DAPS

Alcoholic Drinks Proficiency Testing Scheme

Scheme Description

LGC
Proficiency Testing
1 Chamberhall Business Park
Chamberhall Green
Bury, BL9 0AP
UK.

Telephone: +44 (0) 161 762 2500
Email: axiopt@lgcgroup.com
Website: www.lgcstandards.com

Issue: 22

Issue date: September 2023

Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
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
13	Sept 2016	Minor changes made to the methods. Turbidity and haze combined for B1 and B2.	W.Gaunt
14	Sept 2017	Removal of 2 methyl butanol, 3 methyl butanol, acetal, acetaldehyde, ethyl acetate, isoamyl acetate, methanol, n-butanol & n-propanol from E3. Removal of sample E4. Various DPs revised.	W.Gaunt
15	Mar 2018	General revision and update of method information	W.Gaunt
16	Sept 2018	Methods updated for 2+3 methyl butanol & various acids for D1 & D2. Esters changed to 3DP. SDPA updated for cask extractives. Volatile acidity renamed to fixed acidity.	W.Gaunt
17	Aug 2019	Removed 'standards' from page 1	McCarthy
18	Sep 2020	Addition of phenol to B1 Split samples B2 and B3	W.Gaunt
19	July 2021	Updated email address and UKAS logo	A Collins
20	Sept 2022	Methods updated for haze in B1 & B2, density in B1 & B3 & alcohol in A1. E1 sample description updated. Low participation analytes removed from E1, E2 & E3	W.Gaunt
21	Apr 2023	SDPA updated for ethyl carbamate in B1 & B3	W.Gaunt
22	Sept 2023	Turbidity added to E1, Maltose, lactose, arabinose & xylose added to B1 & B4. Total sugars defined as the sum of fructose+glucose+sucrose for B1 and B4. New analytes added for peated whisky (B1)	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.

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

Analyte	Method	AV	SDPA	Units	DP
Alcohol	Distillation & Density Meter NIR/alcolyser	RMean	0.10	%ABV	2
Original Gravity	Density Meter	RMean	0.50	°sacc (report as 1XXX·XX)	2
Residual Gravity	Density Meter	RMean	0.30	°sacc (report as 1XXX·XX)	2
Final Gravity	Density Meter	RMean	0.10	°sacc (report 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 PT-DP-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 (report as 1XXX·XX)	2
Residual Gravity	Density Meter	RMean	0.10	°sacc (report as 1XXX·XX)	2
Final Gravity	Density Meter	RMean	0.10	°sacc (report 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 PT-DP-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 NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.20	pH Units	2
Colour	CIU	RMean	3	Colour Units	2
	Dr Lange	RMean	0.50	Colour Units	2
Turbidity *(Haze)*	90° - chilled 90° - ambient 25° - chilled 25° - ambient NTU unit	RMean	0.20	Haze units	2
Acetaldehyde	GC	RMean	10% (20%*)	g/100L Absolute Alcohol	2
Ethyl acetate	Distillation and GC GC only	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 butanol	GC, Calculated	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	10%	μg/L	2
NDMA	Various	RMean	RSD	μg/L	2

Analyte	Method	AV	SDPA	Units	DP
Phenol	Chromatographic, Colorimetric, HPLC, GC-MS	RMean	RSD	mg/L	2
Fixed acidity *(previously 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, ICP-MS	RMean	15%	mg/L	2
Magnesium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	15%	mg/L	2
Sodium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	15%	mg/L	2
Potassium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	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 (sum of fructose+glucose+sucrose)	HPLC, IC	RMean	RSD	mg/L	2
Fructose	HPLC, IC	RMean	10%	mg/L	2
Glucose	HPLC, IC	RMean	10%	mg/L	2
Sucrose	HPLC, IC	RMean	10%	mg/L	2
Maltose	HPLC, IC	RMean	10%	mg/L	2
Lactose	HPLC, IC	RMean	10%	mg/L	2
Arabinose	HPLC, IC	RMean	10%	mg/L	2
Xylose	HPLC, IC	RMean	10%	mg/L	2
Specific gravity (20°C)	Density Meter, Pycnometer	RMean	RSD	-	5
Density (20°C)	Alcolyser, Densitometer	RMean	RSD	g/ml	5
Refractive Index (20°C)	Refractometer	RMean	RSD	-	4
Total solids	Various	RMean	RSD	g/100ml	2
Chill difference	PTC-WC-015	RMean	RSD	NTU	2
Guaiacol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2
m-cresol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2

Analyte	Method	AV	SDPA	Units	DP
p-cresol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2
o-cresol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2
4-methyl guaiacol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2
4-ethyl phenol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2
4-ethyl guaiacol***	Chromatographic, HPLC, GC-MS	RMean	RSD	mg/L	2
Cask extractives					
5-HMF	HPLC, UPLC, GC	RMean	10% (min 0.1)	mg/L**	2
Coniferaldehyde	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Ellagic Acid	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Gallic Acid	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Scopoletin	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Sinapaldehyde	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Syringaldehyde	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Syringic Acid	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Vanillic Acid	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Vanillin	HPLC, UPLC, GC	RMean	20% (min 0.1)	mg/L**	2
Esters					
Ethyl Hexanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Octanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Decanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
2-Phenethyl Acetate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Dodecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
2-Phenethyl Ethanol	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Tetradecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Hexadecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl-9-Hexadecenoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3

