



QWAS

Quality in Water Analysis Scheme

Scheme Description

LGC
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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
13	Sept 2017	Addition of sample 4 – ‘Test using dipslide’ from the Hygiene Scheme. Renamed to sample 428. ‘Enumeration of <i>Legionella</i> species’ added to sample 423.	T. Pullan
14	Sept 2018	Amended sample 4 details to be qualitative Replaced method codes with ‘All’ Removed method code information Updated PCR range to ‘All’	T. Pullan
15	Aug 2019	Removed (Presence/Absence) from the title of sample 423 Included direct count analyte to samples 417 & 418	A McCarthy R.Smith
16	Nov 2019	Added ‘Enumeration of <i>Pseudomonas aeruginosa</i> ’ to sample 414	A.S.Eden
17	Feb 2020	Unit amended for sample 417 & 418 Enumeration of <i>Legionella</i> species by culture (direct count) Updated UKAS Logo	R.Smith A McCarthy
18	June 2020	Unit amended for sample 427. Added yeast and mould to sample 413.	R.Smith T.Noblett
19	Sept 2020	Test material 429 TVC in dialysis water added. Test material 430 SARS-CoV-2 in waste water added.	R.Smith
20	Feb 2021	Format of 430 amended	R.Smith
21	July 2021	Updated email address and UKAS logo Test materials 417 and 418 sample description changed from environmental to industrial waters Structure of 430 updated	A Collins M.Bell
22	Sept 2022	Removed sample 428 (Dipslide) Added ‘C.perfringens’ and ‘TVC’ as new parameters for sample 421. Added sample 431	M.Bell
23	July 2023	Removed sample 430 – SARS testing. Enumeration and Detection tests separated in microbiology tables. AV, Reporting Units and DP updated. ‘Range’ column updated to include units. ‘Units’ changed to ‘Reporting Units’ to match PORTAL. Detection test units changed to ‘Detected/Not Detected’	T.Ashcroft
24	Jan 2024	Units of WT419 and WT424 detection tests amended.	T.Ashcroft
25	Feb 2024	Ranges increased for 412, 414 and 420 cfu/vial to reflect sample preparation process.	T.Ashcroft
26	Feb 2024	Reporting units updates for WT431	T.Ashcroft

Notes:

Where this document has been translated, the English version shall remain the definitive version

Scheme Aims and Organisation

The primary aim of the Quality in Water Analysis Scheme (QWAS) is to enable laboratories performing the microbiological analysis of water to monitor their performance and compare it with that of their peers. QWAS also aims to provide information to participants on technical issues and methodologies relating to microbiological testing of water and related materials.

The QWAS scheme year operates from January to December. Further information about QWAS, including test material availability, round despatch dates and reporting deadlines, are available on the current QWAS application form.

Test Materials

Details of test materials available in QWAS are given in Appendix A. The test parameters are continually reviewed to ensure they meet the needs of current laboratory testing and regulatory requirements.

Test material batches are tested for homogeneity for at least one test parameter where deemed appropriate. Details of homogeneity tests performed and results are given in the QWAS Scheme Reports.

Some aspects of the scheme, such as test material production, homogeneity testing and stability assessment, can from time to time be subcontracted. When subcontracting occurs, it is placed with a competent subcontractor and LGC is responsible for this work. The planning of the scheme, the evaluation of performance and the authorisation of the final report will never be subcontracted.

Statistical Analysis

Information on the statistics used in QWAS can be found in the General Protocol and in the Scheme Report. Methods for determining assigned values and the values for SDPA used for individual samples are given in Appendix A.

Methods

Methods are listed in PORTAL. Please select the most appropriate method from the list. If none of the methods are appropriate, then please report your method as 'Other' and record a brief description in the Comments Section in PORTAL.

Results and Reports

QWAS results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email.

QWAS reports will be available on the website within 10 working days of round closure. Participants will be emailed a link to the report when it is available.

APPENDIX A - Description of abbreviations used

Assigned Value (AV)

The assigned value may be derived in the following ways:

- From the robust mean (median) of participant results (RMean). This is the median of participant results after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. Generally, the assigned value will be set using results from all methods, unless the measurement is considered method-dependant, in which case the assigned value will be set by method and indicated in the report tables.
For some analytes, where there is a recognised reference method for that type of measurement, this may be used as the assigned value for a particular analyte i.e. it would be applied to results obtained by any method.

Traceability: Assigned values which are derived from the participant results, or a sub-set of the results are not traceable to an international measurement standard. The uncertainty of assigned values derived in this way is estimated from the participant results, according to ISO 13528.

- From a formulation value (Form). This denotes the use of an assigned value derived from sample preparation details, where known and exact quantities of analyte have been used to prepare the sample.

Traceability: Assigned values calculated from the formulation of the test sample are traceable, via an unbroken metrological traceability chain, to an international measurement standard. The measurement uncertainty of the assigned value is calculated using the contributions from each calibration in the traceability chain.

- From a qualitative formulation (Qual Form). This applies to qualitative tests where the assigned value is simply based on the presence/absence of the analyte in the test material.

