



ALS Australia Dioxin Capability

ALS has specialist HRMS polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and dioxin-like polychlorinated biphenyls (DL-PCBs) analysis capabilities in Europe, North America and in Australia.

In Australia, this specialist capability was established in Brisbane in 2003 with NATA accreditation obtained in February 2004 for the analysis of soil and sediment, fly-ash, water and wastewater. In the following year this accreditation was extended to include XAD-2 analysis for emission samples and then later to PUF canisters for ambient air analysis.

Since that time, the ALS Brisbane Dioxin laboratory has been involved in routine environmental monitoring programs, stack emissions and ambient air testing, harbour sediment monitoring and a range of drinking water and wastewater monitoring programs such as post-bushfire catchment analysis for drinking water. ALS has also been involved with many significant contaminated land remediation projects, including Australia's largest dioxin remediation project at the former Lednez/Union Carbide/Allied Feeds sites and Homebush Bay remediation at the Rhodes Peninsula in Sydney Harbour.

Rapid Dioxin TAT

The Homebush Bay project involved on-site thermal decomposition of dioxins in soil and sediment requiring very fast turnaround of results. ALS worked closely with the remediation contractor to optimise communication and logistics, and developed world leading analytical processes to achieve the delivery of extremely rapid HRMS Dioxin analyses. To this day, ALS Brisbane is still able to achieve 1-day turnaround (or even same-day on limited samples) time for dioxin analysis. To our knowledge, this is the fastest TAT available for dioxin analysis anywhere in the world.

Technical Expertise



The one constant through the many years of ALS Brisbane's Dioxin analysis history has been **Peter Blow, Technical Specialist - Dioxins & Furans**. Peter has been with ALS for almost 30 years and was involved in the very early days of the Environmental Analysis industry in Australia by developing most of ALS' original Organic analysis methodologies. Many of these methods have become industry standard

and are still in use across Australia today. Peter became involved with the development of dioxin analysis in Brisbane in 2002 and worked closely with international technical specialists to bring the technology to Australia and establish Australia's first commercially available dioxin analysis capability. To this day, Peter is still the primary analyst in the Brisbane dioxins lab, and with close to 20 years of experience in one of our most complex analytical procedures, you can be assured of the quality of the results produced.

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NATA Accreditation for Latest Technology

Dioxins and Furans are among the most toxic compounds known and therefore require the lowest possible analytical detection limits. Since the USEPA Methods 1613 and 8290 were released in the mid-1990s, the only instrument capable of achieving these very low (parts per quadrillion) limits was a High-Resolution Mass Spectrometer (HRMS). This is the instrument that has been in use at ALS Brisbane since 2003.

The European Union Commission Regulation (EU) No 709/2014 provides for the inclusion of GC-MS/MS as a confirmatory technique for dioxins in the context of feed and food laws as well as animal health and welfare rules. Previously, this was the reserve of HRGC-MS. In addition, [the US EPA has recognised](#) the need to consider other detection systems, such as GC-MS/MS for the analysis of Dioxins & Furans, and has recently accepted an application of a GC-MS/MS method for wastewater as a candidate Alternative Test Procedure (ATP) for inclusion in a future regulatory action.

ALS is pleased to announce that it has recently been granted NATA accreditation for the analysis of PCDDs, PCDFs and DL-PCBs using Triple Quadrupole GC-MS/MS. In implementing this latest technology, ALS carried out a robust assessment of available instrumentation using validation against the existing HRMS technique as well as comparative studies with our European and North American laboratories.

The GC-MS/MS instrument selected by ALS was the **Waters Xevo TQ-XS**. This instrument varies from other triple quad mass spectrometers on the market in that it utilises an atmospheric pressure chemical ionization (APCI) source which offers exceptional sensitivity for dioxin analysis.



Waters Xevo TQ-XS APGC Mass Spectrometer at ALS Brisbane

New Reduced Volume or Lower LOR Options

The Xevo TQ-XS instrument has proven to be so sensitive that ALS can now offer standard detection limit analysis for dioxins and furans in water using a 100mL sample volume rather than the traditional 1L volume. This means that the benefits to ALS clients in using a 100mL sample volume, such as reduced field time, manual handling risk and environmental impact, that were previously available for other Organic parameters are now also available for dioxin analysis.

Alternatively, if lower detection limits are required (eg for health-based assessments), ALS can also now provide a 10x reduction in Limit of Reporting (LOR) if using the usual 1L sample volume.

Both the reduced volume standard level analysis and the 1L volume low level analysis are fully validated and available now.

	Water	Water	Soil/ Sediment
ALS Method Code	EP300	EP300-LL	EP300
Water/Soil Volume	100mL	1L	10g
	LOR	LOR	LOR
2378-TCDD	5.0pg/L	0.5pg/L	0.5pg/g
12378-PeCDD	25pg/L	2.5pg/L	2.5pg/g
123478-HxCDD	25pg/L	2.5pg/L	2.5pg/g
123678-HxCDD	25pg/L	2.5pg/L	2.5pg/g
123789-HxCDD	25pg/L	2.5pg/L	2.5pg/g
1234678-HpCDD	25pg/L	2.5pg/L	2.5pg/g
OCDD	100pg/L	10.0pg/L	10.0pg/g
2378-TCDF	5.0pg/L	0.5pg/L	0.5pg/g
12378-PeCDF	25pg/L	2.5pg/L	2.5pg/g
23478-PeCDF	25pg/L	2.5pg/L	2.5pg/g
123478-HxCDF	25pg/L	2.5pg/L	2.5pg/g
123678-HxCDF	25pg/L	2.5pg/L	2.5pg/g
234678-HxCDF	25pg/L	2.5pg/L	2.5pg/g
123789-HxCDF	25pg/L	2.5pg/L	2.5pg/g
1234678-HpCDF	25pg/L	2.5pg/L	2.5pg/g
1234789-HpCDF	25pg/L	2.5pg/L	2.5pg/g
OCDF	50pg/L	5.0pg/L	5.0pg/g
WHO-TEF(Zero)	0.00pg/L	0.00pg/L	0.00pg/g
WHO-TEF(0.5LOR)	28.52pg/L	2.85pg/L	2.85pg/g
WHO-TEF(LOR)	57.05pg/L	5.70pg/L	5.70pg/g
I-TEF(Zero)	0.00pg/L	0.00pg/L	0.00pg/g
I-TEF(0.5LOR)	25.08pg/L	2.51pg/L	2.51pg/g
I-TEF(LOR)	50.15pg/L	5.02pg/L	5.02pg/g

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