



EVALUATION OF MEASUREMENT UNCERTAINTY (MU)

**SGS INDUSTRIES & ENVIROMENT, ENVIRONMENTAL TESTING: NOTTING HILL
LABORATORY, VIC**

Evaluation of measurement uncertainty (MU) was calculated at the 95% confidence interval, coverage factor $k = 2$ using batch control sample results. The following MU values are derived from as mentioned batch control samples ranging from 10 to 100 times the limit of reporting (LOR). As analyte results decrease and approach the LOR, estimated MU will increase. At concentrations

< 5xLOR, MU will be reported as the LOR concentration. i/s indicates insufficient data for MU Evaluation.

Microbiological measurement uncertainty (MU) is evaluated by analysis of cleint unknowns and PT samples by a minimum of two analysts and calculated from the standard deviation of the reproducibility of the final results which is then used to evaluate the uncertainty associated with the method.

Method Number	Method Description	Test/Analyte	Water Relative MU % unless stated otherwise.	Water Relative MU % unless stated otherwise.	Soil Relative MU % unless stated otherwise.	Air Relative MU % unless stated otherwise.
AN101	pH soil sludge sed water	pH soil sludge sed water	0.2 pH units		0.2 pH units	
AN106	Conductivity and TDS by Calculation	Conductivity and TDS by Calculation	6.7			
AN113	TDS	TDS	22.7			
AN113	TS	TS	15.6			
AN114	TSS	TSS	24.1			
AN135	Alkalinity in Aqueous Solution	Alkalinity	10.8			
	Sulfide colourimetric	Sulfide	21.8			
MA1117	TOC by NDIR	TOC / NPOC	18.8			
AN240	Redox Potential (Eh)	Redox Potential (Eh)	9.6			
AN171	Total Nitrogen	Total Nitrogen	15.5			
AN181	Chemical Oxygen Demand UV	COD	8.1			
AN274	Chloride	Cl	9.5		11.0	
AN275	Sulfate	Sulfate	11.5		10.9	
AN276	Total Oxidised Nitrogen	NOx-N	16.0			
	Nitrite-N	NO ₂ -N	13.9			
AN278	Soluble Reactive P	FRP	8.1			
AN280	Ammonia by DA	Ammonia	11.4			
MA1127.2	Fluoride	F	9.3		8.5	
MA1102	Total and WAD CN by DA					
		WADCN	12.4			
		TOTAL CN	18.3		13.7	
MA1400	ICP-MS	USEPA6020A	Soluble	Total		
		Aluminium, Al	12.0	12.5	15.6	
		Antimony	11.7	14.5	9.1	
		Arsenic	10.3	8.9	10.9	
		Barium	8.3	9.9	11.4	
		Beryllium	11.5	12.5	11.7	
		Boron	13.8	13.8	15.3	
		Cadmium	7.8	7.9	7.0	
		Chromium	8.4	8.0	8.9	
		Cobalt	10.2	11.6	16.5	
		Copper	10.4	10.6	11.9	
		Iron	9.8	12.9	13.9	
		Lead	9.5	10.9	10.8	
		Manganese	8.6	8.3	10.8	
		Molybdenum	7.3	6.6	6.3	
		Nickel	8.0	7.3	8.2	
		Selenium	11.4	9.7	10.9	
		Silver	9.9		10.6	
		Strontium	11.4	10.6		

		Tin	9.5	11.2	9.8	
		Thallium	9.4	10.3		
		Titanium	7.1			
		Uranium			11.2	
		Vanadium	8.5	7.2	14.7	
		Zinc	10.9	11.7	14.5	
		Mercury			9.5	
MA1410		Hexavalent Chromium	10.9		8.6	
MA1523	Polyfluorinated Surfactants - LC-MS/MS	PFOA	55.9		70.2	
		PFDA	65.6		60.8	
		PFDOA	62.9		64.5	
		PFNA	61.2		65.7	
		PFOS	59.7		56.9	
		PFUNA	76.4		62.4	
		PFHPA	71.1		42.8	
		PFOSA	107.8		98.9	
		PFTEDA	79.4		62.4	
		PFTRDA	121.6		104.0	
MA30	TRH - GC-FID	VARIOUS				
	TRH	C10-C36	33.7		39.1	
	TRH-Silica	C11-C40			47.8	
	TRH-Silica	TOTALC10-C36	31.2		47.9	
	VPH	C6-C10	38.7		57.3	
		C6-C9	41.1		49.9	
MA8270	SVOC all - GC-MS	USEPA8270				
		OC Pesticides: Aldrin	30.5		40.7	
		Gamma BHC	46.5		39.9	
		Dieldren			41.3	
		Endrin	73.3		67.2	
		Heptachlor	55.1		64.8	
		p-p-DDT	83.2		69.7	
		OP Pesticides: Chlorpyriphos	78.9			
		Dichlorvos	78.8			
		PAH: Acenaphthene	53.5		39.0	
		Pyrene	45.1		50.5	
MA8270	Chloroacetic Acids, Herbicides, Phenols by GC-MS					
		2-Chlorophenol	54.3		65.8	