Traceability: Assigned values calculated from the qualitative formulation of the test sample are traceable to a certified reference standard or a microbiological reference strain.

- From expert labs (Expert). The assigned value for the analyte is provided by an 'expert' laboratory.

Traceability: Assigned values provided by an 'expert' laboratory may be traceable to an international measurement standard, according to the laboratory and the method used. The uncertainty of measurement for an assigned value produced in this way will be provided by the laboratory undertaking the analysis. Details of traceability and the associated uncertainty will be provided in the report for the scheme/round.

Range

This indicates the concentration range at which the analyte may be present in the test material.

SDPA

SDPA represents the 'standard deviation for proficiency assessment' which is used to assess participant performance for the measurement of each analyte. This may be a fixed value (as stated), a percentage (%) of the assigned value or based on the robust standard deviation of the participant measurement results, either across all methods or by method depending on whether the measurement made is method dependent (see assigned value).

Units

This indicates the units used for the assessment of data. These are the units in which participants should report their results. For some analytes in some schemes participants may have a choice of which units to report their results, however, the units stipulated in this scheme description are the default units to which any results reported using allowable alternative results will be converted to.

DP

This indicates the number of decimal places to which participants should report their measurement results.

APPENDIX A

Sample PT-WT-412**Supplied as:****Indicator organisms in potable water**

10ml vial (to be resuscitated to final volume of 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Total aerobic count @ 22°C	All	RMean	0 to 10,000	log ₁₀ 0.35	cfu/ml	0
Total aerobic count @ 37°C	All	RMean	0 to 10,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of <i>Escherichia coli</i>	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of coliforms	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of enterococci	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0

Sample PT-WT-413**Supplied as:****Environmental organisms in potable water**

10ml vial (to be resuscitated to final volume of 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Enumeration of <i>Clostridium perfringens</i>	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of sulphite-reducing Clostridia	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Detection of sulphite-reducing Clostridia	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 100ml	NA
Enumeration of sulphite-reducing Clostridia spores ONLY	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of <i>Pseudomonas aeruginosa</i>	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of yeast	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of mould	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of yeast and mould	All	RMean	0 to 1,000	log ₁₀ 0.35	cfu/100ml	0

QWAS Scheme Description

Sample PT-WT-414

Microorganisms in Process water

Supplied as:

10ml vial (to be resuscitated to final volume of 100 ml)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Total aerobic count	All	RMean	0 to 1,000,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of <i>Pseudomonas</i> species	All	RMean	0 to 1,000,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of <i>Pseudomonas aeruginosa</i>	All	RMean	0 to 1,000,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of yeast	All	RMean	0 to 1,000,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of mould	All	RMean	0 to 1,000,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of yeast and mould	All	RMean	0 to 1,000,000	log ₁₀ 0.35	cfu/ml	0

Sample PT-WT-416

Salmonella/E.coli in Effluent sludge

Supplied as:

2 x 10g simulated sludge sample

Analyte	Method	AV	Range cfu/ml	SDPA	Reporting Units	DP
Detection of Salmonella species	All	Qual Form	0 to 10,000	NA	Detected/Not Detected 100ml	NA
Enumeration of <i>Escherichia coli</i>	All	RMean	0 to 10,000	log ₁₀ 0.50	cfu/ml	0

QWAS Scheme Description

Sample PT-WT-417
Supplied as:

***Legionella pneumophila* in Industrial waters**
1 x 10ml vial (to be resuscitated to final volume of up to 10 x 1 litre)

Analyte	Method	AV	Range cfu/L	SDPA	Reporting Units	DP
Enumeration of <i>Legionella pneumophila</i> by culture (membrane filtration)	All	RMean	0 to 100,000	log ₁₀ 0.50	cfu/L	0
Enumeration of <i>Legionella pneumophila</i> by culture (direct count)	All	RMean	0 to 100,000	log ₁₀ 0.50	cfu/L	0
Detection of <i>Legionella pneumophila</i>	All	Qual Form	0 to 100,000	NA	Detected/Not Detected L	NA
Enumeration of <i>Legionella pneumophila</i> by PCR	PCR	RMean	All	log ₁₀ 0.50	genomic units/L	0
Identification of <i>Legionella pneumophila</i>	All	Qual Form	0 to 100,000	NA	NA	NA

Sample PT-WT-418
Supplied as:

***Legionella* species in Industrial waters**
1 x 10ml vial (to be resuscitated to final volume of up to 10 x 1 litre)

Analyte	Method	AV	Range cfu/L	SDPA	Reporting Units	DP
Enumeration of <i>Legionella</i> species by culture (membrane filtration)	All	RMean	0 to 100,000	log ₁₀ 0.50	cfu/L	0
Enumeration of <i>Legionella</i> species by culture (direct count)	All	RMean	0 to 100,000	log ₁₀ 0.50	cfu/L	0
Detection of <i>Legionella</i> species	All	Qual Form	0 to 100,000	NA	Detected/Not Detected L	NA
Enumeration of <i>Legionella</i> species by PCR	PCR	RMean	All	log ₁₀ 0.50	genomic units/L	0
Identification of <i>Legionella</i> species	All	Qual Form	0 to 100,000	NA	NA	NA

