

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
Issue No: 4  
Page: 1 of 7



This document is intended to provide a brief description of Aquacheck Samples and their suitability for different laboratories. Further information on specific determinands included in each Sample can be found in Scheme Description. Many of the determinands or tests involved arise from regulations associated with water quality and with operations in the water industry and other industries using water.

Sample Number	Sample Name	Description
Samples 1-5G	Clean Inorganics	These Samples are suitable for drinking water as well as ground and surface waters from rivers lakes and streams and use chemicals and concentrations that meet the requirements of EU Directives.
Sample 1H & 1S	Major Inorganic Components (H = Hard, S = Soft)	Suitable for water companies, bottled water, water for food, general quality characteristics of waters. The determinands are those widely used to characterise waters e.g. hardness, etc; the kind of analysis results that you might see printed on a bottled water label. Analytical problems can vary with the hardness of the water sample which is why the Aquacheck scheme offers both hard and soft water samples. Customers can select either water type or choose to have both alternately.
Sample 1A	Major Ions in Higher Salinity Potable Water	Similar to Samples 1S and 1H but specifically for higher salinity waters. These might come from groundwaters with salt intrusions or from desalination plants.
Sample 2H & 2S	Nutrients and Others (H = Hard, S = Soft)	Suitable for water companies, bottled water, water for food, general quality characteristics of waters. These determinands also characterise the water and are important for assessing, amongst other things, the potential for eutrophication. Analytical problems can vary with the hardness of the water sample which is why the Aquacheck scheme offers both hard and soft water samples. Customers can select either water type or choose to have both alternately.
Sample 2A	pH in Poorly Buffered Waters	Suitable for high quality waters with low mineral levels such as from upland areas and acid rain monitoring. Waters that are poorly buffered pose special problems for measurement of pH and these samples are needed to properly test laboratories' performance.

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
 Issue No: 4  
 Page: 2 of 7



Sample Number	Sample Name	Description
Sample 3	Non-Specific Determinands	The tests in this Sample are typically those associated with general quality characteristics important for water in supply and production. As such, this Sample is suitable for water companies, bottled water producers and water for food users,
Sample 3A	Inorganic Disinfection By-Products	Suitable for water companies and food/water producers. All the determinands are by-products from commonly used chemical water disinfectants.
Sample 3B & 3C	Free (3B) and Total (3C) Chlorine	Suitable for any company using chlorine to disinfect water for supply and distribution and food and drink production. This measurement is critical in ensuring that chlorine levels are appropriate and waters pose no microbiological risks to consumers.
Sample 4	Metals (preserved in 0.5% nitric acid)	Surface water sample suitable for anyone using water for human consumption and for food and drink production. Many of these metals are toxic at high levels in water. The matrix used will contain low levels of natural organics which can provide complications in chemical analysis and are therefore essential for realistic PT tests.
Sample 4G	Metals in Groundwater (preserved in 0.5% nitric acid)	Similar to Sample 4 but using a groundwater rather than surface water. The water is a clean groundwater which has low levels of organics.
Sample 5	Toxic Metals (preserved in 0.5% nitric acid)	Surface water sample suitable for anyone using water for human consumption and for food and drink production. These metals can also be toxic like those in Sample 4 but the ones in this Sample are less commonly used in industry.
Sample 5A	Metals for Hydride Generation (preserved in 0.5% hydrochloric acid)	Samples are similar to Sample 4 and 5 but with a preservative matched to specific analytical methods that involve the production of volatile metal hydrides.
Sample 5B	EQS Metals (preserved in 0.5% nitric acid)	Suitable for the analysis of rivers and lakes with concentrations suitable for monitoring for compliance with Environmental Quality Standards.
Sample 5C	Chromium (VI) in Clean Water	Suitable for monitoring this specific form of chromium, generally recognised as being the most toxic form in drinking and environmental waters.

