DAPS

Alcoholic Drinks Proficiency Testing Scheme

Scheme Description

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ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
2	Jan 2009	Updates to Section 4.3, Section 5 and Appendix A.	M. Whetton
3	Jan 2010	Additional analytes added to B1, B2, B3, D1 and D2. Removal of acetic acid from B1. Some assigned values for simulant samples amended to be 'formulation'.	M. Whetton
4	Jan 2011	Change of address details. Removed details regarding outliers in Appendix A. Included details of advisors and collaborators and details of sample preparation methods. Update of SDPAs for 2011/12.	M. Whetton
5	Jan 2012	Change of scheme name from 'Distillers' Analytes Proficiency Scheme' to 'Alcoholic Drinks Proficiency Scheme'. Details of Robust Mean AV calculation amended. SDPAs amended for some analytes. Inclusion of Total Sugars in Group B and Reducing Sugars in Group D.	M. Whetton
6	Jan 2013	Change of scheme year from April-March to January-December. Amended number of samples for C1 to '2'. Alteration of SDPAs in Group B. Increased number of DP for Cu and Fe in Group B	M. Whetton
7	Sept 2013	Clarification of SDPAs to be used in B2.	M. Whetton
8	April 2014	Alteration of sample volumes for Group E and simulant samples	M. Whetton
9	Sept 2014	Updated email and website address on front page. 'Round specific' analytes in B4 and E4 available in all rounds. Inclusion of traceability information in Appendix A. Inclusion of subcontracting information in 'Test Materials' section.	M. Whetton
10	Apr 2015	General revision. Total haze added to 'E' samples. Additional method details included. New analytes added for B1, B3, E1 & E3	W. Gaunt
11	Sept 2015	Addition of sample B5 (esters) and cask extracts to B1. General update of appendices Removed Hard copy report information	W. Gaunt A. McCarthy
12	Jan 2016	General update of cask extractives & esters in B1 & B5	W. Gaunt

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

Scheme Aims and Organisation

The primary aim of the Alcoholic Drinks Proficiency Testing scheme (DAPS) is to enable laboratories performing the analysis of alcoholic beverages to monitor their performance and compare it with that of their peers. DAPS also aims to provide information to participants on technical issues and methodologies relating to testing of distilled spirits, other alcoholic beverages and fermented worts.

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

The DAPS scheme operates an advisory group made up of participants, industry experts and regulatory organisations. A list of advisory group members is available from LGC Standards on request. The advisory group meets twice a year and is concerned with all aspects of scheme development, operation and participant performance.

Test Materials

With the exception of the simulant samples, DAPS materials are readily available commercial products, either supplied in their original packaging or bulked and sub-sampled into appropriate containers. Simulant samples are prepared gravimetrically and all samples undergo homogeneity testing prior to despatch.

Details of test materials available in DAPS 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 DAPS 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 DAPS 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

DAPS results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email. However, participants may request result submission forms on which to report and return results if they are unable to report through electronic means. This will incur an additional charge.

DAPS 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 as illustrated 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 (Formulation). 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.

Group A **Worts**

Sample A1 **Fermented Wort (fermented wash)**
Supplied as: 1 x 500mL wort sample

Analyte	Method	AV	SDPA	Units	DP
Alcohol	Density Meter	RMean	0.10	%ABV	2
Original Gravity	Density Meter	RMean	0.50	°sacc (re port as 1XXX·XX)	2
Residual Gravity	Density Meter	RMean	0.30	°sacc (re port as 1XXX·XX)	2
Final Gravity	Density Meter	RMean	0.10	°sacc (repor t as 1XXX·XX)	2
pH	Combination electrode Alcohol electrode	RMean	0.10	pH Units	2
Residual Fermentable Sugars *(Total Amount of Glucose, Maltose and Maltotriose present)*	Various	RMean	RSD	g/100ml	2

