Analytical Procedures and Appendices

I Available photometric test kits and methods

The following methods with the corresponding method numbers are programmed into the photometer and measurements can be made without any further adjustments. Method selection is achieved through a barcode on the cell (for cell tests) or through a barcode on the AutoSelector (for reagent tests).
The method number listed in column 1 is for manual selection. The total range relates to the cited test in column 2 and, in the reagent tests, covers all possible path length (cells from 10 to 50 mm).
At the end of this chapter there are the tables for the pre-programmed AQA1 and PipeCheck methods.

Method number	Determination		Total range	Method
2537	Acesulfame-K EN 1377		0.0 – 1200.0 mg/g	UV absorption
208	Acid Capacity Cell Test to pH 4.3 (total alkalinity)	1.01758	0.40 – 8.00 mmol/l	Indicator reaction
2518	ADMI Color Measurement		2.0 – 100.0	Inherent color
2517	ADMI Color Measurement		10 – 500	Inherent color
2612	α Acids [2)]		0 – 80 mg/l	Inherent color
2637	α Acids (Hop Extracts) [2)]		0.0 - 100.0 %	Inherent color
2636	α/β Acids (Hops) [2)]		0.0 - 100.0 %	Inherent color
196	Aluminium Cell Test [1)]	1.00594	0.02 – 0.50 mg/l Al	Chromazurole S
43	Aluminium Test [1)]	1.14825	0.020 – 1.20 mg/l Al	Chromazurole S
	Amino nitrogen, free - see Free Amino Nitrogen			
2520	Ammonia, free		0.00 – 3.65 mg/l NH_3	as ammonium
104	Ammonium Cell Test	1.14739	0.010 – 2.000 mg/l NH_4-N	Indophenol blue
51	Ammonium Cell Test	1.14558	0.20 – 8.00 mg/l NH_4-N	Indophenol blue
52	Ammonium Cell Test	1.14544	0.5 – 16.0 mg/l NH_4-N	Indophenol blue
53	Ammonium Cell Test	1.14559	4.0 – 80.0 mg/l NH_4-N	Indophenol blue
54	Ammonium Test	1.14752	0.010 – 3.00 mg/l NH_4-N	Indophenol blue
155	Ammonium Test	1.00683	2.0 – 75.0 mg/l NH_4-N	Indophenol blue
163	Ammonium Test	1.00683	5 – 150 mg/l NH_4-N	Indophenol blue
2601	Anthocyanogenes [2)]		0 – 100 mg/l	Acidic hydrolysis
130	Antimony in water and wastewater		0.10 – 8.00 mg/l Sb	Brilliant green
2540	Annatto Cheese §64 LFGB 03.00-37		0.0 – 10.0 mg/kg	Bixin / Norbixin
156	AOX Cell Test [1)]	1.00675	0.05 – 2.50 mg/l AOX	Oxidation to chloride
132	Arsenic Test [1)]	1.01747	0.001 – 0.100 mg/l As	Ag-DDTC
2562	ASTM Color Measurement		0.5 - 8.0	Inherent color

[1)] turbidity correction possible
[2)] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3)] individual calibration necessary