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
 Issue No: 4  
 Page: 3 of 7



Sample 5G	Toxic Metals in Groundwater (preserved in 0.5% nitric acid)	Similar to Sample 5 but using a groundwater rather than a surface water. The water is a clean groundwater which has low levels of organics.
Samples 6A-9	Clean Organics	These Samples are suitable for drinking and surface or ground freshwater monitoring. All use a groundwater as a matrix.
Samples 18A-21	Waste Organics	These Samples are the same as Samples 6A-9 but the levels of the contaminants are at wastewater levels and the water used is a synthetic wastewater.
Sample 6A/18A	Haloforms and Chlorinated Solvents	Common organic contaminants in water for human consumption present in disinfected waters and groundwaters. Many of these determinands are produced during drinking water chlorination; others are widely used as solvents and therefore maybe common groundwater contaminants.
Sample 6B/18B	Phenols	Suitable for environmental monitoring and water in supply and in food and drink production, phenols are chemicals which can cause tainting of water due to both tastes and odours.
Sample 6C/18C	Benzene, Toluene and Xylenes	Common, widely used solvents. Some are highly toxic. Suitable for analysis of water for human consumption and in environmental waters.
Sample 7A/19A	Organochlorine Pesticides	Organochlorine pesticides are priority pollutants in environmental and drinking water samples. Although no longer used in EU, these chemicals are very persistent and can still be found in trace amounts in many waters.
Sample 7B/19B	Chlorinated Solvents	Common organic contaminants in groundwaters but also found in surface waters. The chemicals are widely used in industry.
Sample 7C/19C	Polycyclic Aromatic Hydrocarbons	Highly toxic chemicals which can leach from lined water pipes and can be found in environmental samples suitable for water supply and food and drink production. They are also produced naturally in fires.
Sample 7D/19D	Polychlorinated Biphenyls	Priority pollutants in environmental and water supply. Previously, these compounds were extensively used, for example, in electrical transformers and they are very persistent in the environment.
Sample 8/20	Acid Herbicides	Widely used acid herbicides in agriculture and forestry.
Sample 8B/20B	Triazines and Urea Herbicides	Widely used triazines and urea herbicides in agriculture and forestry.
Sample 9/21	Organophosphorous Pesticides	Widely used insecticides in agriculture, horticulture and forestry.

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
 Issue No: 4  
 Page: 4 of 7



Sample Number	Sample Name	Description
Sample 10	Nutrients	Contaminants often monitored in discharges from wastewater treatment plants. These determinands are important for determining the impact of the discharges on eutrophication (i.e. excessive algal growth) and fish populations.
Sample 11	Non-Specific Determinands	Contaminants often monitored in discharges from wastewater treatment plants. These are the key measurements for monitoring the performance of the plants and the quality of effluents.
Sample 12	Metals (preserved in 0.5% nitric acid)	Contaminants often monitored in discharges from wastewater treatment plants. All the determinands in this Sample can be toxic to fish and other organisms.
Sample 12C	Chromium (VI) in Waste Waters	This metal in this form can often occur in wastewater discharges from factories and wastewater treatment plants. This sample is suitable for those monitoring this type of samples.
Sample 13	Sewage Sludge Inorganics	A real sewage sludge sample for metals and nutrient analyses. The determinands have to be monitored if the sewage sludge is being used as a soil additive
Sample 14	Agricultural Soil Inorganics	A real agricultural soil sample for metal and nutrient analyses. These samples are relatively uncontaminated and are suitable for agricultural and other soil monitoring and for monitoring soils subjected to sewage sludge additions
Sample 15	Settleable Solids	A synthetic sample for determination of settleable solids by use of an Imhoff cone or similar method.
Sample 16	Compositional Analysis of Sewage Sludge	A real sewage sludge sample for determination of minerals and physiochemical parameters. Suitable for the assessment of the general quality of sewage sludge.
Sample 17A	Major Waste Water Determinands	Contaminants at levels likely to be found in discharges from industrial sites, these are often used as consent determinands which require regular monitoring.

