DOC313.53.94328

EZ7900 Toxicity

Method and reagent sheets

01/2023, Edition 1.01

Table of Contents

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.

Toxicity - All specifications				
Analysis method	Respirometry			
Parameter	Toxicity; respiration rate			
Cycle time	Standard measurement cycle time: 30 minutes			
Limit of detection (LOD)	0%			
Precision/Repeatability	Better than 5% full scale range for standard test solutions			
Cleaning	Automatic; frequency freely programmable			
Calibration	Automatic; frequency freely programmable			
Validation	Manual; by means of a standard solution			
Interferences	N.A.			
Measuring range	**% of range - Dilution**		**Low range (%)**	**High range (%)**
	0	Toxicity	0	100

3. Analysis method

Summary

The measuring principle for the on-line determination of toxicity is based on respirometry. Activated sludge of the treatment plant is mixed inside the analyzer with an excess of substrate in order to have the maximum respiration rate. Aeration is stopped and after a first respiration measurement (= reference) aeration restarts and an amount of sample is added. Then a second respiration measurement is done. The ratio between the first and second respiration rate is a measurement for the toxicity of the influent.

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 liter 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/30 min	Recommended containers
Nutrient	~ 2.5 mL	< 5 L	Plastic – 5 L

4.2 DI-water overview and consumption

	Rinse water (mL/analysis)	Dilution water (mL/analysis)	Total (mL/analysis)	Consumption/28 days A rata 1 analysis / 15 min
0	N.A. (Tap water for rinsing)	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 Nutrient solution

Products	Formula	MW (g/mol)	CAS No.	1 litre solution
Sodium acetate	$C_2H_3NaO_2$	82.03	127-09-3	20 g
Sodium formate	$CHNaO_2$	68.01	141-53-7	20 g
Sodium propionate	$C_3H_5NaO_2$	96.06	137-40-6	20 g
Ammonium chloride	NH_4Cl	53.49	12125-02-9	7.64 g

Preparation

Dissolve 20 g of sodium acetate ($C_2H_3NaO_2$), 20 g of sodium formate ($CHNaO_2$), 20 g of sodium propionate ($C_3H_5NaO_2$) and 7.64 g of ammonium chloride (NH_4Cl) in 900 mL of de-ionized water using a volumetric flask of 1000 mL. Dissolve completely and dilute to 1 litre with de-ionized water.

The various nutrient components could be used to get an optimal (maximum) respiration rate of the activated sludge.

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.

Change Information	
Date: 25/01/2023	Previous version: Edition 1 to Edition 1.01

Reason for Change

- Addition of water consumption
- Addition of information reagents
- Addition of cleaning solution

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)
- Addition of cleaning solution (chapter 4.5)