Method number	Determination		Total range	Method
2603	Bitterness - beer [2)]		1.0 – 80.0 BU	UV absorption
2604	Bitterness - wort [2)]		1.0 – 120.0 BU	UV absorption
157	BOD Cell Test [1)]	1.00687	0.5 – 3000 mg/l BOD	Modification of Winkler method
164	Boron Cell Test [1)]	1.00826	0.05 – 2.00 mg/l B	Azomethine H
46	Boron Test [1)]	1.14839	0.050 – 0.800 mg/l B	Rosocyanine
307	Bromate in water and drinking water - Ultra Low Range		1.0 – 40.0 µg/l BrO_3	3,3'-Dimethylnaphthidine
308	Bromate in water and drinking water - Low Range		5.0 – 200.0 µg/l BrO_3	3,3'-Dimethylnaphthidine
146	Bromine Test [1)]	1.00605	0.020 – 10.00 mg/l Br_2	S-DPD
67	Cadmium Cell Test	1.14834	0.025 – 1.000 mg/l Cd	Cadion derivate
183	Cadmium Test	1.01745	0.0020 – 0.500 mg/l Cd	Cadion derivate
165	Calcium Cell Test [1)]	1.00858	10 – 250 mg/l Ca	Phthalein purple
42	Calcium Test [1)]	1.14815	5 – 160 mg/l Ca	Glyoxal-bis-hydroxyanil
125	Calcium Test sensitive [1)]	1.14815	1.0 – 15.0 mg/l Ca	Glyoxal-bis-hydroxyanil
304	Calcium Test [3)]	1.00049	0.20 – 4.00 mg/l Ca	Phthalein derivate
	Carbohydrates, total - see Total Carbohydrates			
2523	Carotene (palm oil)		10 – 7500 mg/kg	Inherent color
313	Cell Density (OD600)		-0.020 – 1.200	Measurement at 600 nm
	Cell Density - see McFarland or Cell Density (OD600)			
95	Chloride Cell Test [1)]	1.14730	5 – 125 mg/l Cl	Iron(III)-thiocyanat
110	Chloride Test [1)]	1.14897	2.5 – 25.0 mg/l Cl	Iron(III)-thiocyanat
63	Chloride Test [1)]	1.14897	10 – 250 mg/l Cl	Iron(III)-thiocyanat
218	Chloride Cell Test [1)]	1.01804	0.5 – 15.0 mg/l Cl	Iron(III)-thiocyanat
219	Chloride Test [1)]	1.01807	0.10 – 5.00 mg/l Cl	Iron(III)-thiocyanat
141	Chlorine Cell Test [1)] (free chlorine)	1.00595	0.03 – 6.00 mg/l Cl_2	S-DPD
142	Chlorine Cell Test [1)] (free chlorine + total chlorine)	1.00597	0.03 – 6.00 mg/l Cl_2	S-DPD
143	Chlorine Test [1)] (free chlorine)	1.00598	0.010 – 6.00 mg/l Cl_2	S-DPD
145	Chlorine Test [1)] (total chlorine)	1.00602	0.010 – 6.00 mg/l Cl_2	S-DPD
144	Chlorine Test [1)] (free chlorine + total chlorine)	1.00599	0.010 – 6.00 mg/l Cl_2	S-DPD
194	Chlorine Cell Test [1)] (free chlorine + total chlorine)	1.00086/1.00087/ 1.00088/1.00089	0.03 – 6.00 mg/l Cl_2	DPD

[1)] turbidity correction possible
[2)] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3)] individual calibration necessary

Method number	Determination		Total range	Method
306	Chlorine Test [1] (free chlorine + total chlorine)	1.00086/1.00087/ 1.00088	0.010 – 1.000 mg/l Cl_2	DPD
149	Chlorine Dioxide Test [1]	1.00608	0.020 – 10.00 mg/l ClO_2	S-DPD
2509	Chlorophyll-a (DIN/ISO)		result in µg/l Chl-a or Phaeo	Inherent color
2504	Chlorophyll-a (APHA/ASTM)		result in mg/m³ Chl-a or Phaeo	Inherent color
2507	Chlorophyll-a, -b, -c (APHA/ASTM)		result in mg/m³ Chl-a, -b, -c	Inherent color
39	Chromate Cell Test [1]	1.14552	0.05 – 2.00 mg/l Cr	Diphenylcarbazide
39	Chromate Cell Test [1] (total chromium)	1.14552	0.05 – 2.00 mg/l Cr	Peroxodisulfate oxidation / Diphenylcarbazide
40	Chromate Test [1]	1.14758	0.010 – 3.00 mg/l Cr	Diphenylcarbazide
20	Chromium Baths		4.0 – 400 g/l CrO_3	Inherent color
232	Cobalt Cell Test [1]	1.17244	0.05 – 2.00 mg/l Co	Nitroso-R salt
305	Cobalt in water		0.5 – 10.0 mg/l Co	Nitroso-R salt
31	COD Cell Test [1]	1.14560	4.0 – 40.0 mg/l COD	Chromosulfuric acid oxidation / chromate determination
211	COD Cell Test [1]	1.01796	5.0 – 80.0 mg/l COD	Chromosulfuric acid oxidation / chromate determination
14	COD Cell Test [1]	1.14540	10 – 150 mg/l COD	Chromosulfuric acid oxidation / chromate determination
105	COD Cell Test [1]	1.14895	15 – 300 mg/l COD	Chromosulfuric acid oxidation / chromate determination
93	COD Cell Test [1]	1.14690	50 – 500 mg/l COD	Chromosulfuric acid oxidation / chromate determination
23	COD Cell Test [1]	1.14541	25 – 1500 mg/l COD	Chromosulfuric acid oxidation / chromium(III) determination
94	COD Cell Test [1]	1.14691	300 – 3500 mg/l COD	Chromosulfuric acid oxidation / chromium(III) determination
24	COD Cell Test [1]	1.14555	500 – 10000 mg/l COD	Chromosulfuric acid oxidation / chromium(III) determination

