

Standard range: 5 to 500 Pt-Co

Method
EZ1008sc

Scope and application: For industrial and municipal water.



Test preparation

Before starting

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment. Dispose of chemicals and wastes in accordance with local, regional and national regulations.
Review the Safety Data Sheets (MSDS/SDS) before the bottles are filled or the reagents are prepared.
All chemicals must be of reagent grade, ACS grade or better ¹ . The use of pro-analysis chemicals is recommended. Use of reagents that are not of sufficient quality can have a negative effect on the analyzer performance.
All EZ analyzers are put through long tests with standard solutions, reagents and dilution water prepared with Type I water or better water as specified in ASTM D1193-91.
To get the specifications shown on the data sheet, method and reagents sheet and acceptance test reports, the same water quality (or better) must be used to prepare the standard solutions, reagents and dilution water.
In addition, prepare the standard solutions for an EZ analyzer with water that does not contain the parameter to be measured or interferences for the method.
When operating the device, always make sure to follow the reagent recommendations given in Reagent consumption on page 2.
For longer-term storage, keep the reagents in a cold and dark place. Do not keep reagents longer than recommended. If applicable, keep the reagents in a refrigerator during measurements. Refer to Reagent consumption on page 2 for the reagent temperature.
The manufacturer recommends to replace the reagents, stock and standard solution at 28-day intervals unless specified differently in the sections that follow. Do not mix used reagents with freshly prepared reagents. If reagents, standards or DI water in the containers are replaced, discard all of the container contents in accordance with local, regional and national regulations. Rinse out all of the containers and then fill each container with freshly prepared new reagent.

Specifications

Specifications are subject to change without notice.

Specification	Details
Analysis method	Colorimetric measurement
Measurement wavelength	450 nm
Parameter	Long description: Color Short description (default): PCU Options: None
Unit	Pt-Co (default); PCU
Precision	The precision value is found on the full-scale range for standard test solutions. Refer to Table 1 .
Cleaning	Automatic or manual; frequency is freely programmable

¹ 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.

Specification	Details
Calibration	Automatic or manual; 2-point, offset or slope; frequency is freely programmable. Refer to Table 3 on page 2.
Validation	Automatic or manual; frequency is freely programmable
Interferences	Large quantities of color and turbidity interfere. Fats, oil, proteins, surfactants and tar interfere.

Table 1 Measuring ranges

Range code	Description	LOD (Pt-Co)	Range (Pt-Co)	Precision (%)	Cycle time (minutes)	
					Continuous	Default
A	10% of standard range	1	50	3	4	10
B	25% of standard range	1	125	2	4	10
C	50% of standard range	2.5	250	2	4	10
0	Standard range	5	500	2	4	10

Summary of method

Summary

The analyzer uses the platinum-cobalt method for the measurement of the apparent color of potable water and of water in which color is due to naturally occurring materials. The term apparent color refers to the measurement of the unfiltered sample.

The unit for color is defined 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 color measurement is expressed as Pt-Co Color/L. The absorbance is measured at a wavelength of 450 nm.

Analysis steps

The analysis vessel is rinsed and filled with new sample. After stabilization, the color of the sample is measured at 450 nm.

The color of the water sample is determined by comparison of the sample absorbance to the absorbance of Pt-Co standard solutions with a known color value.

Calibration

The calibration procedure measures the REF1 solution (Channel 9, REF1 valve) and the REF2 solution (Channel 10, REF2 valve).

Validation

The validation procedure measures the REF2 solution (Channel 10, REF2 valve).

Reagent consumption

[Table 2](#) and [Table 3](#) show the consumption rate of the calibration standards. Examine the consumption of the reagents after 28 days to adjust the quantities prepared. Refer to [Necessary reagents](#) on page 3 to collect the necessary items to prepare the reagents.

Table 2 Calibration standards

Product information		Consumption	Recommendation	
Label	Product	Per calibration	Use life	Containers
REF1	REF1 standard	~ 0.2 L	28 days	Plastic, 1 L (align with recommendation)
REF2	REF2 standard	~ 0.2 L	28 days	Plastic, 1 L (align with recommendation)

Table 3 Calibration recommendations

Calibration	Time (minutes)	Recommended frequency	Solutions
Offset (recommended)	12	Daily	REF1
2-point	24	Optional	REF1 and REF2

DI water consumption

All range codes are configured as default without the use of rinse and dilution water. Refer to [Table 2](#) on page 2 for the DI water consumption due to calibration.

