

EN

# pH (colorimetric)

REF 984349

3 x 20 ml Reagent 1

## INTENDED USE

Reagent for photometric determination of pH (colorimetric) in homogenous liquid samples using automated Thermo Scientific Arena or Gallery analyzer.

## METHOD

Colorimetric test with pH indicator dyes in an aqueous solution. Method is performed at 37 °C, using 575 nm filter and 700 nm as side wavelength.

## PRINCIPLE OF THE PROCEDURE

pH (colorimetric) method is based on the property of acid-base indicator dyes, which produce color depending on the pH of the sample. The color change can be measured as an absorbance change spectrophotometrically.

## REAGENT INFORMATION

Reagent 1 (R1)	Barcode ID
3 x 20 ml	A13

**Note:** Labels of reagent vials have two barcodes. For Arena analyzers, turn the short barcode to the barcode reader. For Gallery analyzers, turn the long barcode to the barcode reader.

## Concentrations

Sodium Chloride 0.25-0.35 %  
Dyes

## Precautions

The reagent may contain sodium azide (< 0.1 %) as preservative. Do not swallow. Avoid contact with skin and mucous membranes. Take the necessary precautions for the use of laboratory reagents.

## Preparation

The reagent is ready-to-use.

**Note:** Check that there are no bubbles on the surface of the reagent when you insert vials into the analyzer.

## Storage and Stability

Reagents in unopened vials are stable at 2...8 °C until the expiry date printed on the label. Do not freeze the reagents or expose to light. Refer to the Application Notes of your analyzer for the on board stability of reagents.

## SAMPLES

### Sample Type

This method is primarily intended for beer and wort samples. All other samples types needs to be validated by the user.

### Sample concentration and Arena/Gallery application

All method related details are in the separate application note.

Note that automatic sample or calibrator predilution feature cannot be used for pH test.

### Sample preparation

Beer samples can be used directly.

Following sample preparation procedures can be considered:

- Use clear and colorless liquid samples directly.
- Filter or centrifuge turbid solutions. Crush or homogenize solid or semi-solid samples. Weigh sufficient quantity of sample in a volumetric flask (take care of the measuring range), extract with water and filtrate or centrifuge.
- Weigh sufficient quantity of fat containing samples into a volumetric flask (take care of the measuring range), extract with hot water. Cool to allow the fat to separate, make up the mark, place the volumetric flask in an ice bath for 15 min. and filter.

## TEST PROCEDURE

See a separate application for the Arena or Gallery analyzer.

### Materials required but not provided

Distilled water (aseptic and free of heavy metals) and general laboratory equipment.

Calibrators (pH 3, 4, 5, 6).

pH 4 Std for QC, Thermo Fisher Scientific Cat no 984331

pH 7 Std for QC, Thermo Fisher Scientific Cat no 984332

### Calibration

This method has been developed using 4 separate calibration points. Calibrators used were:

Fixanal pH 3, Fixanal pH 4, Fixanal pH 5 and Fixanal pH 6 from Sigma-Aldrich.

**Note:** Samples measured with manual pH meter can also be used as calibrators. In this case the calibration must be performed with same matrix type and with several points covering the whole measuring range. This calibration type must be validated by the user.

### Quality Control

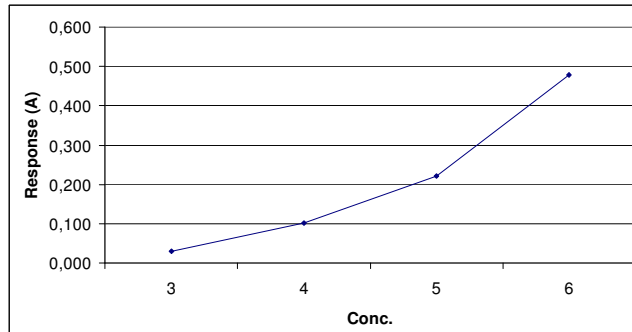
Use quality control samples at least once a day and after each calibration and every time a new bottle of reagent is used. It is recommended to use two level of controls. The control intervals and limits must be adapted to the individual laboratory requirements. The results of the quality control sample(s) should fall within the limits pre-set by the laboratory.