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[3] individual calibration necessary

Method number	Determination		Total range	Method
209	COD Cell Test [1)]	1.01797	5000 – 90000 mg/l COD	Chromosulfuric acid oxidation / chromium(III) determination
137	COD Cell Test (Hg free) [1)]	1.09772	10 – 150 mg/l COD	Chromosulfuric acid oxidation / chromate determination
138	COD Cell Test (Hg free) [1)]	1.09773	100 – 1500 mg/l COD	Chromosulfuric acid oxidation / chromium(III) determination
220	COD Cell Test for seawater [1)]	1.17058	5.0 – 60.0 mg/l COD	Chloride depletion / chromosulfuric acid oxidation / chromate determination
221	COD Cell Test for seawater [1)]	1.17059	50 – 3000 mg/l COD	Chloride depletion / chromosulfuric acid oxidation / chromium(III) determination
15	Color α(436) (spectral absorptions coefficient)		0.1 – 250 m^{-1}	Measurement at 436 nm
61	Color α(525) (spectral absorptions coefficient)		0.1 – 250 m^{-1}	Measurement at 525 nm
78	Color α(620) (spectral absorptions coefficient)		0.1 – 250 m^{-1}	Measurement at 620 nm
303	Color (410) (EN 7887)		2 – 2500 mg/l Pt	Measurement at 410 nm
2633	Color - ASBC [2)]		0.0 – 50.0 °SRM	Inherent color
2602	Color - EBC [2)]		0.0 – 60.0 EBC Units	Inherent color
32	Color Hazen [1)]		0.2 – 500 mg/l Pt/Co (Hazen)	Platinum-cobalt-Standard Method, measurement at 340 nm
179	Color Hazen [1)]		0 – 1000 mg/l Pt/Co (Hazen)	Platinum-cobalt-Standard Method, measurement at 445 nm
180	Color Hazen [1)]		0 – 1000 mg/l Pt/Co (Hazen)	Platinum-cobalt-Standard Method, measurement at 455 nm
181	Color Hazen [1)]		0 – 1000 mg/l Pt/Co (Hazen)	Platinum-cobalt-Standard Method, measurement at 465 nm
	Color of sugar solutions - see ICUMSA Color			

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[3)] individual calibration necessary

Method number	Determination		Total range	Method
2613	Copper - EBC [2)]		0.10 – 5.00 mg/l Cu	Cuprethol
26	Copper Cell Test [1)]	1.14553	0.05 – 8.00 mg/l Cu	Cuprizone
27	Copper Test [1)]	1.14767	0.02 – 6.00 mg/l Cu	Cuprizone
83	Copper Baths		2.0 – 80.0 g/l Cu	Inherent color
228	Cyanide Cell Test [1)] (free cyanide)	1.02531	0.010 – 0.500 mg/l CN	Barbituric acid + pyridinecarboxylic acid
75	Cyanide Cell Test [1)] (free cyanide)	1.14561	0.010 – 0.500 mg/l CN	Barbituric acid + pyridinecarboxylic acid
75	Cyanide Cell Test [1)] (readily liberated cyanide)	1.14561	0.010 – 0.500 mg/l CN	Citric acid / barbituric acid + pyridinecarboxylic acid
109	Cyanide Test [1)] (free cyanide)	1.09701	0.0020 – 0.500 mg/l CN	Barbituric acid + pyridinecarboxylic acid
109	Cyanide Test [1)] (readily liberated cyanide)	1.09701	0.0020 – 0.500 mg/l CN	Citric acid / barbituric acid + pyridinecarboxylic acid
210	Cyanuric Acid Test	1.19253	2 – 160 mg/l Cyan Acid	Triazine derivative
2528	delta K268 (olive oil)		-0.10 – 1.00	UV absorption
2529	delta K270 (olive oil)		-0.10 – 1.00	UV absorption
2631	Diacetyl (ASBC) [2)]		0.00 – 4.00 mg/l Diacetyl	a-Naphthol
	Diacetyl (EBC) - see Vicinal Diketones			
2524	DOBI (palm oil)		0.00 – 4.00	UV absorption
2512	dsDNA		5 – 37500 µg/ml dsDNA	UV absorption
2626	Flavanoids [2)]		3 – 200 mg/l	4-Dimethylaminocinnamaldehyde
2635	Flocculation (ASBC) [2)]		0.0 - 100.0 %	Turbidity
215	Fluoride Cell Test [1)]	1.00809	0.10 – 1.80 mg/l F	Alizarin complexone
216	Fluoride Cell Test sensitive	1.00809	0.025 – 0.500 mg/l F	Alizarin complexone
234	Fluoride Cell Test	1.17243	0.10 – 2.50 mg/l F	SPADNS (As free)
166	Fluoride Test [1)]	1.14598	0.10 – 2.00 mg/l F	Alizarin complexone
167	Fluoride Test [1)]	1.14598	1.0 – 20.0 mg/l F	Alizarin complexone
217	Fluoride Test	1.00822	0.02 – 2.00 mg/l F	SPADNS
233	Fluoride Test	1.17236	0.02 – 2.00 mg/l F	SPADNS (As free)
28	Formaldehyde Cell Test [1)]	1.14500	0.10 – 8.00 mg/l HCHO	Chromotropic acid
91	Formaldehyde Test [1)]	1.14678	0.02 – 8.00 mg/l HCHO	Chromotropic acid
2606	Free Amino Nitrogen beer / wort [2)]		0 – 400 mg/l	Ninhydrin
2561	Gardner Color Measurement		1.0 - 18.0	Inherent color

