ALS Laboratory Group

DATA QUALITY OBJECTIVES – WATER SAMPLES

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INORGANICS	ACCURACY [1] DQO	MATRIX SPIKE [2] DQO	PRECISION [3] DQO
Acidity	85-115%	70-130%	20%
Alkalinity	85-115%	70-130%	20%
Ammonia	85-115%	75-125%	20%
Biochemical Oxygen Demand			
- BOD, Soluble BOD, CBOD	85-115%	n/a	20%
- Chemical Oxygen Demand (COD)	85-115%	n/a	20%
Carbons (TOC/TIC/DIC/DOC)	80-120%	70-130%	20%
Chlorine (Free & Total)	75-125%	n/a	15%
Chrome VI	80-120%	75-125%	15%
Colour	85-115%	n/a	20%
Common Anions (Cl, Br, F, NO2, NO3, SO4)	85-115%	75-125%	20%
Conductivity	90-110%	85-115%	10%
Cyanate	85-115%	75-125%	20%
Cyanides (Total and WAD)	80-120%	70-130%	20%
Dissolved Oxygen	85-115%	75-125%	20%
Hardness (as CaCO3)	75-125%	65-135%	25%
Metals	80-120%	70-130%	20%
Oxidation - Reduction Potential	80-120%	n/a	15%
Oxyhalides (Chlorate, Chlorite, Bromate)	85-115%	75-125%	20%
pH	± 0.10 pH units	n/a	± 0.20 pH units
Phenols, Total (4AAP)	85-115%	75-125%	15%
Phosphates - all forms	80-120%	70-130%	20%
Salinity	85-115%	n/a	20%
Solids (TDS / TSS)	85-115%	75-125%	20%
Sulfide	75-125%	65-135%	20%
Tannins & Lignins	85-115%	n/a	20%
Thiocyanate	85-115%	75-125%	20%
Total Kjedahl Nitrogen / Total Nitrogen	75-125%	70-130%	20%
Turbidity	85-115%	n/a	15%
ORGANICS - HYDROCARBONS	**ACCURACY [1] DQO**	**MATRIX SPIKE [2] DQO**	**PRECISION [3] DQO**
Extractable Hydrocarbons			
- CWS F2-F4, EPH/LEPH/HEPH, RBCA, SK	65-135%	50-150%	n/a [4]
Oil & Grease / Mineral Oil & Grease	70-130%	50-150%	n/a [4]
Volatile Hydrocarbons (F1, VH/VPH)	70-130%	50-150%	30%
ORGANICS – SEMI-VOLATILES	**ACCURACY [1] DQO**	**MATRIX SPIKE [2] DQO**	**PRECISION [3] DQO**
Acid Extractable Herbicides, except listed	65-135%	50-150%	n/a [4]
- Dinoseb, Clopyralid	30-150%	30-150%	n/a [4]
- Picloram	25-150%	25-150%	n/a [4]
Chlorinated Hydrocarbons	40-130%	40-150%	n/a [4]
Chlorophenols, except listed	65-130%	n/a [4]	n/a [4]
- 5,6- Dichlorovanillin, Tetrachlorocatechol	40-130%	n/a [4]	n/a [4]
- Tetrachloroveratrole	40-130%	n/a [4]	n/a [4]
- 2,6-Dichlorosyringaldehyde	20-130%	n/a [4]	n/a [4]
Dioxins and Furans (Chlorinated & Brominated)	70-130%	n/a	n/a [4]
Formaldehyde	70-130%	50-150%	30%
Glycols	70-130%	50-150%	30%
Haloacetic Acids	50-130%	50-150%	40%

