ELECTROCHEMISTRY> pH
Logbook for pH Electrode Calibration & Maintenance

Meter

Brand	
Type	
Serial no.	
Software version	

Electrode

Brand	
Type	
Serial no.	
Date of 1st usage	

pH Buffer for calibration

Set A	pH value	Lot	Expiration date	Opened 1st time
pH buffer 1				
pH buffer 2				
pH buffer 3				

Set B	pH value	Lot	Expiration date	Opened 1st time
pH buffer 1				
pH buffer 2				
pH buffer 3				

Calibration

#	Date	pH Buffer Set	Slope [mV/pH]	Slope [%]	Intercept [mV]	Offset [mV]	Stabilisation time pH 7 [sec]	Accepted yes/no	Operator
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Cleaning + Maintenance

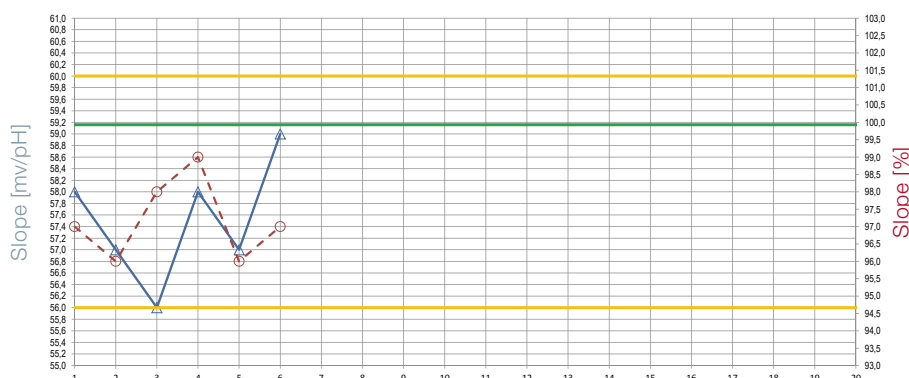| #	Date	Cleaned	Refilled
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

pH Logbook: How to enter your data

Meter

Brand	Hach
Type	HQ440D
Serial no.	123456789
Software version	1.1

Elektrode

Brand	Hach
Type	PHC444
Serial no.	24681012
Date of 1st usage	10.04.2014

pH Buffer for Calibration

Set A	pH value	Lot	Expiration date	Opened 1st time
pH buffer 1	4.01	CO123	Jun 2015	03.07.2014
pH buffer 2	7.00	CO234	May 2015	03.07.2014
pH buffer 3	10.01	CO345	Dec 2015	22.07.2014
Set B	**pH value**	**Lot**	**Expiration date**	**Opened 1st time**
pH buffer 1				
pH buffer 2				
pH buffer 3				

Cleaning + Maintenance / Calibration

#	Date	Cleaned	Refilled	pH Buffer Set	Slope [mV/pH]	Slope [%]	Intercept [mV]	Offset [mV]	Stabilisation time pH 7 [sec]	Accepted yes/no	Operator
1	01.08.2014	Water	No	A	58.00	97.0	414.1	4.0	25	Y	J. Smith
2	04.08.2014	Detergent	No	A	57.00	96.0	412.0	13.0	30	Y	J. Smith
3	05.08.2014	Water	No	A	56.00	98.0	408.0	16.0	16	Y	J. Smith
4	06.08.2014	Detergent	No	A	58.00	99.0	409.0	3.0	28	Y	J. Smith
5	07.08.2014	Water	No	A	57.00	96.0	408.0	9.0	19	Y	J. Smith
6	08.08.2014	Hypochlorite	3 M KCl	A	59.00	97.0	411.0	-2.0	23	Y	J. Smith
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Graph

Slope limits [mv/pH]

Low	56.00
Ideal	59.16
High	60.00

Page no.

Company	
Department	
Laboratory	
Address	

Comments

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What to do and where	Why

Meter and Electrode

Fill in brand, type/model and serial number. Enter the embedded software version of the meter. Finally enter the date of first use of the pH probe.

For traceability reasons, the meter and probe have to be clearly defined. Therefore, serial numbers etc. must be documented. The probe and meter user manuals will normally indicate the serial number.

pH Buffer for Calibration

Two sets of calibration buffers can be defined A and B. Enter the pH value of the buffers as defined on the bottle (column 2), the individual lot number and the expiration date. Finally fill in the date of first opening of the bottle.

Buffers have to be defined for a 2 or 3 point calibration. When support is needed, e.g. in case of problems, the lot number (production number) must be known. In order to better monitor the lifetime of an opened bottle, the date must be entered.

Cleaning and Maintenance

First enter the date of cleaning or refilling of the probe. Enter the cleaning solution used and whether the probe was also refilled. If refilled, then indicate which filling solution was used.

The need for a cleaning step must be captured with date and type of chemical used. This is helpful in case the probe does not work correctly. In addition it is necessary to control the internal electrolyte filling. If the electrolyte must be refiled in short time, this can indicate a damaged probe.

Calibration

pH buffer set: indicate whether buffer set A or B was used.

Enter the slope calculated by the meter under slope [mV/pH] and/or Slope [%]. Intercept is the mV offset-value calculated by the meter. If measured/recorded, enter the time [sec.] needed for stabilisation in this specific buffer. Next you may indicate whether the meter/you accepted the calibration result or not. Finally enter the operator's name.

The pH probe performance is checked by calibration with pH buffers. To trace back any pH result, the calibration data must be stored. After 2 or 3 point calibration the meter displays the resulting slope and offset.

If the calibration is ok, enter those values in the table, complete with stabilisation time and operator name. An increase of stabilisation time may indicate the need for a cleaning procedure.