[1)] turbidity correction possible
[2)] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3)] individual calibration necessary

Method number	Determination		Total range	Method
45	Gold Test	1.14821	0.5 – 12.0 mg/l Au	Rhodamine B
	Hardness - see Total Hardness or Residual Hardness			
	Hazen - see Color Hazen			
2634	Hop Storage Index (HSI) [2)]		0.00 – 2.00 HSI	UV absorption
44	Hydrazine Test [1)]	1.09711	0.005 – 2.00 mg/l N_2H_4	4-Dimethylaminobenz-aldehyde
99	Hydrogen Peroxide Cell Test [1)]	1.14731	2.0 – 20.0 mg/l H_2O_2	Titanyl sulfate
128	Hydrogen Peroxide Cell Test sensitive [1)]	1.14731	0.25 – 5.00 mg/l H_2O_2	Titanyl sulfate
198	Hydrogen Peroxide Test	1.18789	0.015 – 6.00 mg/l H_2O_2	Phenanthroline derivative
2538	Hydroxyproline Meat §64 LFGB 06.00-8		0.000 – 1.000 g/100 g	4-Dimethylaminobenz-aldehyde
2548	ICUMSA Color GS1/3-7		0 – 50 000 $IU_{7.0}$	Inherent color
2549	ICUMSA Color GS2/3-9		0 – 600 $IU_{7.0}$	Inherent color
2550	ICUMSA Color GS2/3-10		0 – 50 $IU_{7.0}$	Inherent color
2551	ICUMSA Color GS9/1/2/3-8		0 – 20 000 $IU_{7.0}$	Inherent color
147	Iodine Test [1)]	1.00606	0.050 – 10.00 mg/l I_2	S-DPD
2615	Iodine Value, photometric [2)]		0.00 – 0.80	Iodine
2616	Iodine Value, photometric [2)]		0.00 – 0.80	Iodine
33	Iodine Color Number		0.010 – 3.00	Measurement at 340 nm
21	Iodine Color Number		0.2 – 50.0	Measurement at 445 nm
2642	Iron - ASBC [2)]		0.00 – 3.00 mg/l Fe	1,10-Phenanthroline
2643	Iron - ASBC [2)]		0.00 – 3.00 mg/l Fe	2,2'-Bipyridine
2644	Iron - ASBC [2)]		0.00 – 0.40 mg/l Fe	Triazine (ferrozine)
2623	Iron - EBC [2)]		0.000 – 1.000 mg/l Fe	Triazine
2624	Iron - EBC [2)]		0.000 – 0.800 mg/l Fe	Triazine
37	Iron Cell Test	1.14549	0.05 – 4.00 mg/l Fe	Triazine
106	Iron Cell Test [1)]	1.14896	1.0 – 50.0 mg/l Fe (Fe(II) and Fe(III))	2,2'-Bipyridine
38	Iron Test	1.14761	0.005 – 5.00 mg/l Fe	Triazine
161	Iron Test [1)]	1.00796	0.010 – 5.00 mg/l Fe (Fe(II) and Fe(III))	1,10-Phenanthroline
2611	Iso-α Acids [2)]		0 – 60	UV absorption
2525	K232 (olive oil)		0.00 – 4.00	UV absorption
2526	K268 (olive oil)		0.00 – 4.00	UV absorption