Sample A2 **Simulated Wort**
Supplied as: 1 x 250mL simulated wort sample

Analyte	Method	AV	SDPA	Units	DP
Alcohol	Density Meter	Formulation	0.10	%ABV	2
Original Gravity	Density Meter	RMean	0.50	°sacc (re port as 1XXX·XX)	2
Residual Gravity	Density Meter	RMean	0.10	°sacc (re port as 1XXX·XX)	2
Final Gravity	Density Meter	RMean	0.10	°sacc (repor t as 1XXX·XX)	2
Residual Fermentable Sugars *(Total Amount of Glucose, Maltose and Maltotriose present)*	Various	RMean	RSD	g/100ml	2

Group B **Distilled Spirits**

Sample B1 **Scotch Whisky**
Supplied as: 1 x 300mL bottle of commercially available Scotch whisky

Analyte	Method	AV	SDPA	Units	DP
Apparent Alcoholic Strength	Density Meter	RMean	0.03	%ABV	2
Actual Alcoholic Strength	Distillation & Density Meter Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.20	pH Units	2
Colour	CIU	RMean	RSD	Colour Units	2
	Dr Lange	RMean	0.50	Colour Units	2
Haze	Various	RMean	0.20	Haze units	2
Acetaldehyde	GC	RMean	10% (20%*)	g/100L Absolute Alcohol	2
Ethyl acetate	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Acetal	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
n-Propanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Methanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
n-Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
iso-Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
2-Methyl Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
3-Methyl Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
2 + 3-Methyl Butanols	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
iso-Amyl acetate	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Furfural	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Ethyl Carbamate	Various	RMean	RSD	µg/L	2
NDMA	Various	RMean	RSD	µg/L	2
Volatile Acidity	Titration	RMean	10%	g/100L Absolute Alcohol (as acetic acid)	2
Total Acidity	Titration	RMean	10%	g/100L Absolute Alcohol (as acetic acid)	2
Calcium	Flame photometry, IC, AAS, ICP-OES	RMean	15%	mg/L	2
Magnesium	Flame photometry, IC,	RMean	15%	mg/L	2

Analyte	Method	AV	SDPA	Units	DP
	AAS, ICP-OES				
Sodium	Flame photometry, IC, AAS, ICP-OES	RMean	15%	mg/L	2
Potassium	Flame photometry, IC, AAS, ICP-OES	RMean	15%	mg/L	2
Copper	AAS, ICP-OES, ICP-MS	RMean	RSD	mg/L	3
Iron	AAS, ICP-OES, ICP-MS	RMean	RSD	mg/L	3
Total Sugars	HPLC	RMean	RSD	mg/L	2
Fructose	HPLC	RMean	10%	mg/L	2
Glucose	HPLC	RMean	10%	mg/L	2
Sucrose	HPLC	RMean	10%	mg/L	2
Specific Gravity (20℃)	Density Meter Pycnometer	RMean	RSD	-	3
Density (20℃)	Various	RMean	RSD	g/ml	3
Turbidity	Various	RMean	RSD	NTU	2
Refractive Index (20℃)	Refractometer	RMean	RSD	-	4
Total Solids	Various	RMean	RSD	g/100ml	2
Chill Difference	PTC-WC-015	RMean	RSD	NTU	2
Cask extractives					
5-HMF	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Coniferaldehyde	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Ellagic Acid	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Gallic Acid	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Scopoletin	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Sinapaldehyde	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Syringaldehyde	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Syringic Acid	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Vanillic Acid	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Vanillin	HPLC, UPLC, GC	RMean	Robust SD	mg/L**	2
Esters					
Ethyl Hexanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Octanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Decanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
2-Phenethyl Acetate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1

Analyte	Method	AV	SDPA	Units	DP
Ethyl Dodecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
2-Phenethyl Ethanol	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Tetradecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Hexadecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl-9-Hexadecenoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1

*where the assigned value is <10g/100L the larger SDPA will be used in the calculation of the performance score.
**to be reported in the sample as provided

Sample B2 **Dark Distilled Spirit**
Supplied as: 1 x 300mL bottle of commercially available dark distilled spirit