Sample PT-WT-419**Microorganisms in Surface/Waste/Bathing waters****Supplied as:**

10ml vial (to be resuscitated to final volume of up to 10 x 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Enumeration of total coliforms	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of faecal coliforms	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of <i>Escherichia coli</i>	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of enterococci	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Detection of <i>Salmonella</i> species	All	Qual Form	0 to 100,000	NA	Detected/Not Detected L	NA

Sample PT-WT-420**Microorganisms in Mineral water****Supplied as:**

10ml vial (to be resuscitated to final volume of up to 10 x 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Total aerobic count @ 22°C	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/ml	0
Total aerobic count @ 37°C	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/ml	0
Enumeration of <i>Escherichia coli</i>	All	RMean	0 to 10,000	log ₁₀ 0.35	cfu/250ml	0
Enumeration of Enterococci	All	RMean	0 to 10,000	log ₁₀ 0.35	cfu/250ml	0
Enumeration of <i>Pseudomonas aeruginosa</i>	All	RMean	0 to 10,000	log ₁₀ 0.35	cfu/250ml	0

Sample PT-WT-421
Supplied as:

Microorganisms in Surface/Bathing/Recreational water
 10ml vial (to be resuscitated to final volume of 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Enumeration of coagulase-positive staphylococci	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of <i>Staphylococcus</i> species	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of sulphite-reducing clostridia	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of <i>Clostridium perfringens</i>	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Total aerobic count	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0

Sample PT-WT-422
Supplied as:

Microorganisms in Sea Water
 10ml vial (to be resuscitated to final volume of up to 10 x 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Enumeration of total coliforms	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of faecal coliforms	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of <i>Escherichia coli</i>	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Enumeration of enterococci	All	RMean	0 to 100,000	log ₁₀ 0.35	cfu/100ml	0
Detection of <i>Salmonella</i> species	All	Qual Form	0 to 100,000	NA	Detected/Not Detected L	NA

QWAS Scheme Description

Sample PT-WT-423

Legionella in Potable Water

Supplied as:

10ml vial (to be resuscitated to final volume of 10 x 1 litre)

Analyte	Method	AV	Range cfu/L	SDPA	Reporting Units	DP
Detection of <i>Legionella</i> species at low levels	All	Qual Form	0 to 1,000	NA	Detected/Not Detected L	NA
Enumeration of <i>Legionella</i> species by culture	All	RMean	0 to 1,000	log ₁₀ 0.50	cfu/L	0

Sample PT-WT-424

Microorganisms in Mineral water (Presence/absence)

Supplied as:

10ml vial (to be resuscitated to final volume of 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Detection of coagulase-positive staphylococci	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 250ml	NA
Detection of sulphite-reducing Clostridia	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 50ml	NA
Detection of sulphite-reducing Clostridia spores ONLY	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 50ml	NA

Sample PT-WT- 425

Indicator organisms in potable water (Presence/absence)

Supplied as:

10ml vial (to be resuscitated to a final volume of 1 litre)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Detection of <i>Escherichia coli</i>	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 100ml	NA
Detection of coliforms	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 100ml	NA
Detection of enterococci	All	Qual Form	0 to 1,000	NA	Detected/Not Detected 100ml	NA

Sample PT-WT-426**Supplied as:****Identification Test (non-pathogen)**

Participants will be provided with a vial of freeze-dried material containing a single organism which will need to be cultured on non-selective agar before test. The sample may contain biosafety level 1 or 2 organisms typically found in water.

The organism should be identified to the correct family, genus or species level.

Analyte	Method	AV	Range	SDPA	Reporting Units	DP
Identification of unknown organism	All	Qual Form	NA	NA	NA	NA

Sample PT-WT-427**Supplied as:****Paper exercise**

Participants will be provided with a photograph and a scenario in order to count the number of colonies and calculate the number of microorganisms in the original sample.

Analyte	Method	AV	Range	SDPA	Reporting Units	DP
Colony count and calculation of number of microorganisms	Visual count	Formulation	0 to 1,000	Greater of robust SD or \log_{10} 0.35	Various	0

Sample PT-WT-429**Supplied as:****Total viable count in dialysis water**

10ml vial (to be resuscitated to a final volume of 100ml)

Analyte	Method	AV	Range cfu/vial	SDPA	Reporting Units	DP
Total aerobic count @ 17-23°C	All	RMean	0 to 100	\log_{10} 0.35	cfu/100ml	0

Sample PT-WT-431*
Supplied as:

Somatic Coliphages (ϕ X174) in water
1 x lyophilised vial

Analyte	Method	Range	AV	SDPA	Reporting Units	DP
Detection of Somatic coliphages	All	Positive/Negative	Qual Form	NA	NA	NA
Quantification of Somatic coliphages	All	0 to 1000	Formulation	Robust SD	PFU ml ⁻¹	NA

* Test material currently not included in LGC's UKAS Scope of Accreditation.