[1)] turbidity correction possible
[2)] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3)] individual calibration necessary

Method number	Determination		Total range	Method
2527	K270 (olive oil)		0.00 – 4.00	UV absorption
66	Lead Cell Test [1)]	1.14833	0.10 – 5.00 mg/l Pb	PAR
160	Lead Test [1)]	1.09717	0.010 – 5.00 mg/l Pb	PAR
158	Magnesium Cell Test [1)]	1.00815	5.0 – 75.0 mg/l Mg	Phthalein purple
159	Manganese Cell Test [1)]	1.00816	0.10 – 5.00 mg/l Mn	Formaldoxime
19	Manganese Test [1)]	1.14770	0.010 – 10.00 mg/l Mn	Formaldoxime
226	Manganese Test [1)]	1.01846	0.005 – 2.00 mg/l Mn	PAN
2513	McFarland		0.0 – 10.0	Cell density, turbidimetric
135	Mercury in water and wastewater		0.025 – 1.000 mg/l Hg	Michler's ketone
175	Molybdenum Cell Test	1.00860	0.02 – 1.00 mg/l Mo	Brompyrogallol red
206	Molybdenum Test	1.19252	0.5 – 45.00 mg/l Mo	Mercaptoacetic acid
185	Monochloramine Test	1.01632	0.050 – 10.00 mg/l Cl_2	Indophenol blue
2614	Nickel - EBC [2)]		0.00 – 5.00 mg/l Ni	Dimethylglyoxime
17	Nickel Cell Test [1)]	1.14554	0.10 – 6.00 mg/l Ni	Dimethylglyoxime
18	Nickel Test [1)]	1.14785	0.02 – 5.00 mg/l Ni	Dimethylglyoxime
57	Nickel Bath		2.0 – 120 g/l Ni	Inherent color
59	Nitrate Cell Test [1)]	1.14542	0.5 – 18.0 mg/l NO_3-N	Nitrospectral
30	Nitrate Cell Test [1)]	1.14563	0.5 – 25.0 mg/l NO_3-N	2,6-Dimethylphenol
107	Nitrate Cell Test [1)]	1.14764	1.0 – 50.0 mg/l NO_3-N	2,6-Dimethylphenol
151	Nitrate Cell Test [1)]	1.00614	23 – 225 mg/l NO_3-N	2,6-Dimethylphenol
60	Nitrate Test [1)]	1.14773	0.20 – 20.0 mg/l NO_3-N	Nitrospectral
139	Nitrate Test [1)]	1.09713	0.10 – 25.0 mg/l NO_3-N	2,6-Dimethylphenol
72	Nitrate Cell Test in seawater [1)]	1.14556	0.10 – 3.00 mg/l NO_3-N	Resorcine
140	Nitrate Test in seawater [1)]	1.14942	0.2 – 17.0 mg/l NO_3-N	Resorcine
227	Nitrate Test	1.01842	0.3 – 30.0 mg/l NO_3-N	Reduction / Benzoic acid derivative
2503	Nitrate (UV)		0.0 – 7.0 mg/l NO_3-N	Direct measurement in the UV range
35	Nitrite Cell Test [1)]	1.14547	0.010 – 0.700 mg/l NO_2-N	Griess reaction
197	Nitrite Cell Test [1)]	1.00609	1.0 – 90.0 mg/l NO_2-N	Iron(II)-ethylenediammonium sulfate
36	Nitrite Test [1)]	1.14776	0.002 – 1.00 mg/l NO_2-N	Griess reaction
68	Nitrogen (total) Cell Test	1.14537	0.5 – 15.0 mg/l N	Peroxodisulfate oxidation / Nitrospectral