Analyte	Method	AV	SDPA	Units	DP
Apparent Alcoholic Strength	Density Meter	RMean	0.03	%ABV	2
Actual Alcoholic Strength	Distillation & Density Meter Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.20	pH Units	2
Colour	CIU	RMean	RSD	Colour Units	2
	Dr Lange	RMean	RSD	Colour Units	2
Haze	Various	RMean	RSD	Haze units	2
Acetaldehyde	GC	RMean	10% (20%*)	g/100L Absolute Alcohol	2
Ethyl acetate	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Acetal	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
n-Propanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Methanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
n-Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
iso-Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
2-Methyl Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
3-Methyl Butanol	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
2 + 3 Methyl Butanols	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
iso-Amyl acetate	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2

Analyte	Method	AV	SDPA	Units	DP
Furfural	GC	RMean	5% (20%*)	g/100L Absolute Alcohol	2
Acetic Acid	Various	RMean	RSD	g/100L Absolute Alcohol	2
Ethyl Carbamate	Various	RMean	RSD	µg/L	2
NDMA	Various	RMean	RSD	µg/L	2
Volatile Acidity	Various	RMean	10%	g/100L Absolute Alcohol (as acetic acid)	2
Total Acidity	Titration	RMean	10%	g/100L Absolute Alcohol (as acetic acid)	2
Total Sugars	HPLC	RMean	RSD	mg/L	2
Fructose	HPLC	RMean	10%	mg/L	2
Glucose	HPLC	Rmean	10%	mg/L	2
Sucrose	HPLC	Rmean	10%	mg/L	2
Calcium	Flame photometry, IC, AAS, ICP-OES	Rmean	15%	mg/L	2
Magnesium	Flame photometry, IC, AAS, ICP-OES	Rmean	15%	mg/L	2
Sodium	Flame photometry, IC, AAS, ICP-OES	Rmean	15%	mg/L	2
Potassium	Flame photometry, IC, AAS, ICP-OES	Rmean	15%	mg/L	2
Copper	AAS ICP-OES ICP-MS	Rmean	RSD	mg/L	3
Iron	AAS ICP-OES ICP-MS	Rmean	RSD	mg/L	3

*where the assigned value is <10g/100L the larger SDPA will be used in the calculation of the performance score.

Sample B3 **Clear Distilled Spirit**
Supplied as: 1 x 300mL bottle commercially available clear distilled spirit

Analyte	Method	AV	SDPA	Units	DP
Apparent Alcoholic Strength	Density Meter	Rmean	0.03	%ABV	2 2

Analyte	Method	AV	SDPA	Units	DP
Actual Alcoholic Strength	Distillation & Density Meter Density Meter NIR/alcolyser	Rmean	0.08	%ABV	2 2 2
pH	Combination electrode Alcohol electrode	Rmean	0.50	pH Units	2 2
Acetaldehyde	GC	Rmean	10%*	g/100L Absolute Alcohol	2
Ethyl acetate	GC	Rmean	5%*	g/100L Absolute Alcohol	2
Acetal	GC	Rmean	5%*	g/100L Absolute Alcohol	2
n-Propanol	GC	Rmean	5%*	g/100L Absolute Alcohol	2
Methanol	GC	Rmean	5%*	g/100L Absolute Alcohol	2
n-Butanol	GC	Rmean	5%*	g/100L Absolute Alcohol	2
iso-Butanol	GC	Rmean	5%*	g/100L Absolute Alcohol	2
2-Methyl Butanol	GC	Rmean	5%*	g/100L Absolute Alcohol	2
3-Methyl Butanol	GC	Rmean	5%*	g/100L Absolute Alcohol	2
2 + 3-Methyl Butanols	GC	Rmean	5%*	g/100L Absolute Alcohol	2
iso-Amyl acetate	GC	Rmean	5%*	g/100L Absolute Alcohol	2
Furfural	GC	Rmean	5%*	g/100L Absolute Alcohol	2
Acetic Acid	Various	Rmean	RSD	g/100L Absolute Alcohol	2
Ethyl Carbamate	Various	Rmean	RSD	µg/L	2
NDMA	Various	Rmean	RSD	µg/L	2
Volatile Acidity	Various	Rmean	RSD	g/100L Absolute Alcohol (as acetic acid)	2
Total Acidity	Titration	Rmean	RSD	g/100L Absolute Alcohol (as acetic acid)	2
Total Sugars	HPLC	Rmean	RSD	mg/L	2
Fructose	HPLC	RMean	RSD	mg/L	2
Glucose	HPLC	Rmean	RSD	mg/L	2
Sucrose	HPLC	Rmean	RSD	mg/L	2
Linalool *(gin only)*	GC	Rmean	RSD	g/1000L Absolute Alcohol	2
Terpinene-4-ol *(gin only)*	GC	Rmean	RSD	g/1000L Absolute Alcohol	2
Calcium	Flame photometry, IC, AAS, ICP-OES	Rmean	RSD	mg/L	2
Magnesium	Flame photometry, IC, AAS, ICP-OES	Rmean	RSD	mg/L	2