For Quality control, pH 4 Std from Thermo Fisher Scientific (Code 984331) and pH 7 Std (Cat no 984332) can be used.

## CALCULATION OF RESULTS

The results are calculated automatically by the analyzer using a calibration curve.

### Calibration Curve (example)



Note that the calibration curve is lot dependent.

Calibrator	Response (A)	Calc. conc.
pH 3	0.030	3.00
pH 4	0.102	4.00
pH 5	0.222	5.00
pH 6	0.478	6.00

## LIMITATIONS OF THE PROCEDURE

### Interference

The determination is specific for beer and wort pH in pH range 3-7.20. Strong sample color may interfere the measurement. Some additives, e.g. flavours may interfere the measurement.

### MEASURING RANGE

The test has been developed to determine pH within a measuring range from 3.00 to 7.20.

**PERFORMANCE CHARACTERISTICS**

The results obtained in individual laboratories may differ from the performance data given.

**Precision****Gallery analyzer**

	Mean 4.12 Lager beer		Mean 4.22 Home brew beer		Mean 4.59 Dark beer	
	SD	CV %	SD	CV %	SD	CV %
Within run	0.002	0.05	0.002	0.05	0.007	0.15
Between run	0.006	0.14	0.017	0.41	0.005	0.11
Total	0.006	0.15	0.017	0.41	0.009	0.19

A precision study was performed using Gallery, with the number of measurements being n = 20.

**Accuracy / Method comparison**

Method comparison was performed between the pH (Colorimetric) system kit and the manual pH meter. The pH values of nineteen randomly selected beer samples were measured.

Sample	pH System kit value	Manual pH meter value	Recovery rate (%)
Beer 1	4.26	4.24	101
Beer 2	4.18	4.22	99
Beer 3	4.20	4.22	100
Beer 4	4.12	4.14	100
Beer 5	4.15	4.21	99
Beer 6	4.23	4.36	97
Beer 7	4.34	4.38	99
Beer 8	4.26	4.36	98
Beer 9	4.97	4.71	106
Beer 10	4.17	4.24	98
Beer 11	4.20	4.35	97
Beer 12	4.14	4.18	99
Beer 13	4.57	4.54	101
Beer 14*	3.72*	3.28*	113*
Beer 15	4.36	4.48	97
Beer 16	4.20	4.32	97
Beer 17	4.34	4.24	102
Beer 18	4.25	4.48	95
Beer 19	4.30	4.49	96

\*Cherry flavoured beer. Additives, e.g. flavours may interfere the measurement.

**OTHER REMARKS**

Note that the application performance has been verified with pure chemicals dissolved in deionized water or native sample has been used. With native samples pH value is correlated to a manual pH (Orion) pH meter.

The results obtained in individual laboratories may differ from the given performance data due to, e.g. sample matrix or analysis environment. Each laboratory is responsible to verify the method to prove the analysis performance.

**WASTE MANAGEMENT**

Please refer to local legal requirements. It is recommended to empty the analyzer cuvette waste bin and waste water daily. Emptying should be done immediately after the analysis when using hazardous reagents/solutions.

**Note:** If using reagents/solutions that react with each other, cuvette waste bin and waste water should be emptied and washed between use of these reagents.

**BIBLIOGRAPHY**

- Faulkner WR and King JW, Renal Function. In Tietz NW, Ed. Fundamentals of Clinical Chemistry, 2nd Edition, Philadelphia, 1976, WB Saunders Co, pp 975-1014.

**ADDITIONAL MATERIAL**

Certificate of analysis, SDS, and Applications for Gallery and Arena automated analyzers are available upon request from the local sales representative. Information in the Application note can change without prior notice.

**MANUFACTURER**

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2012-06-21

**Changes from previous version**

Measuring wavelength changed to 575 nm. Sample types, calibration and interference sections updated.