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EZ1008 Colour Analyser

Method and reagent sheets

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1. Legal information

Manufacturer: AppliTek NV/SA

Distributor: Hach Lange GmbH

The translation of the manual is approved by the manufacturer.

2. Analytical specifications

Please refer also to the respective technical datasheet at Hach Support Online.

Colour - All specifications			
Analysis method	Colorimetric measurement at 450 nm		
Parameter	Colour (Platinum-Cobalt scale)		
Unit	PCU (mg of Pt/Co Colour/L)		
Cycle time	Standard measurement cycle time: 10 minutes		
Limit of detection (LOD)	≤ 1 Pt-Co		
Precision/Repeatability	Readings on colour standard solution 10% and 25% of standard range: readings within 3 PCU of expected values. Readings on colour standard solution 50% of standard range and standard range: readings within 5% of the expected values.		
Cleaning	Automatic; frequency freely programmable		
Calibration	Automatic, 1-point; frequency freely programmable		
Validation	Automatic; frequency freely programmable		
Interferences	Large amounts of turbidity interfere. Fats, oil, proteins, surfactants and tar.		
Measuring ranges	% of range - Dilution		Low range (PCU)
			High range (PCU)
	A	10% of standard range	0.5
	B	25% of standard range	1
	C	50% of standard range	2.5
	0	standard range	5
			500

3. Analysis method

Summary

Colour may be expressed as “apparent” or “true” colour. The apparent colour is the colour produced by dissolved substances and by suspended matter in the water where the turbidity has not been removed. The term true colour refers to the colour of water from which turbidity has been removed by filtration through a 0.45 µm filter.

The analyser uses the platinum-cobalt method for the measurement of true colour of potable water and of water in which colour is due to naturally occurring materials. If the measurement of apparent colour is desired, it can be determined by measuring the unfiltered sample. The same procedure is used for both types of colour.

The analyser uses the platinum-cobalt method for the measurement of true colour of water. The unit for colour is that produced by 1 mg/L of platinum in the form of chloroplatinate ion in the presence of 2 mg/L of cobalt (II) chloride hexahydrate. The colour measurement is expressed in PCU or mg of Pt/Co Colour/L.

Analysis steps

The analysis vessel is cleaned and filled with fresh sample. After stabilization, the color of the sample is measured at 450 nm. The determination of color of the water sample is based on a comparison of the sample to standard solutions with a known color concentration.

Calibration

The calibration procedure measures a REF2 Pt-Co solution (channel 10, REF2 valve) to adapt the slope factor by means of a one point calibration.

The reference or blank value needs to be measured on a regular base (once a day) in order to correct for any contamination of the glassware and for the aging of the LED. This reference value is determined as a constant value that is used in the calculation of the colour value.

The blank measurement (ABS1) is performed automatically on a REF1 or 0 PCU Pt-Co standard solution (channel 9, REF1 valve) in order to adapt the constant ABS1 factor.

The calibration is performed in the MAIN method.

Remark

The methods cannot be started at the same time.

4. Reagents

⚠ CAUTION	
	Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Read the safety data sheet from the supplier before bottles are filled or reagents are prepared. For laboratory use only. Make the hazard information known in accordance with the local regulations of the user.

⚠ CAUTION	
	Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

4.1 Reagent overview and consumption

In the tables below, the products that are needed to prepare the reagents are listed. The product name, the formula, the molecular weight, the CAS No. and the amount needed to prepare 1 litre of the reagents is given. Check the consumption of the reagents (28 days) to adapt the volumes needed.

Product	Consumption	Consumption/28 days A rata 1 analysis/ 10 min	Recommended containers
REF1 solution	~ 0.5 L / calibration	/	Plastic – 1 L
REF2 solution	~ 0.5 L / calibration	/	Plastic – 1 L

4.2 DI-water overview and consumption

	Rinse water (mL/analysis) Type I	Dilution water (mL/analysis) Type I	Total (mL/analysis)	Consumption/28 days A rata 1 analysis / 10 min
A	N.A.	N.A.	N.A.	N.A.
B	N.A.	N.A.	N.A.	N.A.
C	N.A.	N.A.	N.A.	N.A.
0	N.A.	N.A.	N.A.	N.A.

