The new *Approved Methods for Sampling and Analysis of Air Pollutants in NSW* replaces the 2007 version.

Table 1 **Comparison of the changes against the 2007 version of *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales***

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-1	Selection of sampling positions	Same methods but no restrictions on the use of USEPA method 1 for groups 5 (previously approved under exceptional circumstances) and 6 (previously not approved under any circumstance)	USEPA method 1 provides additional options and an alternative criterion to those provided in AS4323.1 for assessing sampling planes. The alternative criterion can be used to identify a suitable sampling position that would otherwise be non-compliant with AS4323.1.
TM-2	Velocity or volumetric flow rate or temperature or pressure of stack gases	Addition of ISO 10780	ISO 10780 has been included as an additional approved test method for velocity/flow rate.
TM-3	Sulfuric acid mist or sulfur trioxide	Removal of APHA 4110B as an approved method Addition of USEPA Conditional Test Method 013B (CTM-013B) and an approved alternative method USEPA SW-846 method 9056A to the analytical procedure of USEPA method 8	USEPA method 9056A and APHA 4110B use the same analytical principle. The USEPA has approved method 9056A as an alternative method (ALT-133) for the analysis component of USEPA methods 6,8,15A and 16A. method 4110B therefore did not have to be retained. CTM-013B uses a heated quartz filter for capturing particulates, thereby eliminating the potential for interference from particulate sulfate.

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-4	Sulfur dioxide	Removal of USEPA methods 6A and 6B Addition of USEPA methods 8 and 320 Addition of an approved alternative method USEPA SW-846 method 9056A to the analytical procedure of USEPA method 6	Removed USEPA method 6A. This method is the same as method 6 but also allows for the measuring of CO2; however, it is not an approved method for CO_2. Removed method 6B as it is for determination of SO_2 on a 24-hour average basis. The averaging period specified in the POEO Clean Air Regulation is 1 hour, so method 6B is not being retained. USEPA method 8 is suitable for the measurement of SO_2 and allows for the simultaneous measurement of SO_2, SO_3 and H_2SO_4. USEPA method 320 allows for flexible sampling designs and has been approved by USEPA as an alternative method to USEPA method 6C. Refer to USEPA Alt 046. Analysis via barium thorin titration has largely been replaced by ion chromatography. Also, the USEPA has approved Method 9056A as an alternative method (ALT-133) for the analysis component of USEPA methods 6,8,15A and 16A.
TM-5	Hydrogen sulfide	Removal of Environment Canada Reference Method EPS1/RM/6	The Environment Canada Reference Method EPS1/RM/6 is no longer easily accessible via Environment Canada and appears to be no longer supported. Additionally, section 1.2.4 of method EPS1/RM/6 requires that 'analysis must begin within one hour of taking the sample'. In practice, this is unworkable.
TM-6	Sulfur in petroleum products	No longer included	Fuel-quality standards in Australia are now regulated through the *Fuel Quality Standards Act 2000* (the Act). The Act provides a legislative framework for setting national fuel quality and fuel-quality information standards for Australia. Fuel-quality standards have been made for petrol, diesel, biodiesel, autogas and ethanol E85. The legal instrument implementing the petrol standard is Fuel Standard (Petrol) Determination 2001, which lists ASTM D5453 as the standard test method for measuring total sulfur in fuels.

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-7	Chlorine	Addition of USEPA method 26 and the inclusion of the requirement that method 26A must be used when water droplets are present in the gas stream, such as after a scrubber	USEPA method 26 is a non-isokinetic sampling technique for determination of halogens and halides. Non-isokinetic sampling is suitable for applications where chlorine is in a gaseous phase. Method 26 is not suitable where water droplets are present.
TM-8	Hydrogen chloride	Addition of USEPA method 26 and the inclusion of requirement that method 26A must be used when water droplets are present in the gas stream, such as after a scrubber Addition of USEPA method 321	USEPA method 26 is a non-isokinetic sampling technique for determination of halogens and halides. Non-isokinetic sampling is suitable for applications where hydrogen chloride is in a gaseous phase. Method 26 is not suitable where water droplets are present. USEPA method 321 allows for flexible sampling designs and has been promulgated by the USEPA as a suitable method for the determination of gaseous HCl. This method is self-validating.
TM-9	Fluorine or any compound containing fluorine, except where emitted by a primary aluminium smelter while manufacturing aluminium from alumina	Addition of ISO15713 Inclusion of approved alternative methods USEPA SW-846 method 9056A and APHA 4110B to the analytical procedure of USEPA methods 13A and 13B	Analytically, ISO15713 is less complicated as it does not require filter and particulate fusion, and fluoride distillation prior to analysis. The analysis techniques described in USEPA 13A and 13B (SPADNS Colorimetric Method and Specific Ion Electrode) are no longer used extensively in NSW. The inclusion of alternative methods allows analysis via contemporary techniques. These methods allow measurement simultaneously with other analytes using one column and same eluents.
TM-10	Hydrogen fluoride emitted by a primary aluminium smelter while manufacturing aluminium from alumina	Inclusion of USEPA SW-846 method 9056A and APHA 4110B as approved alternative methods to the analytical procedure of USEPA methods 14 and 14A	The analysis techniques described in USEPA 14 and 14A (SPADNS Colorimetric Method and Specific Ion Electrode) are no longer used extensively in NSW. The inclusion of alternative methods allows analysis via contemporary techniques. These methods allow measurement simultaneously with other analytes using one column and same eluents.