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[2)] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
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Method number	Determination		Total range	Method
153	Nitrogen (total) Cell Test	1.00613	0.5 – 15.0 mg/l N	Peroxodisulfate oxidation / 2,6-Dimethylphenol
108	Nitrogen (total) Cell Test	1.14763	10 – 150 mg/l N	Peroxodisulfate oxidation / 2,6-Dimethylphenol
	OD280 - see Protein (OD280)			
	OD600 - see Cell Density (OD600)			
	Oils - see K (olive oil), delta K (olive oil), Carotene (palm oil) or DOBI (palm oil)			
92	Oxygen Cell Test [1)]	1.14694	0.5 – 12.0 mg/l O_2	Modification of Winkler method
207	Oxygen Scavengers Test	1.19251	0.020 – 0.500 mg/l DEHA	FerroZine®
148	Ozone Test [1)]	1.00607	0.010 – 4.00 mg/l O_3	S-DPD
133	Palladium in water and wastewater		0.05 – 1.25 mg/l Pd	Thio-Michler's ketone
	2,3-Pentandion - see Vicinal Diketones			
186	pH Cell Test	1.01744	6.4 – 8.8	Phenol red
	Phaeophytin (DIN/ISO) / (APHA/ASTM) - see Chlorophyll-a (DIN/ISO) or (APHA/ASTM)			
73	Phenol Cell Test [1)]	1.14551	0.10 – 2.50 mg/l C_6H_5OH	MBTH
176	Phenol Test [1)]	1.00856	0.025 – 5.00 mg/l C_6H_5OH	Aminoantipyrine
177	Phenol Test [1)]	1.00856	0.002 – 0.100 mg/l C_6H_5OH	Aminoantipyrine by extraction
	Phenols, steam-volatile - see steam-volatile Phenols			
212	Phosphate Cell Test	1.00474	0.05 – 5.00 mg/l PO_4-P	Phosphormolybdenum blue
55	Phosphate Cell Test	1.14543	0.05 – 5.00 mg/l PO_4-P	Phosphormolybdenum blue
55	Phosphate Cell Test (total phosphorus)	1.14543	0.05 – 5.00 mg/l P	Peroxodisulfate oxidation / phosphormolybdenum blue
213	Phosphate Cell Test	1.00475	0.5 – 25.0 mg/l PO_4-P	Phosphormolybdenum blue
86	Phosphate Cell Test	1.14729	0.5 – 25.0 mg/l PO_4-P	Phosphormolybdenum blue
86	Phosphate Cell Test (total phosphorus)	1.14729	0.5 – 25.0 mg/l P	Peroxodisulfate oxidation / phosphormolybdenum blue
152	Phosphate Cell Test	1.00616	3.0 – 100.0 mg/l PO_4-P	Phosphormolybdenum blue
214	Phosphate Cell Test	1.00673	3.0 – 100.0 mg/l PO_4-P	Phosphormolybdenum blue
214	Phosphate Cell Test (total phosphorus)	1.00673	3.0 – 100.0 mg/l P	Peroxodisulfate oxidation / phosphormolybdenum blue
56	Phosphate Test	1.14848	0.005 – 5.00 mg/l PO_4-P	Phosphormolybdenum blue
162	Phosphate Test	1.00798	1.0 – 100.0 mg/l PO_4-P	Phosphormolybdenum blue

1) turbidity correction possible
2) the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
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Method number	Determination		Total range	Method
69	Phosphate Cell Test [1]	1.14546	0.5 – 25.0 mg/l PO_4-P	Vanadatomolybdate
70	Phosphate Test [1]	1.14842	0.5 – 30.0 mg/l PO_4-P	Vanadatomolybdate
2535	Phosphatide Milk §64 LFGB 01.00-41		0 – 750 mg/100 g P	Ashing / phosphor-molybdenum blue
2534	Phosphorus Juice EN 1136		0.0 – 300.0 mg/l P	Phosphormolybdenum blue
2533	Phosphorus Meat §64 LFGB 06.00-9		0.000 – 2.500 g/100 g P_2O_5	Ashing / vanadato-molybdate
2532	Phosphorus Milk §64 LFGB 01.00-92		0 – 2000 mg/100 g P	Ashing / phosphor-molybdenum blue
	Photometric iodine test - see Iodine Test, photometric			
	Pigment, yellow - see Yellow Pigment			
134	Platinum in water and waste-water		0.10 – 1.25 mg/l Pt	o-Phenylendiamine
103	Potassium Cell Test	1.14562	5.0 – 50.0 mg/l K	Kalignost®, turbidimetric
150	Potassium Cell Test	1.00615	30 – 300 mg/l K	Kalignost®, turbidimetric
2539	Proline Juice EN 1141		0 – 1200 mg/l	Ninhydrin
319	Protein BCA [3]		200 – 1000 µg/l BSA	Bicinchoninic acid (BCA)
2640	Protein Beer, dark [2]		0.00 – 100.00 % (wt/wt)	UV absorption
2639	Protein Beer, stabilized [2]		0.00 – 100.00 % (wt/wt)	UV absorption
2638	Protein Beer, unstabilized [2]		0.00 – 100.00 % (wt/wt)	UV absorption
315	Protein Biuret Low Range [3]		0.5 – 5.0 g/l BSA	Biuret reaction
316	Protein Biuret High Range [3]		1 – 10 g/l BSA	Biuret reaction
317	Protein Bradford Low Range [3]		0.01 – 0.10 mg/l BSA	Coomassie® Brilliant Blue
318	Protein Bradford High Range [3]		0.1 – 1.4 mg/l BSA	Coomassie® Brilliant Blue
312	Protein (OD280)		-0.020 – 2.000	Measurement at 280 nm
2641	Protein Wort [2]		0.00 – 100.00 % (malt/db)	UV absorption
2617	Reducing Power [2]		0 – 100 %	DPI
2632	Reducing Sugars [2]		0.00 – 1.00 g/l Dextrose	PAHBAH
98	Residual Hardness Cell Test [1]	1.14683	0.50 – 5.00 mg/l Ca	Phthalein purple
2510	RNA		4 – 30000 µg/ml RNA	UV absorption
2536	Saccharine EN 1376		0.0 – 1200.0 mg/g	UV absorption
2563	Saybolt Color Measurement		-15 - 30	Inherent color
79	Silicate (Silicic acid) Test	1.14794	0.11 – 10.70 mg/l SiO_2	Silicomolybdenum blue