Remark

The indicated volumes are an estimation of the consumption for rinse and dilution water, based on a standard operating procedure, as defined in the specifications of the EZ analyser. Please be aware that, depending on the sample matrix, the rinse water volumes might increase.

4.3 Storage and quality of chemicals

Quality of chemicals

All chemicals should be of Reagent grade, ACS grade or better (*). The use of pro analysis chemicals is recommended. Poor quality of the reagents can affect the analyser performance.

(*) Analytical Reagent (AR), Guaranteed Reagent (GR), UNIVAR, AnalaR, Premium Reagent (PR), ReagentCertified ACS reagent, ACS Plus reagent, puriss p.a. ACS reagent, ReagentPlus®, TraceCERT®, Suprapur®, Ultrapur®, or better are also possible

Quality of DI-water

All EZ analysers are tested with standard solutions, reagents and dilution water prepared using type I water or better as defined by ASTM D1193-91.

To achieve the specifications as stated on the data sheet, method and reagents sheet and acceptance test reports, the same water quality (or better) must be used for the preparation of the standard solutions, reagents and dilution water.

Additionally the water used for the preparation of the standard solutions for an EZ analyser must be free of the parameter or any of the interferences for the method of that EZ analyser.

Storage of Reagents

While operating the instrument, keep in mind the reagent requirements as stated in the reagent overview, the chapters below and/or in the data sheet of the instrument.

⚠ CAUTION	
	For longer-term storage: Store the reagents cold; Store the reagents in the dark; If applicable: Store the reagents in a fridge during operation

⚠ CAUTION	
	Refresh the reagents after one month (unless stated differently in the chapters below). Do not mix old reagents with freshly prepared reagents. Remove old reagents from the container before adding freshly prepared reagents.

4.4 Calibration solution

Products	Formula	MW (g/mol)	CAS No.	1 litre solution
Potassium chloroplatinate	K_2PtCl_6	485.99	16921-30-5	1.246 g
Cobaltous chloride	$CoCl_2 \cdot 6H_2O$	237.93	7791-13-1	1.00 g
Hydrochloric acid 37%	HCl	36.46	7647-01-0	100 ml

Preparation

500 PCU stock solution

Prepare a stock solution of 500 PCU: Dissolve accurately 1.246 g potassium chloroplatinate (K_2PtCl_6) and 1.00 g crystallized cobaltous chloride ($CoCl_2 \cdot 6H_2O$) in 300 ml de-ionized water using a volumetric flask of 1000 ml. Add carefully 100 ml concentrated hydrochloric acid (HCl, 37%). Mix and fill up to 1 litre with de-ionized water.

PCU standard solution – REF2

Prepare a standard solution for calibration according to the following table: take accurately x ml of the 500 PCU stock solution and transfer into a plastic volumetric flask of 1 litre. Add de-ionized water up to the mark grade.

	Measuring range	Concentration REF1	Amount of stock solution to add to 1 litre
A	50 PCU	50 PCU	100 mL
B	125 PCU	125 PCU	125 mL
C	250 PCU	250 PCU	500 mL
0	500 PCU	500 PCU	1000 mL

PCU standard solution – REF1

Prepare a standard solution of 0 PCU. Use de-ionized water.

4.5 Cleaning solution (facultative)

The cleaning procedure should prevent any build-up of chemicals in the analyser. To obtain an effective cleaning procedure one has to test the cleaning solution and the cleaning interval for each application. Perform the selected cleaning solution and interval for a trial period, check then the effectiveness of the procedure and change if necessary.

Products	Formula	MW (g/mol)	CAS No.	1 litre solution
Nitric acid 65%	HNO_3	63.01	7697-37-2	4 mL

Preparation

Dissolve approximately 4 mL concentrated Nitric acid (HNO_3 , 65%) in degassed de-ionized water by carefully adding the acid solution to the de-ionized water. Allow the solution to cool and fill up to 1 litre with de-ionized water.

Change Information	
Date: 17/09/2021	Previous version: Edition 5 to Edition 1.01
Reason for Change	
- Addition of water consumption - Addition of information reagents	
Description of Change	
- Addition of estimated consumption of water for rinse and dilution (chapter 4.2) - Addition of extra information regarding storage and quality of reagents (chapter 4.3)	