Analyte	Method	AV	SDPA	Units	DP
Sodium	Flame photometry, IC, AAS, ICP-OES	Rmean	RSD	mg/L	2
Potassium	Flame photometry, IC, AAS, ICP-OES	Rmean	RSD	mg/L	2
Copper	AAS ICP-OES ICP-MS	Rmean	RSD	mg/L	3
Iron	AAS ICP-OES ICP-MS	Rmean	RSD	mg/L	3
Specific Gravity (20℃)	Density Meter Pycnometer	RMean	RSD	-	3
Density (20℃)	Various	RMean	RSD	g/ml	3
Turbidity	Various	RMean	RSD	NTU	2
Refractive Index (20℃)	Refractometer	RMean	RSD	-	4
Colour	PTC-WC-003	RMean	RSD	CCS	2

*where the assigned value is <10g/100L the RSD is used in the calculation of the performance score.

Sample B4 **Simulated Spirit**
Supplied as: 1 x 250mL simulated spirit sample

Analyte	Method	AV	SDPA	Units	DP
Apparent Alcoholic Strength	Density Meter	Rmean	0.03	%ABV	2
Actual Alcoholic Strength	Distillation & Density Meter Density Meter NIR/alcolyser	Formulation	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	Rmean	RSD	pH Units	2
Ethyl Carbamate	Various	Formulation	RSD	µg/L	2
NDMA	Various	Formulation	15%	µg/L	2
Total Sugars	Various	Formulation	RSD	mg/L	2
Fructose	HPLC	Formulation	10%	mg/L	2
Glucose	HPLC	Formulation	10%	mg/L	2
Sucrose	HPLC	Formulation	10%	mg/L	2
Maltose	HPLC	Formulation	10%	mg/L	2

Glycerol	Various	Formulation	RSD	mg/L	2
Citric Acid	Various	Formulation	RSD	mg/L	2
Propylene Glycol	Various	Formulation	RSD	mg/L	2

Sample B5 **Esters**
Supplied as: 1 x 100mL non chill filtered whisky

Analyte	Method	AV	SDPA	Units	DP
Ethyl Hexanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Octanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Decanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
2-Phenethyl Acetate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Dodecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
2-Phenethyl Ethanol	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Tetradecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Hexadecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl-9-Hexadecenoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Octadecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Oleate (C18:1)	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Linoleate (C18:2)	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1
Ethyl Linolenate (C18:3)	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	1

Group C **Ciders**

Sample C1
Supplied as: 2 x commercially available cider provided in original container

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Density Meter Pycnometer	RMean	0.10	°Sacc (report as XXXX·XX)	2
Actual Alcoholic Strength	Distillation & Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.10	pH Units	2
Volatile Acidity	Titration	RMean	RSD	g/L (as acetic acid)	2
Total Acidity	Titration	RMean	RSD	g/L (as malic acid)	2

Carbon dioxide	Volume expansion (e.g. Carbo QC) Pressure corrected (e.g. calculated value)	RMean	RSD	g/L	2
Colour	Spectrophotometer	RMean	RSD	°EBC	2
Total sulfur dioxide	GC, Monier-Williams, Para-Rosaniline, DTNB, Ripper, Enzymatic	RMean	RSD	mg/L (total SO_2)	2
Haze	Various	RMean	RSD	EBC	2

Group D **Wines and Fortified Wines**

Sample D1 **White/Rosé wine**
Supplied as: 1 x 500mL bottle of commercially available white or rosé wine