[1] turbidity correction possible
[2] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3] individual calibration necessary

Method number	Determination		Total range	Method
81	Silicate (Silicic acid) Test	1.14794	0.011 – 1.600 mg/l SiO_2	Silicomolybdenum blue
169	Silicate (Silicic acid) Test [1)]	1.00857	1.1 – 107.0 mg/l SiO_2	Molybdatosilicate
171	Silicate (Silicic acid) Test [1)]	1.00857	11 – 1070 mg/l SiO_2	Molybdatosilicate
225	Silicate (Silicic acid) Test	1.01813	0.5 – 500.0 µg/l SiO_2	Silicomolybdenum blue
47	Silver Test [1)]	1.14831	0.25 – 3.00 mg/l Ag	Eosine / 1,10-Phenanth-roline
168	Sodium Cell Test in nutrient solutions [1)]	1.00885	10 – 300 mg/l Na	indirectly as chloride
300	Spectral Absorption Coefficient α(254)		0.1 – 250 m^{-1}	Measurement at 254 nm
302	Spectral Absorption Coefficient α(436)		0.1 – 250 m^{-1}	Measurement at 436 nm
301	Spectral Attenuation Coefficient µ(254)		0.1 – 250 m^{-1}	Measurement at 254 nm
2511	ssDNA		3 – 25000 µg/ml ssDNA	UV absorption
2621	Steam-volatile Phenols - malt [2)]		0.00 – 3.00 mg/kg	Aminoantipyrine by extraction
2621	Steam-volatile Phenols - beer [2)]		0.00 – 0.30 mg/kg	Aminoantipyrine by extraction
2622	Steam-volatile Phenols - malt [2)]		0.00 – 3.00 mg/kg	Aminoantipyrine by extraction
2622	Steam-volatile Phenols - beer [2)]		0.00 – 0.30 mg/kg	Aminoantipyrine by extraction
314	Sugars [3)]		0 – 200 g/l	3,5-Dinitrosalicylic acid (DNSA)
	Sugar solutions, Color of - see ICUMSA Color			
229	Sulfate Cell Test	1.02532	1.0 – 50.0 mg/l SO_4	Bariumsulfate, turbidi-metric
64	Sulfate Cell Test	1.14548	5 – 250 mg/l SO_4	Bariumsulfate, turbidi-metric
154	Sulfate Cell Test	1.00617	50 – 500 mg/l SO_4	Bariumsulfate, turbidi-metric
82	Sulfate Cell Test	1.14564	100 – 1000 mg/l SO_4	Bariumsulfate, turbidi-metric
65	Sulfate Test [1)]	1.14791	25 – 300 mg/l SO_4	Tannin
224	Sulfate Test	1.01812	0.50 – 50.0 mg/l SO_4	Bariumsulfate, turbidi-metric

[1)] turbidity correction possible
[2)] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3)] individual calibration necessary

