TI01787C/07/EN/01.24-00
71720508
2025-08-18

Technical Information
CPY20

High-precision pH buffer solutions for all industries in two quality grades

Application

Buffer solutions are used in every industry for the calibration and adjustment of pH sensors. They are optimized both for all routine and high-precision sensor adjustments in the process and in the laboratory.

The high level of accuracy and reproducibility of the buffers help to optimize the pH value of the process, thus increasing product quality and yield.

The following are suitable for calibration and adjustment:
- All of the transmitters in the Liquiline series
- Memobase Pro software
- All conventional pH transmitters on the market

Your benefits

- pH values pH 4, pH 7 and pH 10 are available as certified reference buffer solutions. They are manufactured and filled in an accredited production area, characterized in an accredited calibration laboratory and additionally tested for homogeneity and stability.
- The certified reference pH buffer solutions are metrologically traceable to the primary standard of the PTB ('Physikalisch-Technischen Bundesanstalt', Germany's national metrology institute).
- Technical pH buffer solutions with a factory calibration certificate are available for pH values 2, 4, 7, 9, 9.2, 10 and 12.
- All Liquiline series transmitters have preprogrammed temperature curves stored in their memory for easy sensor calibration and adjustment, and reduced maintenance.

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

pH measurement
The pH value is used as a unit of measurement for the acidity or alkalinity of a medium. The membrane glass of the sensor supplies an electrochemical potential depending on the pH value of the medium. This potential is generated by the selective accumulation of H^+ ions on the outer layer of the membrane. As a result, an electrochemical boundary layer with an electrical potential difference forms at this point. An integrated Ag/AgCl reference system serves as the required reference electrode.
The measured voltage is converted to the corresponding pH value using the Nernst equation.

Metrological traceability for certified reference pH buffer solutions

Metrological traceability involves verifying an unbroken chain of calibrations with known measurement uncertainties. This ensures that measurements are comparable and reliable as they can be traced back to a common basis, i.e. the three primary standards of the national metrology institutes.

Uncertainty according to GUM

GUM stands for "Guide to the Expression of Uncertainty in Measurement", an internationally recognized guide on the uncertainty of measurement. It is a standardized process that is used to assess and quantify the uncertainty of measurement results. The GUM guide provides a structured method to determine and combine measurement uncertainties from various sources.

The uncertainty of the characterization of pH buffers according to GUM is also determined for technical pH buffer solutions.

Performance characteristics

Availability

Certified reference material

Container/pH	4	7	10
20 x 18 ml (0.6 fl oz)	-	-	-
250 ml (8.5 fl oz)	✔	✔	✔
1 000 ml (33.8 fl oz)	✔	✔	✔
5 000 ml (169 fl oz)	✔	✔	✔
25 l (6.6 gal)	✔	✔	-

Technical buffer solution

Container/pH	2	4	7	9	9.22	10	12
20 x 18 ml (0.6 fl oz)	-	✔ 1)	✔ 1)	-	-	-	-
250 ml (8.5 fl oz)	✔	✔	✔	✔	✔	✔	✔
1 000 ml (33.8 fl oz)	✔	✔	✔	✔	✔	✔	✔
5 000 ml (169 fl oz)	✔	✔	✔	✔	✔	✔	✔
25 l (6.6 gal)	-	✔	✔	-	-	-	-

1) Delivery without factory calibration certificate

Measured error

Certified reference pH buffer solution
Uncertainty with metrological traceability:
- For pH 4 and pH 7 ≤ 0.03 pH units
- For pH 10 ≤ 0.08 pH units

Technical pH buffer solution
Measurement uncertainty in characterization (without metrological traceability):
- For pH < 10: 0.02 pH units
- For pH ≥ 10: 0.05 pH units

Shelf life

Damaged containers are not durable.

The certified value is guaranteed for 12 months from the date of issue of the certificate up to a maximum of the first opening.

Environment

Transport conditions

- ▶ Ensure the product is free from frost during transport.
- ▶ Do not exceed a temperature of 40 °C (104 °F) over a period of 24 hours.
- ▶ Do not exceed a temperature of 70 °C (158 °F).

Ambient temperature range

> 25 °C (77 °F) 24 hours max., do not exceed 70 °C (158 °F)

< 15 °C (59 °F) 24 hours max., do not exceed 5 °C (41 °F)

Storage temperature

Store the pH buffer solution at 15 to 25 °C (59 to 77 °F) and in a dark place.

Process

Temperature compensation

As with all electrolytes, the pH value of the calibration solution is temperature-dependent. Thermostatization of the calibration to the reference temperature T_0 = 25 °C (77 °F) is therefore recommended. If thermostatization is not possible or practical, the pH temperature dependency between 0 to 80 °C (32 to 176 °F) can be compensated for each pH buffer type using the tables below.

	CPY20-A	CPY20-C	CPY20-E	CPY20-G	CPY20-I	CPY20-K	CPY20-M
Temperature	pH	pH	pH	pH	pH	pH	pH
0 °C (32 °F)	1.99	4.05	7.13	9.24	9.46	10.24	12.58
5 °C (41 °F)	1.99	4.04	7.07	9.17	9.40	10.16	12.42
10 °C (50 °F)	1.99	4.02	7.05	9.11	9.33	10.10	12.26
15 °C (59 °F)	1.99	4.01	7.02	9.05	9.28	10.05	12.13
20 °C (68 °F)	2.00	4.00	7.00	9.00	9.22	10.00	12.00
25 °C (77 °F)	2.00	4.01	6.98	8.96	9.18	9.95	11.87
30 °C (86 °F)	2.00	4.01	6.98	8.93	9.14	9.90	11.75
40 °C (104 °F)	2.00	4.01	6.95	8.86	9.07	9.82	11.53
50 °C (122 °F)	2.00	4.00	6.95	8.80	9.01	9.75	11.31
60 °C (140 °F)	2.00	4.00	6.96	8.75	8.96	9.68	11.09
70 °C (158 °F)	2.00	4.00	6.96	8.71	8.92	9.62	10.88
80 °C (176 °F)	2.00	4.00	6.97	8.67	8.89	9.55	10.68

Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

Ordering information

Scope of delivery	The scope of delivery comprises: ▪ Buffer solution in the version and quantity ordered ▪ Safety data sheet, can be downloaded at: www.endress.com/cpy20
Product page	www.endress.com/cpy20
Product Configurator	1. **Configure**: Click this button on the product page. 2. Select **Extended selection**. ↳ The Configurator opens in a separate window. 3. Configure according to your requirements, select the desired option for each feature. ↳ In this way, you receive a valid and complete order code for the device. 4. **Add to cart**: Add the configured product to the shopping cart.