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ORGANICS – SEMI-VOLATILES – Cont'd	ACCURACY [1] DQO	MATRIX SPIKE [2] DQO	PRECISION [3] DQO
Naphthenic Acids	70-130%	50-150%	n/a [4]
Nitrogen Heterocyclics (e.g. Acridine, Quinoline)	60-130%	50-150%	n/a [4]
Pesticides, Organochlorine	50-150%	50-150%	n/a [4]
Pesticides, Organophosphate, except listed - Acephate, Dimethoate, Phorate	60-130% 30-140%	50-150% 30-150%	n/a [4] n/a [4]
Pesticides, Carbamate	50-140%	50-150%	n/a [4]
Phenolics, Chlorinated - Mono, Di, and Trichlorophenols - Tetra and Pentrachlorophenols	 50-130% 60-130%	 50-150% 50-150%	 n/a [4] n/a [4]
Phenolics, Non-chlorinated, except listed - Dimethylphenol, Phenol, Phenol-d5 - Nitrophenols - 2-Fluorophenol (surrogate)	50-130% 30-130% 40-140% 20-130%	50-150% 30-150% 40-150% n/a	n/a [4] n/a [4] n/a [4] n/a
Polychlorinated Biphenyls - Aroclors - Congeners, except monochloro PCBs - Monochloro PCBs	 65-130% 60-140% 30-140%	 50-150% 50-150% 30-150%	 n/a [4] n/a [4] n/a [4]
Polycyclic Aromatic Hydrocarbons, except listed - Naphthalene, 3-Methylcholanthrene - 7,12-Dimethylbenz(a)anthracene - Misc surrogates: 2-Fluorobiphenyl, 2,4,6-Tribromophenol, Nitrobenzene-d5	60-130% 50-130% 40-130% 40-130%	50-150% 50-150% 40-150% n/a	n/a [4] n/a [4] n/a [4] n/a
Resin and Fatty Acids, except listed - Abietic and Palustric Acids - Levopimaric and Neoabietic Acids	60-140% 40-130% 15-130%	50-150% 40-150% 15-150%	n/a [4] n/a [4] n/a [4]
ORGANICS – VOLATILES	**ACCURACY [1] DQO**	**MATRIX SPIKE [2] DQO**	**PRECISION [3] DQO**
VOCs, Non-Gaseous	70-130%	n/a	30%
VOCs, Gaseous (e.g. Vinyl Chloride, Chloromethane)	60-140%	n/a	50%
MICROBIOLOGICAL TESTS	**ACCURACY [1] DQO**	**MATRIX SPIKE [2] DQO**	**PRECISION [3] DQO**
Coliform - Total & Fecal, by MF or Colilert	n/a [5]	n/a [5]	50% [5]
Coliform - Total and Fecal, by MPN	n/a [5]	n/a [5]	100% [5]
Heterotrophic Plate Count	n/a [5]	n/a [5]	50% [5]

METHOD BLANK DQO (All Tests): < Limit of Reporting (LOR)

Footnotes and Explanations:

1) Accuracy is measured as Percent Difference from True Value or Certified Target for Reference Materials and/or Method Analyte Spikes and Surrogates where applicable. For Matrix Spikes, accuracy is measured as the measured amount minus the sample background amount divided by the spiked amount.

   For low level results the accuracy objective is for the measured result to lie within +/- 2 times the LOR from the target.

2) Matrix Spike (MS) recovery, expressed as a percentage is defined as:
   100 * {[(Measured Concentration) - (Background Analyte Concentration in Sample)] ÷ (Spike Concentration)}

   High analyte background may prevent accurate determination of MS recovery. MS recoveries are not calculated or evaluated when the spiked amount is less than 0.3 times the background analyte concentration in the sample.

3) Precision is measured as the absolute value of Relative Percent Difference (RPD) for Laboratory Duplicate Samples. RPD = |(Result2 - Result1) / Mean| * 100.

   For low level results, the precision objective is for the difference of the two results to be less than 2 times the LOR.

4) Precision DQO is not applicable where whole samples are analyzed (lab duplicates not possible).

5) Spikes or Reference Materials unavailable for Microbiological tests. Duplicates are only possible when sufficient sample has been submitted to allow multiple tests.

DQOs are in the process of being standardized at the ALS Environmental locations in Canada. ALS DQOs represent the minimum criteria for acceptance of QC data without qualification. Where DQOs are not met, analysis will be repeated or affected result(s) will be qualified. DQOs are subject to periodic change. Please contact your Account Manager for current DQOs, or to receive a Controlled Copy when updates are made.