Method number	Determination		Total range	Method
230	Sulfate Test [4]	1.02537	5 – 300 mg/l SO_4	Bariumsulfate, turbidimetric
236	Sulfate Test [4]	1.02537	5 – 300 mg/l SO_4	Bariumsulfate, turbidimetric
80	Sulfide Test [1]	1.14779	0.020 – 1.50 mg/l S	Dimethyl-p-phenylendiamin
71	Sulfite Cell Test [1]	1.14394	1.0 – 20.0 mg/l SO_3	Ellman's reagent
127	Sulfite Cell Test sensitive [1]	1.14394	0.05 – 3.00 mg/l SO_3	Ellman's reagent
187	Sulfite Test [1]	1.01746	1.0 – 60.0 mg/l SO_3	Ellman's reagent
231	Surfactants (anionic) Cell Test	1.02552	0.05 – 2.00 mg/l SDAS	Methylene blue
192	Surfactants (cationic) Cell Test [1]	1.01764	0.05 – 1.50 mg/l k-Ten	Disulfine blue
193	Surfactants (nonionic) Cell Test [1]	1.01787	0.10 – 7.50 mg/l n-Ten	TBPE
182	Suspended Solids		1 – 750 mg/l SusS	
2619	Thiobarbituric Acid Number [2]		0 – 250	Thiobarbituric acid
100	Tin Cell Test [1]	1.14622	0.10 – 2.50 mg/l Sn	Pyrocatechol violet
235	Tin Cell Test [1]	1.17265	0.10 – 2.50 mg/l Sn	Pyrocatechol violet
172	TOC Cell Test	1.14878	5.0 – 80.0 mg/l TOC	Peroxodisulfate oxidation / Indicator
173	TOC Cell Test	1.14879	50 – 800 mg/l TOC	Peroxodisulfate oxidation / Indicator
2625	Total Carbohydrates [2]		0.000 – 6.000 g/100 ml	Anthrone
178	Total Hardness Cell Test [1]	1.00961	5 – 215 mg/l Ca	Phthalein purple
2610	Total Polyphenols [2]		1 – 800 mg/l	Iron(III)
77	Turbidity		1 – 100 FAU	Measurement at 550 nm
2620	Vicinal Diketones [2]		0.000 – 2.000 mg/kg	Phenylendiamin
222	Volatile Organic Acids Cell Test [1]	1.01749	50 – 3000 mg/l CH_3COOH	Esterification
223	Volatile Organic Acids Test [1]	1.01809	50 – 3000 mg/l CH_3COOH	Esterification
	Water hardness - see Total Hardness or Residual Hardness			
2541	Yellow Pigment EN ISO 11052		0.000 – 1.250 mg/100 g	ß-Carotene
174	Zinc Cell Test	1.00861	0.025 – 1.000 mg/l Zn	PAR
74	Zinc Cell Test	1.14566	0.20 – 5.00 mg/l Zn	PAR
41	Zinc Test [1]	1.14832	0.05 – 2.50 mg/l Zn	Cl-PAN

[1] turbidity correction possible
[2] the analytical procedure for this method is given in the manual of the "Brewery Methods Prove"
[3] individual calibration necessary
[4] **Only when selecting the method manually:**
For batches with a minimum shelf life **till** 2021/10/31: select method number **230**.
For batches with a minimum shelf life **after** 2021/10/31: select method number **236**.

Pre-programmed AQA1 and PipeCheck methods

AQA1

Method number	Name	Cat. No.	Method	Content
9002	Certipur® UV-VIS Standard 1	1.08160.0001	Photometric accuracy	Potassium dichromate solution
9003	Certipur® UV-VIS Standard 1a	1.04660.0001	Photometric accuracy	Potassium dichromate solution
9005	Certipur® UV-VIS Standard 2	1.08161.0001	Stray light	Sodium nitrite solution
9004	Certipur® UV-VIS Standard 6	1.08166.0001	Wavelength accuracy	Holmium oxide solution
9001	Spectroquant® PhotoCheck	1.14693.0001	Photometric accuracy	Color solutions

PipeCheck

Method number	Name	Cat. No.	Pipette volume	Content
9012	Spectroquant® PipeCheck	1.14692.0001	2.0 ml	Check and reference solution
9013	Spectroquant® PipeCheck	1.14692.0001	3.0 ml	Check and reference solution
9014	Spectroquant® PipeCheck	1.14692.0001	5.0 ml	Check and reference solution
9015	Spectroquant® PipeCheck	1.14692.0001	10.0 ml	Check and reference solution