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Density Meter Pycnometer	RMean	0.10	°Sacc (report as XXXX·XX)	2
Actual Alcoholic Strength	Distillation & Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.10	pH Units	2
Reducing Sugars	Various	RMean	RSD	g/L	2
Glucose	HPLC Enzymatic	RMean	RSD	g/L	2
Fructose	HPLC Enzymatic	RMean	RSD	g/L	2
Ascorbic Acid	Various	RMean	RSD	mg/L	2
Citric Acid	Various	RMean	RSD	mg/L	2
Sorbic Acid	Various	RMean	RSD	mg/L	2
Lactic Acid	Various	RMean	RSD	g/L	2
Malic Acid	Various	RMean	RSD	g/L	2
Volatile Acidity	Titration	RMean	0.07	g/L (as acetic acid)	2
Total Acidity	Titration	RMean	0.30	g/L (as tartaric acid)	2
Colour @ 420nm	Spectrophotometer	RMean	RSD	Absorbance in 1cm cell	3
Colour @ 520nm	Spectrophotometer	RMean	RSD	Absorbance in 1cm cell	3

Colour @ 620nm	Spectrophotometer	RMean	RSD	Absorbance in 1cm cell	3
Total Sulfur Dioxide*	GC, Monier-Williams, Para-Rosaniline, DTNB, Ripper, Enzymatic	RMean	RSD	mg/L	2
Free Sulfur Dioxide*	Various	RMean	RSD	mg/L	2
Copper	AAS	RMean	RSD	mg/L	2
Iron	AAS	RMean	RSD	mg/L	2

*Participants should ensure that they analyse the samples for sulfur dioxide within the dates stipulated on the sample label

Sample D2 **Red wine**
Supplied as: 1 x 500mL bottle of commercially available red wine

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Various	RMean	0.10	°Sacc (report a s XXXX·XX)	2
Actual Alcoholic Strength	Distillation & Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode	RMean	0.10	pH Units	2
	Alcohol electrode				
Reducing Sugars	Various	RMean	RSD	g/L	2
Glucose	HPLC Enzymatic	RMean	RSD	g/L	2
Fructose	HPLC Enzymatic	RMean	RSD	g/L	2
Ascorbic Acid	Various	RMean	RSD	mg/L	2
Citric Acid	Various	RMean	RSD	mg/L	2
Sorbic Acid	Various	RMean	RSD	mg/L	2
Lactic Acid	Various	RMean	RSD	g/L	2
Malic Acid	Various	RMean	RSD	g/L	2
Volatile Acidity	Titration	RMean	0.07	g/L (as acetic acid)	2
Total Acidity	Titration	RMean	0.30	g/L (as tartaric acid)	2
Colour @ 420nm	Spectrophotometer	RMean	RSD	Absorbance in 1cm cell	3
Colour @ 520nm	Spectrophotometer	RMean	RSD	Absorbance in 1cm cell	3
Colour @ 620nm	Spectrophotometer	RMean	RSD	Absorbance in 1cm cell	3
Total Sulfur Dioxide*	GC, Monier-Williams, Para-Rosaniline, DTNB, Ripper,	RMean	RSD	mg/L	2

	Enzymatic				
Free Sulfur Dioxide*	Various	RMean	RSD	mg/L	2
Copper	AAS	RMean	RSD	mg/L	2
Iron	AAS	RMean	RSD	mg/L	2

*Participants should ensure that they analyse the samples for sulfur dioxide within the dates stipulated on the sample label.

Group E **Other Alcoholic Beverages**

Sample E1 **Ready to Drink**
Supplied as: 2 x commercially available 'ready to drink' beverage provided in the original container (ABV<10%)