Rinse water

If the analyzer does a dilution, a deionized water rinse must be used. If no dilution is done, use the sample to rinse. If there is a filter panel in front of the analyzer, make sure that the rinse water also flows through the filter.

Necessary reagents

The full list of reagents is shown in [Table 4](#). The product name, formula, molecular weight, CAS number and the necessary quantity to prepare 1 L of the reagents are given.

Table 4 Reagent list

Solutions	Products	Formula	MW (g/mol)	CAS number	For each 1 L solution
Stock solution	Potassium hexachloroplatinate	K_2PtCl_6	485.99	16921-30-5	1.246 g
	Cobalt (II) chloride hexahydrate	$CoCl_2 \cdot 6H_2O$	237.93	7791-13-1	1.00 g
	Hydrochloric acid 37%	HCl	36.46	7647-01-0	100 mL
REF1 calibration standard	Deionized water (Type I or better)	—	—	—	—
REF2 calibration standard	500 PCU stock solution	—	—	—	Refer to Table 5 on page 4.
Validation standard (optional)	REF2 calibration standard	—	—	—	Refer to Validation standard on page 4.
Cleaning solution (optional)	Hydrochloric acid (36%)	HCl	36.46	7647-01-0	41.5 mL

Reagent preparation

Prepare the reagents as follows. Refer to [Table 4](#) on page 3 to collect the applicable items. To calculate the correct reagent quantity, refer to [Reagent consumption](#) on page 2. Make sure to discard the remaining solution from the analyzer bottles before new reagents are added.

Calibration standards

Calibrations are completed with two standards: a REF1 calibration standard and a REF2 calibration standard. The REF2 calibration standard is a dilution of a stock solution.

Stock solution

Prepare a 500 PCU stock solution as follows. Refer to [Necessary reagents](#) on page 3 to collect the applicable items.

1. Add 500 mL of deionized water to a beaker.
2. Add the items that follow:
 - 1.246 g potassium hexachloroplatinate (K_2PtCl_6)
 - 1.00 g cobalt (II) chloride hexahydrate ($CoCl_2 \cdot 6H_2O$)
3. Mix until fully dissolved.
4. Pour the solution into a 1000-mL volumetric flask.
5. Slowly mix in 100 mL of concentrated hydrochloric acid (HCl, 36%).
6. Add deionized water to the mark.
7. Fully mix the solution.

REF1 calibration standard

Use deionized water for the REF1 calibration standard.

REF2 calibration standard

Dilute the stock solution to prepare the REF2 calibration standard.

1. Use a pipet to add the applicable quantity (mL) of the stock solution into a 1000-mL volumetric flask. Refer to [Table 5](#).
2. Add deionized water to the mark.
3. Fully mix the solution.

Table 5 Calibration standard preparation

Range code	Concentration REF2 (PCU)	Quantity (mL) of stock solution
A	50	100
B	125	250
C	250	500
0	500	1000

Validation standard

By default, the automatic validation procedure is not enabled. When enabled, the default validation standard is the REF2 calibration standard. For best results, do not use the same solution that was used for calibration. Use a different standard solution from a different source for the validation standard. The concentration of the validation standard must be within the measuring range of the analyzer.

Before validation, connect the REF2 sample line to the validation standard. After validation, connect the REF2 sample line to the REF2 calibration standard again. For multi-channel setups, a different channel can be used.

Cleaning solution

By default, the automatic cleaning procedure is not enabled. When enabled, the default volume of cleaning solution that is used during each cleaning cycle is 30 mL.

The cleaning procedure must prevent the collection of chemicals in the analyzer. For an accurate cleaning procedure, examine the cleaning solution and the cleaning interval for each application. Make sure that the cleaning procedure is sufficient. Change the cleaning procedure if necessary.

The manufacturer recommends to use a 0.5 M hydrochloric acid (HCl) solution. Refer to [Necessary reagents](#) on page 3. Prepare the solution as given in the steps that follow or use a commercially available solution.

1. Add 500 mL of deionized water to a beaker.
2. Slowly mix in 41.5 mL of concentrated hydrochloric acid (HCl, 36%).
3. Pour the solution into a 1000-mL volumetric flask.
4. Add deionized water to the mark.
5. Fully mix the solution.



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