*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
***peated whisky only

Sample PT-DP-B2 (A, B, C & D) **Dark Distilled Spirits**
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 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
Turbidity *(Haze)*	90° - chilled 90° - ambient 25° - chilled 25° - ambient NTU unit	RMean	0.20	Haze units	2
Acetaldehyde	GC	RMean	10% (20%*)	g/100L Absolute Alcohol	2
Ethyl acetate	Distillation and GC GC only	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, Calculated	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
Acetic acid	GC	RMean	RSD	g/100L Absolute Alcohol	2
Ethyl carbamate	Various	RMean	10%	µg/L	2
NDMA	Various	RMean	RSD	µg/L	2
Fixed acidity *(previously volatile acidity)*	Titration	RMean	10%	g/100L Absolute Alcohol (as acetic acid)	2

Analyte	Method	AV	SDPA	Units	DP
Total acidity	Titration	RMean	10%	g/100L Absolute Alcohol (as acetic acid)	2
Total sugars	HPLC, IC	RMean	RSD	mg/L	2
Fructose	HPLC, IC	RMean	10%	mg/L	2
Glucose	HPLC, IC	RMean	10%	mg/L	2
Sucrose	HPLC, IC	RMean	10%	mg/L	2
Calcium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	15%	mg/L	2
Magnesium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	15%	mg/L	2
Sodium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	15%	mg/L	2
Potassium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	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 PT-DP-B3 (A, B & C) **Clear Distilled Spirits**
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
Actual alcoholic strength	Distillation & Density Meter NIR/alcolyser	RMean	0.08	%ABV	2
pH	Combination electrode Alcohol electrode	RMean	0.50	pH Units	2
Acetaldehyde	GC	RMean	10%*	g/100L Absolute Alcohol	2
Ethyl acetate	Distillation and GC GC only	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

Analyte	Method	AV	SDPA	Units	DP
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 Butanol	GC, Calculated	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	GC	RMean	RSD	g/100L Absolute Alcohol	2
Ethyl carbamate	Various	RMean	10%	µg/L	2
NDMA	Various	RMean	RSD	µg/L	2
Fixed acidity *(previously 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
Total sugars	HPLC, IC	RMean	RSD	mg/L	2
Fructose	HPLC, IC	RMean	RSD	mg/L	2
Glucose	HPLC, IC	RMean	RSD	mg/L	2
Sucrose	HPLC, IC	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, ICP-MS	RMean	RSD	mg/L	2
Magnesium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	RSD	mg/L	2
Sodium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	RMean	RSD	mg/L	2
Potassium	Flame photometry, IC, AAS, ICP-OES, ICP-MS	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°C)	Density Meter, Pycnometer	RMean	RSD	-	5
Density (20°C)	Alcolyser Densitometer	RMean	RSD	g/ml	5

Analyte	Method	AV	SDPA	Units	DP
Turbidity	Various	RMean	RSD	NTU	2
Refractive Index (20°C)	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.

Note: levels for some higher alcohol analytes may be higher due to spiking when vodka products are provided.

Sample PT-DP-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, NIR/alcolyser	Formulation	0.08	%ABV	2
pH	Combination electrode, Alcohol electrode	RMean	RSD	pH Units	2
Ethyl carbamate	Various	Formulation	10%	µg/L	2
NDMA	Various	Formulation	15%	µg/L	2
Total sugars (sum of fructose+glucose+sucrose)	HPLC, IC	Formulation	RSD	mg/L	2
Fructose	HPLC, IC	Formulation	10%	mg/L	2
Glucose	HPLC, IC	Formulation	10%	mg/L	2
Sucrose	HPLC, IC	Formulation	10%	mg/L	2
Maltose	HPLC, IC	Formulation	10%	mg/L	2
Lactose	HPLC, IC	Formulation	10%	mg/L	2
Arabinose	HPLC, IC	Formulation	10%	mg/L	2
Xylose	HPLC, IC	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 PT-DP-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)	3
Ethyl Octanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Decanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
2-Phenethyl Acetate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Dodecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
2-Phenethyl Ethanol	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Tetradecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Hexadecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl-9-Hexadecenoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3

Analyte	Method	AV	SDPA	Units	DP
Ethyl Octadecanoate	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Oleate (C18:1)	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Linoleate (C18:2)	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3
Ethyl Linolenate (C18:3)	GC, GCMS	RMean	Robust SD	g/100L (absolute alcohol)	3