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
 Issue No: 4  
 Page: 5 of 7



Sample Number	Sample Name	Description
Sample 17B	Total Phenol, Cyanide and Sulphate	Contaminants at levels likely to be found in discharges from industrial sites, these are often used as consent determinands which require regular monitoring.
Sample 17C	Metals (preserved in 0.5% nitric acid)	Contaminants at levels likely to be found in discharges from industrial sites, these are often used as consent determinands which require regular monitoring. Determinands are at higher levels than those in Sample 12 and are in a wastewater matrix.
Sample 17D	Ammonia, Phosphate and Nitrogen	Contaminants at levels likely to be found in discharges from industrial sites, these are often used as consent determinands which require regular monitoring. Levels are consequently higher than those in Sample 10.
Sample 22	Qualitative Organics by GCMS	Suitable for any laboratory charged with the investigation of water quality problems. This Sample tests the ability of laboratories to detect and identify chemicals.
Sample 22A	Qualitative Organics by Purge and Trap GCMS	Suitable for any laboratory charged with the investigation of water quality problems. This Sample tests the ability of laboratories to detect and identify potential water quality problems using purge and trap or other similar analytical methods.
Sample 23	Mineral Oil in Water	Suitable for laboratories monitoring oil in waste and environmental waters. A mixture of high and low molecular weight hydrocarbons are used in this Sample at varying ratios.
Sample 24	Oil and Grease in Water	Suitable for laboratories monitoring oil and grease in water. A mixture of high and low molecular weight hydrocarbons and grease components are used in this Sample.
Sample 25	Qualitative Determination in Clean Water	This Sample simulates a reported water quality issue. Participants are asked to identify a taste or odour taint within a sample of otherwise clean water.
Sample 26	PFOS and PFOA	Suitable for participants quantifying the levels of perfluorinated surfactants in surface waters.

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
Issue No: 4  
Page: 6 of 7



Sample Number	Sample Name	Description
Sample 27	AOX in Wastewater	Suitable for participants analysing samples for halogenated organic compounds. Concentration levels are aimed at wastewater levels and a synthetic effluent matrix is supplied alongside a spiking solution for this sample.
Sample 28	Formaldehyde in Clean Water	Suitable for laboratories quantifying formaldehyde at levels <1mg/L.
Sample 29	High and low COD	Similar to the materials supplied for COD in other Aquacheck samples, although supplied at lower and higher concentration levels.
Sample 30	Gross Alpha and Gross Beta in Clean Water	Suitable for all laboratories carrying out radioactivity monitoring of waters. Natural and spiked natural waters are used for a range of concentrations and multiple calibration nuclides are available.
Sample 31	Aqueous Tritium in Clean Water	Suitable for all laboratories carrying out tritium monitoring of waters. Spiked samples simulate levels found in industrial discharges.
Sample 32	Sulfide in Wastewater	Suitable for laboratories carrying out sulfide analysis on wastewaters containing <20mg/L sulfide.
Sample 33	Chlorophyll a in Clean Water	Suitable for laboratories analysing for algae concentrations in water.
Sample 34	Water Framework Directive	Suitable for laboratories complying with the EU Water Framework Directive (WFD), which was adopted in 2000 and takes a pioneering approach to protecting water, based on natural geographical formations i.e. river basins. This sample is split into A-J and it covers low level alkyl phenols through to tributyltin compounds, in either surface or groundwater.
Sample 35	BOD/COD in high concentrations	Similar to the materials supplied for BOD and COD in other Aquacheck samples, although supplied at higher concentration levels.
Sample 36	Taste and Odour in Clean Water	Suitable for laboratories carrying out taste and odour assessment in drinking water, using sensory methods.
Sample 37	Acrylamide	Suitable for laboratories quantifying acrylamide at levels <0.5µg/L.
Sample 38	UV Absorbing Organic Constituents in Clean Water	Suitable for all laboratories analysing samples to indicate the total concentration of UV-absorbing organic compounds in drinking water.
Sample 39	Geosmin and MIB in Clean Water	Suitable for laboratories routinely monitoring geosmin and 2-methylisoborneol in drinking water for levels of up to 200ng/L.

Author: Rita Sharma

Authorised by: Matthew Whetton

L:\Scheme Information\Scheme Documentation\AQUACHECK\Scheme description\Sample Definitions\Aquacheck Sample Definitions V4.doc

## AQUACHECK SAMPLE DEFINITIONS

Issue Date: 12/02/2016  
Issue No: 4  
Page: 7 of 7



Sample 40	Fungicides in groundwater	Suitable for participants analysing samples for fungicides in groundwater. The water is a clean groundwater which has low levels of organics.
Sample 50	Ecotoxicology	Suitable for laboratories using ecotoxicity tests such as those involving water fleas (Daphnia), bacteria (such as Microtox and other assay methods) and other tests.