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Various	RMean	0.30	°Sacc (report a s XXXX·XX)	2
Actual Alcoholic Strength	Various	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.10	pH Units	2
Total Sugars	Lane & Eynon	RMean	RSD	g/L	2
Ascorbic acid	Various	RMean	RSD	mg/L	2
Citric acid	Various	RMean	RSD	mg/L	2
Benzoic acid	HPLC	RMean	RSD	mg/L	2
Sorbic acid	HPLC	RMean	RSD	mg/L	2
Carbon dioxide	Various	RMean	RSD	g/L	2
Volatile Acidity	Titration	RMean	RSD	g/L (as acetic acid)	2
Total Acidity	Titration	RMean	RSD	g/L (as citric acid)	2
Total Brix	Densitometer Refractometer	RMean	RSD	^{o}Brix	2
Density (20℃)	Various	RMean	RSD	g/ml	3
Refractive Index (20℃)	Refractometer	RMean	RSD	-	4
Dissolved oxygen	Various	RMean	RSD	ppm	2
Colour absorbance	Various	RMean	RSD	-	2

Sample E2 **Liqueur**
Supplied as: 1 x 300mL bottle of commercially available liqueur (ABV 20-40%)

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Various	RMean	0.30	°Sacc (report a s XXXX·XX)	2
Actual Alcoholic Strength	Distillation & Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode	RMean	0.20	pH Units	2
	Alcohol electrode				
Residue	Various	RMean	RSD	g/100mL	2
Volatile Acidity	Titration	RMean	RSD	g/100L Absolute Alcohol (as acetic acid)	2
Total Acidity	Titration	RMean	RSD	g/100L Absolute Alcohol (as acetic acid)	2
Acetaldehyde	GC	RMean	RSD	g/100L Absolute Alcohol	2
Ethyl Acetate	GC	RMean	RSD	g/100L Absolute Alcohol	2
Acetal	GC	RMean	RSD	g/100L Absolute Alcohol	2
n-Propanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
Methanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
n-Butanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
Iso-Butanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
2-Methylbutanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
3-Methylbutanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
2+3 Methylbutanols	GC	RMean	RSD	g/100L Absolute Alcohol	2
Iso Amyl Acetate	GC	RMean	RSD	g/100L Absolute Alcohol	2
Furfural	GC	RMean	RSD	g/100L Absolute Alcohol	2
Total Brix	Densitometer Refractometer	RMean	RSD	°Brix	2

Sample E3 **Cream Liqueur**
Supplied as: 1 x 300mL bottle of commercially available cream liqueur

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Various	RMean	0.3	°Sacc (report as XXXX·XX)	2
Actual Alcoholic Strength	Distillation & Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode	RMean	0.10	pH Units	2
	Alcohol electrode				
Residue	Various	RMean	RSD	g/100mL	2
Acetaldehyde	GC	RMean	RSD	g/100L Absolute Alcohol	2
Ethyl Acetate	GC	RMean	RSD	g/100L Absolute Alcohol	2
Acetal	GC	RMean	RSD	g/100L Absolute Alcohol	2
n-Propanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
Methanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
n-Butanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
Iso-Butanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
2-Methylbutanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
3-Methylbutanol	GC	RMean	RSD	g/100L Absolute Alcohol	2
2+3 Methylbutanols	GC	RMean	RSD	g/100L Absolute Alcohol	2
Iso Amyl Acetate	GC	RMean	RSD	g/100L Absolute Alcohol	2
Furfural	GC	RMean	RSD	g/100L Absolute Alcohol	2
Total Brix	Densitometer Refractometer	RMean	RSD	°Brix	2
Refractive Index (20°C)	Refractometer	RMean	RSD	-	4
Total solids	Dried on sand	RMean	RSD	%	2

Sample E4 **Simulated Liqueur**
Supplied as: 1 x 250mL simulated liqueur sample (ABV 5-25%)

Analyte	Method	AV	SDPA	Units	DP
Specific Gravity	Various	RMean	0.10	°Sacc (report a s XXXX·XX)	2
Actual Alcoholic Strength	Distillation & Density Meter NIR/alcolyser	Formulation	0.08	%ABV	2
pH	Combination electrode	RMean	RSD	pH Units	2

	Alcohol electrode				
Residue	Various	RMean	RSD	g/100mL	2
Glycerol	Various	Formulation	RSD	mg/L	2
Citric Acid	Various	Formulation	RSD	mg/L	2
Propylene Glycol	Various	Formulation	RSD	mg/L	2
Total Brix	Densitometer Refractometer	RMean	RSD	^{o}Brix	2

Text written in italics is for reference purposes only and will not feature in the published report.