds such as alcohols, direct injection GC/MS should be used if these compounds are to be monitored.

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RANGE OF APPLICATION

- 1 to 2000 ug/l, ug/kg (compound dependent)

LIMIT OF DETECTION

- Typically 1 ug/l, ug/kg

ANALYTICAL QUALITY CONTROL

Analytical quality control is maintained by a number of measures:

- Multi-point calibration with authentic standards (with defined minimum performance characteristics)
- Analysis of control samples within each analytical batch, such as independent standards, matrix spikes or reference materials
- Analysis of reagent/method blanks within each analytical batch
- Ongoing quality assured by the use of control charts in conjunction with warning and action limits for the QC sample data
- Participation in external proficiency testing and interlaboratory schemes such as LGC CONTEST, HSE WASP, CSL FAPAS

REFERENCES

US EPA Method 8260, Revision B, Volatile Organic Compounds by Gas Chromatography-Mass Spectrometry (GC/MS).