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-11	Nitrogen dioxide or nitric oxide	Addition of USEPA method 320 Removal of USEPA method 20 Removal of the note specifying that NOx analysers may be substituted in method 7E if performance measures are met	USEPA method 320 allows for flexible sampling designs and has been approved as an alternative method to USEPA method 7 by the USEPA. Refer to USEPA ALT070. USEPA method 20 requires that NOx measurements be performed in accordance with USEPA method 7E. As method 7E is already an approved method, method 20 does not need to be retained. USEPA method 7E allows for the use of analysers operating on any principle, provided the performance criteria can be achieved. The note is therefore now redundant.
TM-12	Type 1 substances: elements antimony, arsenic, cadmium, lead or mercury, or any compound containing one or more of those elements	Same	NA
TM-13	Type 2 substances (elements beryllium (Be), chromium (Cr), cobalt (Co), manganese (Mn), nickel (Ni), selenium (Se), tin (Sn) or vanadium (V), or any compound containing one or more of those elements)	Same method. Text specifying the analysis methods has been removed.	-
TM-14	Cadmium or mercury, or any compound containing one or more of those elements	Addition of USEPA method 30B for measurement of vapour-phase mercury in sources where there is low particulate concentrations	USEPA 30B is a reference method for relative accuracy test audits (RATAs) of vapor-phase Hg CEMS and sorbent trap monitoring systems. It is intended for use only under low-particulate conditions (i.e. sampling after all pollution control devices). In cases where significant amounts of particle-bound Hg may be present, an isokinetic sampling method for Hg should be used.

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-15	Solid particles (total)	Removal of the exclusion on the use of USEPA method 5 for groups 5 and B (previously approved under exceptional circumstances) and 6 and C (previously not approved under any circumstance) Addition of USEPA methods 17 and 201A	Method 5 is referenced in USEPA isokinetic test methods listed in the approved methods. The inclusion of method 5 under all circumstances allows for greater continuity between the USEPA methods listed and allows for reporting of particles collected via methods such as USEPA M29. USEPA method 17 is considered applicable for the determination of solid particles and is comparable to AS4323.2. USEPA method 201A is appropriate to use as long as the measurement criteria of USEPA methods 5 and 17 are satisfied.
TM-16	Smoke (if determining whether a specified Ringelmann standard has been exceeded)	No longer included	The use of the Ringelmann chart has been rendered redundant in recent years due to improvements in opacity monitors, dust-collection systems and improved operation of plant and equipment. With the reduction in visible emissions across the industry, scores higher than zero would rarely be recorded.
TM-18	Dioxins or furans	Change in the required duration of sampling from between 6 and 16 hours to not less than 2 hours. Removal of note allowing several discrete samples to be taken such that total sampling time is within specified range but sampling point for each point must comply with TM-15	Sampling times and sample collection volumes are reduced to reflect current analytical capabilities and laboratory method detection limits (MDLs), which can achieve lower practical limits.
TM-19	Volatile organic liquids: total mass of unburnt organic vapours, displaced by the transfer of volatile organic liquids from vapour disposal units	No longer included	TM-19 describes the sampling method for determining the total mass of unburnt organic vapours from vapour disposal units (VDUs). VDUs are not widely used in NSW. The determination of unburnt hydrocarbons can be achieved via TM-34, and so TM-19 does not have to be retained.
TM-20	Volatile organic liquids: total mass of unrecovered organic vapours, displaced by the transfer of volatile organic liquids from vapour recovery units	Same	NA

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-21	Volatile organic liquids: calculation of vapour pressure	Method 21 has been re-written and now includes graphs and tables for calculating vapour pressure	Method 21 has been revised to include additional detail. A graph has replaced the existing table, which required interpolation and consultation with the EPA for extrapolation.
TM-22	Moisture content in stack gases	Addition of two methods USEPA Alt-008 and ASTM E337 that may be used under specific circumstances	USEPA Alt-008 is an approved alternative method to USEPA method 4, however it is not appropriate for all sources, situations, or test conditions. It is not appropriate where isokinetic sampling is required. This is also the case for ASTM E337, however additional conditions also apply for this method – it may only be used on sources that are <50^{O}C and at approximately 1 atmosphere of pressure.
TM-23	Dry gas density or molecular weight of stack gases	Same	NA
TM-24	Carbon dioxide in stack gases	Same	NA
TM-25	Oxygen in stack gases	Same	NA
TM-26 to -30	(Previously in Table 2A – motor vehicle fuels)	No longer included – motor vehicle fuel methods except for visible smoke TM-31	Fuel standards are regulated at a federal level. NSW EPA does not regulate fuel standards. Fuel quality standards in Australia are regulated through the *Fuel Quality Standards Act 2000*. The Fuel Quality Standards Determinations that sit under the Act list the test methods for compliance purposes.
TM-31	(Previously in Table 2A – motor vehicle fuels) – observation procedure for excessive air impurities: visible emissions	Same	NA
TM-32	Carbon monoxide	Same	NA
TM-33	Total reduced sulfides	Addition of USEPA methods 16 and 16C	The introduction of USEPA methods 16 and 16C allows for greater flexibility in the approach to semicontinuous measurements of TRS.
TM-34	Volatile organic compounds	Same	NA
TM-35	Methanol	Same	NA