		4-chloro-3-methylphenol	47.5		74.7	
		Herbicides: 2,4-D	36.4			
		Dicamba	36.0			
		Diuron	32.2			
		MCPA	33.7			
		meta Sulfuron methyl	36.7			
		Phenol			73.3	
MA1421		Glyphosate	31.6		30.3	
		Acrylamide	61.5			
EPA552.3		Haloacetic acids:				
		Bromoacetic acid	37.8			
		Bromochloroacetic acid	35.0			
		Trichloroacetic acid	39.2			
		2,2-Dichloropropionic acid	43.8			
MA8260	GC-MS-P&T	VOCs: 1,1,1 - trichloroethane	30.2		51.3	
		1,1,2-trichloroethane	25.3		31.2	
		1,1-Dichloroethene	38.7		94.2	
		1,2-Dichlorobenzene	21.5		36.3	
		1,2-Dichloroethane	27.0		33.8	
		1,2-dichloropropane	21.5		24.2	
		1,4-dichlorobenzene	16.2		31.5	
		1,2,4-Trichlorobenzene	53.8		47.3	
		2-Methyl-1-Butanol	33.0			
		2-Methyl-2-Butanol	35.5			
		3-Methyl-1-Butanol	40.7			
		Bromodichloromethane	21.6		40.7	
		Carbon Tetrachloride	33.9		51.6	
		Chlorobenzene	28.0		37.6	
		Dibromochloromethane	27.0		65.5	
		Dibromofluoromethane	17.9			
		Dichloromethane	29.0		109.2	
		Tetrachloroethene	27.5		77.7	
		Cis-1,2-Dichloroethene	24.8		31.0	
		Trans-1,2-Dichloroethene	25.4		67.3	
		Tribromomethane	29.8			
		Trichloroethene	18.2		23.0	
		Trichloromethane	22.1		24.6	
		Vinyl chloride	50.1			
		Benzene	18.4		18.8	
		Ethyl Benzene	23.1		20.6	
		m,p-xylene	25.5		36.7	
		o-xylene	27.8		41.5	
		toluene	24.6		24.7	
		styrene	20.5		40.5	

MA82	PCB in Oil GC-ECD	USEPA 8082A				
		Arochlor 1260				40.6
MA-TO15	TO15 VOCs in Suma Cannisters GC-MS	USEPA TO 15				
		Acrylonitrile				62.7
		Benzene				31.8
		1,2-Dichloroethane				37.2
		1,3-Butadiene				40.5
		1,1,2-Tricchloroethane				33.0
		1,2,4-Trimethylbenzene				21.0
		Chloroform				35.8
		Dichloromethane				37.3
		Dichlorodifluoromethane				17.0
		Freon 113				21.0
		m/p xylene				13.0
		Tetrachloroethene				29.6
		Trichloroethene				33.5
		Vinyl Chloride				35.4
MA1105	GC-FID	Methane	46.4			
MA1125	Glycols in Wtaer LC-MS	Diethylene Glycol	36.4			
		Ethylene Glycol	41.5			
		Propylene Glycol	48.5			
		Triethylene Glycol	37.4			
MA1418	Ethanol Methanol in Water - GC-FID	Ethanol	31.3			
		Methanol	34.1			
MA1425	Organic Acids - LC-MS	Acetic Acid	28.1			
		Butanoic Acid	23.8			
		Formic Acid	26.7			
		Glycolic Acid	33.0			
		Heptanoic Acid	33.5			
		Hexanoic Acid	33.2			
		Lactic Acid	35.6			
		Propanoic Acid	24.0			
		Valeric Acid	32.6			
MA1569	Herbicides	24D	22.8			
		Dicamba	25.5			
		MCPA	26.8			
		Metasulfuron methyl	35.3			
NIOSH2544		Nicotine				59.5

EPA29/MA1400	ICP-MS	Antimony				16.9
		Arsenic				9.8
		Beryllium				14.8
		Cadmium				6.5
		Chromium				7.7
		Cobalt				15.2
		Copper				9.2
		Lead				10.9
		Magnesium				13.3
		Manganese				10.2
		Nickel				6.5
		Selenium				12.9
		Thallium				14.7
		Tin				11.7
		Vanadium				13.3
		Zinc				15.0
AN701	Heterotrophic (Std or Total) Plate Count- Pour Plate Technique	Heterotrophic Plate Count	0.15 log ₁₀ cfu/mL			
AN735	E.coli and Faecal Coliforms by Colilert-18 (Defined Substrate Technology)	Coliforms	0.19 log ₁₀ MPN/100mL			
		E. coli	0.20 log ₁₀ MPN/100mL			
		Faecal coliforms	0.24 log ₁₀ MPN/100mL			
AN750	Enterolert Test Kit Enterococci	Enterococci	0.19 log ₁₀ MPN/100mL			