



ENVIROMAIL 49

August 2010

Analysis of Whole Air Samples for VOCs from Passivated (Summa®) Canisters

INTRODUCTION

In late 2009 ALS Newcastle completed canister air analysis validation for VOCs, following secondment of an ALS North American expert. Globally ALS has >15 years experience in performing USEPA protocol VOC canister analyses for major industry clients. This knowledge and capability has now been brought to Australia to support local industry and enhance service delivery times and in June 2010 ALS received formal NATA accreditation for VOCs in air by either USEPA Air Toxics methods TO14ar or TO15r.

Volatile Organic Chemicals (VOCs) form a significant component of the air toxics that are known to cause harm to humans or the environment. Monitoring of these pollutants allows the implementation of management options as appropriate. Sampling can be performed using either an integrated (time weighted) or grab approach and when combined with trace level analysis has broad application including **ambient air, vapour intrusion and indoor air quality studies.**

While Soil Gas is also analysed from Canisters, ALS prefers to use dedicated/separate canisters for this application for quality reasons. Please contact ALS Newcastle for further information.

ANALYTICAL METHODS

ALS has adopted the industry standard USEPA Air Toxics methods TO14ar and TO15r for VOCs in canisters. These methods are similar, but differ in the types of chemicals tested and the way they deal with sample humidity. Method TO15r is the latest and more flexible of the two methods and can be applied to a wide range of polar and non-polar VOCs, including aliphatic and aromatic hydrocarbons, alcohols, ketones, ethers and esters. TO14 provides a subset of TO15 targeting BTEX, MAHs, CFCs & halogenated organics.

Due to their flexibility, sensitivity, holding times and convenience, canister methods are often the preferred approach for many applications.

ALS METHOD CODE: EP101

LOR: 0.5 ppbv (0.05-5 $\mu\text{g}/\text{m}^3$)

or 0.0005 ppmv (upon request)

Typical ALS Canister for this application: 6 litre



ALS SUPPLIED EQUIPMENT & TECHNICAL SUPPORT

Whether collecting integrated or grab samples ALS provides dedicated evacuated canisters and flow restrictors or calibrated passive samplers (at no additional charge subject to prompt return).

All canisters are cleaned, analysed and 'ALS certified' as clean with full data available should it be required for traceability or audit purposes.

Guidance on appropriate use of canisters and flow regulators, plus technical training and support is also available on request. ALS has a strong focus on ensuring that project requirements are clearly defined and communicated to optimize equipment selection. Technical queries should be directed to the ALS *Center of Excellence for Air* in Newcastle on (02) 4968 9433 or newcastle@alsenviro.com.

LOGISTICS

ALS prefers that canisters and sampling equipment be ordered directly through Newcastle given the technical requirements. These will be road couriered to your site or office. Samples can be delivered via ALS Environmental offices however for the fastest turnaround, canisters should be returned direct to ALS Newcastle.

Note that Dangerous Goods Transport Regulations may apply after sampling if the cylinder is pressurised or contains significant levels of hazardous materials.

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TARGET COMPOUNDS

TO14 - EP101-14 (39 compounds)

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
1,2,4-Trimethylbenzene
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Benzene
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-dichloroethene
cis-1,3-Dichloropropene
Ethylbenzene
Freon-12
Freon-11
Freon-113
Freon-114
Hexachloro-1,3-Butadiene
Dichloromethane
m- & p-Xylene
o-Xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,3-Dichloropropene
Trichloroethene
Vinyl Chloride
1,2,4-Trichlorobenzene

TO15 - EP101-15 (64 compounds)

TO14 *plus*
1,3-Butadiene
1,4-Dioxane
2,2,4-Trimethylpentane
4-Ethyltoluene
Acetone
Allyl Chloride
Bromodichloromethane
Bromoform
Carbon Disulfide
Cyclohexane
Dibromochloromethane
Ethyl Acetate
Isopropyl Alcohol
Methyl Butyl Ketone
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Methyl-t-Butyl Ether (MTBE)
n-Heptane
n-Hexane
Propene
Tetrahydrofuran
trans-1,2-Dichloroethene
Vinyl Acetate
Vinyl Bromide
Benzyl Chloride

TO15X - EP101-15X (84 compounds)

TO15 *plus*
Methanol
Ethanol
Acetonitrile
Acrolein
Acrylonitrile
tert-Butyl Alcohol
2-chloroprene
Diisopropyl Ether
Ethyl tert-Butyl Ether
tert-Amyl Methyl Ether
Methyl Methacrylate
1,1,1,2-Tetrachloroethane
Cumene
2-Chlorotoluene
n-Propylbenzene
tert-Butylbenzene
sec-Butylbenzene
o-Cymene
n-Butylbenzene
Naphthalene

National Environment Protection (Air Toxics) Measure

made under subsection 14(1) of the

National Environment Protection Council Act 1994 (Cwlth), National Environment Protection Council (New South Wales) Act 1995 (NSW), National Environment Protection Council (Victoria) Act 1995 (Vic), National Environment Protection Council (Queensland) Act 1994 (Qld), National Environment Protection Council (Western Australia) Act 1996 (WA), National Environment Protection Council (South Australia) Act 1995 (SA), National Environment Protection Council (Tasmania) Act 1995 (Tas), National Environment Protection Council (Northern Territory) Act 1994 (NT), and the National Environment Protection Council Act 1994 (ACT)

This Measure was made on 3 December 2004

AUSTRALIAN GUIDELINES

Methods USEPA TO14 and/or TO15 are recommended in the *National Environment Protection (Air Toxics) Measure for Benzene, Toluene & Xylenes for Ambient air (see above for jurisdiction)*. ALS methods comply with this NEPM.

CERTIFICATE OF ANALYSIS & QC REPORTING

ALS issues fully NATA endorsed Certificates of Analysis consistent with USEPA TO14/TO15 method requirements. Results are normally reported in ppbv and/or $\mu\text{g}/\text{m}^3$. Quality assurance reporting is based on automated compliance checking against USEPA QC criteria. In addition to the normal Quality Control Report that details Blanks, Laboratory Controls and duplicates, an Interpretative Quality Control Report provides a pass or fail for each QA check. This includes holding times, QC outliers, and details of QC frequencies.

REFERENCES

USEPA/625/R-96/010b Air Toxics Monitoring Methods <http://www.epa.gov/ttn/amtic/airtox.html>
Compendium Method TO-14A: Determination of Volatile Organic Compounds (VOCs) in ambient air using specially prepared Canisters with subsequent analysis by Gas Chromatography <http://www.epa.gov/ttn/amtic/files/ambient/airtox/to-14ar.pdf>
Compendium Method TO-15: Determination of Volatile Organic Compounds (VOCs) in air collected in specially-prepared Canisters and analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) <http://www.epa.gov/ttn/amtic/files/ambient/airtox/to-15r.pdf>
National Environment Protection (Air Toxics) Measure - 2004.

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