Group C **Ciders**

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

Analyte	Method	AV	SDPA	Units	DP
Specific gravity	Density Meter, Pycnometer	RMean	0.2	°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	30% of AV	g/L (as acetic acid)	2
Total acidity	Titration	RMean	6% of AV (min 0.2)	g/L (as malic acid)	2
Carbon dioxide	Volume expansion (e.g. Carbo QC) Pressure corrected (e.g. calculated value)	RMean	5% of AV	g/L	2
Colour	Spectrophotometer	RMean	0-10: 0.3 >10-40: 1.5	°EBC	2
Total sulfur dioxide	GC, Monier-Williams, Para-Rosaniline, DTNB, Ripper, Enzymatic	RMean	15% of AV	mg/L (total SO_2)	2
Haze	Various	RMean	0.1	EBC	2

Group D **Wines and Fortified Wines**

Sample PT-DP-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	OIV-MA-AS311, Enzymatic FTIR, HPLC, Calculated	RMean	RSD	g/L	2
Glucose	HPLC, Enzymatic, IC	RMean	RSD	g/L	2
Fructose	HPLC, Enzymatic, IC	RMean	RSD	g/L	2
Ascorbic acid	Titration, HPLC, LCMS	RMean	3	mg/L	2
Citric acid	HPLC, LCMS, FTIR, Enzymatic	RMean	RSD	mg/L	2
Sorbic acid	HPLC, LCMS, FTIR, Enzymatic	RMean	3	mg/L	2
Lactic acid	HPLC, LCMS, FTIR, Enzymatic	RMean	RSD	g/L	2
Malic acid	HPLC, LCMS, FTIR, Enzymatic	RMean	0.1	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, OIV-MA-AS32, Iodometry, Aeration-oxidation	RMean	15% of AV	mg/L	2

Analyte	Method	AV	SDPA	Units	DP
Free sulfur dioxide*	OIV-MA-AS32, Iodometry, Aeration-oxidation	RMean	25% of AV	mg/L	2
Copper	AAS	RMean	0.05	mg/L	2
Iron	AAS	RMean	0.1	mg/L	2

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

Sample PT-DP-D2 **Red wine**
Supplied as: 1 x 500mL bottle of commercially available red 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	RMean	0.10	pH Units	2
	Alcohol electrode				
Reducing sugars	OIV-MA-AS311, Enzymatic, FTIR, HPLC, Calculated	RMean	RSD	g/L	2
Glucose	HPLC, Enzymatic, IC	RMean	RSD	g/L	2
Fructose	HPLC, Enzymatic, IC	RMean	RSD	g/L	2
Ascorbic acid	Titration, HPLC, LCMS	RMean	3	mg/L	2
Citric acid	HPLC, LCMS, FTIR, Enzymatic	RMean	RSD	mg/L	2
Sorbic acid	HPLC, LCMS, FTIR, Enzymatic	RMean	3	mg/L	2
Lactic acid	HPLC, LCMS, FTIR, Enzymatic	RMean	RSD	g/L	2
Malic acid	HPLC, LCMS, FTIR, Enzymatic	RMean	0.1	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
Iron	AAS	RMean	0.1	mg/L	2

Analyte	Method	AV	SDPA	Units	DP
Total sulfur dioxide*	GC, Monier-Williams, Para-Rosaniline, DTNB, Ripper, Enzymatic, OIV-MA-AS32, Iodometry, Aeration-oxidation	RMean	5	mg/L	2
Free sulfur dioxide*	OIV-MA-AS32, Iodometry, Aeration-oxidation	RMean	5	mg/L	2
Copper	AAS	RMean	0.05	mg/L	2
Iron	AAS	RMean	0.1	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 PT-DP-E1 **'Ready to drink' beverages**
Supplied as: 2 x commercially available 'ready to drink' beverages provided in the original containers (ABV<10%)

Analyte	Method	AV	SDPA	Units	DP
Specific gravity	Density Meter, Pycnometer	RMean	0.30	°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
Total sugars	Lane & Eynon	RMean	RSD	g/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	°Brix	2
Density (20°C)	Various	RMean	0.0005	g/ml	4
Dissolved oxygen	Various	RMean	RSD	ppm	2
Colour absorbance	430nm, 500nm, 630nm	RMean	RSD	-	2

Analyte	Method	AV	SDPA	Units	DP
Turbidity	90° - chilled 90° - ambient 25° - chilled 25° - ambient NTU unit	RMean	0.20	Haze units	2

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

Analyte	Method	AV	SDPA	Units	DP
Specific gravity	Density Meter, Pycnometer	RMean	0.30	°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	0.20	pH Units	2
Residue	Various	RMean	RSD	g/100mL	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
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+3 Methyl butanol	GC, Calculated	RMean	RSD	g/100L Absolute Alcohol	2
iso Amyl acetate	GC	RMean	RSD	g/100L Absolute Alcohol	2
Total brix	Densitometer, Refractometer	RMean	RSD	^{o}Brix	2

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

Analyte	Method	AV	SDPA	Units	DP
Specific gravity	Density Meter, Pycnometer	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 Alcohol electrode	RMean	0.10	pH Units	2

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