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
TM-37	Smoke (if determining whether standard for emission of smoke from flares has been exceeded)	Same	NA
TM-38	Combination of air impurities from two or more sources	Same	NA
CEM-1	Smoke (if determining whether a specified standard of concentration of opacity has been exceeded)	Same method with the addition of Procedure 3	Procedures 1, 2, 3, 5 and 6 have been included to ensure ongoing QA/QC is used to maintain or improve the integrity, accuracy and representativeness of CEMS data.
CEM-2	Sulfur dioxide or nitrogen dioxide or nitric oxide	Same method with the addition of Procedure 1	-
CEM-3	Oxygen or carbon dioxide in stack gases	Same method with the addition of Procedure 1	-
CEM-4	Carbon monoxide	Same method with the addition of Procedure 1	-
CEM-5	Total reduced sulfides	Same method with the addition of Procedure 1	-
CEM-6	Velocity or volumetric flow rate of stack gases	Same method with the addition of Procedure 1	-
CEM-7	Hydrogen sulfide	Same method with the addition of Procedure 1	-
CEM-8	Volatile organic compounds or methanol	Same method with the addition of Procedure 1	-
CEM-9	Volatile organic compounds or methanol	Same method with the addition of Procedure 1	-
CEM-10	Volatile organic compounds or methanol	Same method with the addition of Procedure 1	-
CEM-11	Particulate matter	Inclusion of USEPA Performance Specification 11 and Procedure 2	These performance specifications have been promulgated in the US following the 2007 publication of the approved method. The methods reflect contemporary air emission monitoring techniques.
CEM-12	Vapour phase mercury	Inclusion of USEPA Performance Specification 12A and Procedure 5	-

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
CEM-13	Gaseous hydrogen chloride	Inclusion of USEPA Performance Specification 18 and Procedure 6	-
OM-3	(Previously in Table 1C)	No longer included	The method is not included in any EPL and is no longer used for regulating emissions from industries.
OM-4	(Previously in Table 1C)	Same methods. Some text has been removed.	-
OM-5	'Fine' particulates (PM10 and/or PM2.5)	Inclusion of ISO 23210 and parameter measured extended to include PM2.5	
OM-6	Polycyclic aromatic hydrocarbons (PAHs)	Same	-
OM-7	Odour sampling from point sources or odour analysis using dynamic olfactometry	Same	-
OM-8	Odour sampling from diffuse sources	USEPA (1986) EPA/600/8-8E/008 replaced with AS 4323.4	AS4323.4 was published in 2009 and was developed based on the 1986 EPA standard. As such, retention of the EPA standard is not required
OM-9	'Coarse' particulates	Same	-
Not previously included	OM-10 Ammonia	Inclusion of ISO 21877	Newly included parameter
Not previously included	OM-11 Formaldehyde	Inclusion of USEPA method 323, USEPA method 318 and USEPA SW-846 test method 0011 Addition of USEPA compendium method TO-5, TO11A and NIOSH method 2016 when source is comparable to ambient air conditions (<50˚C, low moisture and low particulate concentrations)	Newly included parameter Options for sampling formaldehyde in air streams that are comparable to ambient air conditions, such as ventilation exhaust systems, have been included.
Not previously included	OM-12 Isocyanates	Inclusion of USEPA method 326	Newly included parameter
Not previously included	OM-13 Asbestos	ISO 10397	Newly included pollutant

Method number in 2007 Approved Methods	Parameter measured	Summary of change	Reason for the change
AM-1 to AM-22	(Previously in Tables 3A and 3B)	Ambient monitoring methods are no longer included	The EPA does not regulate air pollution using ambient air limits and ambient monitoring is not typically used for demonstrating compliance with licence limits. Ambient methods are not mandated or referenced in any Protection of the Environment Operations (POEO) legislation used to regulate air pollution from industry. The changes allow for greater flexibility in ambient monitoring design with a focus on fit-for-purpose monitoring. The AM-coded methods will now exist on EPA's website alongside generic guidance on ambient air monitoring as a companion to the Approved Methods.

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