Graph

The graphic control chart is commonly used to visually indicate the status of the probe. It can be used for sample measurements as well, if the sample pH limits are known and entered into the sheet.

This type of control chart with table and user data shows the complete traceability of the pH measurement done with the defined pH probe on a defined pH meter.

There are specific norms defining control charts and their individual input. Example: ISO 7870-5:2014-01 English

Slope limits (mV/pH) and (%)

For the graphic display below the table, enter the ideal (desired) value, then enter the lower and upper limits, which define the result acceptance area. Highlight these also in the graph.

The limits entered here may originate from norms, regulations or internal operating procedures. These limits and the ideal value are used to indicate the acceptance area in the graphic.

Page no.

Every sheet is created for a period of 20 days. Create a new folder/page as long as you are using the same electrode and meter. Enter the number of the page here.

Put every page sorted by page number into a folder named by year. This allows a quick search in the data.
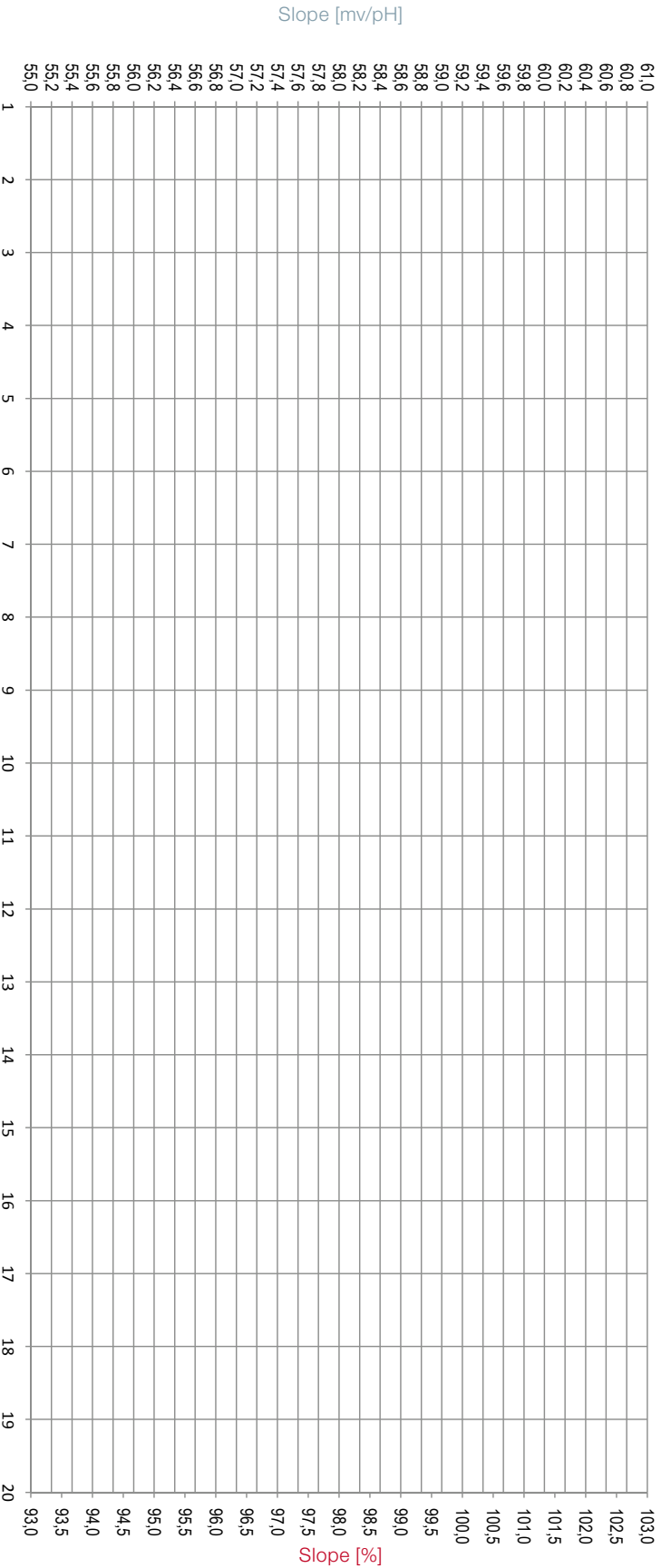
Company data

Enter COMPANY, DEPARTMENT, LABORATORY and ADDRESS to complete the traceability of all the data. In addition a COMMENT may be entered.

In order to clearly document where the measurements were done, note down the complete address of your company and laboratory.

Examples for Cleaning + Maintenance		
a	Water	3 M KCl
b	De-ionised water	3 M KCl saturated with AgCl
c	Mild detergent	3.5 M KCl
d	Hypochlorite	4 M KCl
e	Pepsin in HCl	Saturated KCl
f	Thiourea	K_2SO_4
g	Ethanol	NH_4Cl
h	Acetone	NH_4NO_3
i	Phosphoric acid	LiCl in water
j	Hydrochloric acid	LiCl in ethanol

This table shows examples, how the cleaning and refill solutions can be abbreviated for input in the cleaning / refill columns.

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Company
Department
Laboratory
Address

Comments

Slope [mv/pH]

61.0
60.8
60.6
60.4
60.2
60.0
59.8
59.6
59.4
59.2
59.0
58.8
58.6
58.4
58.2
58.0
57.8
57.6
57.4
57.2
57.0
56.8
56.6
56.4
56.2
56.0
55.8
55.6
55.4
55.2
55.0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

93.0
93.5
94.0
94.5
95.0
95.5
96.0
96.5
97.0
97.5
98.0
98.5
99.0
99.5
100.0
100.5
101.0
101.5
102.0
102.5
103.0

Slope [%]

Slope limits [mv/pH]
Low
Ideal
High

Page no.