

**Amount of substance, pH, Germany, PTB (Physikalisch-Technische Bundesanstalt)**

In the case where an uncertainty range is given, the expanded uncertainty range spans from the smallest numerical value of the uncertainty to the largest numerical value of the uncertainty found within the quantity range.



The expanded uncertainties correspond to  $k = 2$  (level of confidence 95%)

| NMI Service Identifier | Measurement Service Category | Matrix                     | Quantity | Dissemination Range of Measurement Capability |     | Range of Expanded Uncertainties as Disseminated |       |   | Range of Certified Values in Reference Materials |     | Range of Expanded Uncertainties for Certified Value |       |   | Mechanism(s) for Measurement Service Delivery | Comments  |
|------------------------|------------------------------|----------------------------|----------|---|-----|---|-------|---|--|-----|---|-------|---|---|---|
|                        |                              |                            |          | From  | To  | From  | To    | Is the expanded uncertainty a relative one? | From   | To  | From  | To    | Is the expanded uncertainty a relative one? |   |   |
| AC-pH1                 | pH                           | aqueous pH buffer solution | pH       | 1.5   | 4.2 | 0.002   | 0.003 | No  | 1.5  | 1.9 | 0.003   | 0.003 | No  | CRM PTB-OX                                    | Temperature range 5 °C to 50 °C, data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approved on 06 December 2011  |
| AC-pH2                 | pH                           | aqueous pH buffer solution | pH       | 1.5   | 4.2 | 0.002   | 0.003 | No  | 3.4  | 3.8 | 0.003   | 0.003 | No  | CRM PTB-TA                                    | Temperature range 5 °C to 50 °C (sat. tartrate buffer from 25 °C to 50 °C), data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approved on 06 December 2011 |
| AC-pH3                 | pH                           | aqueous pH buffer solution | pH       | 1.5   | 4.2 | 0.002   | 0.003 | No  | 3.8  | 4.2 | 0.003   | 0.003 | No  | CRM PTB-PHT                                   | Temperature range 5 °C to 50 °C, data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approved on 06 December 2011  |

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|------------------------|------------------------------|----------------------------|----------|---|------|---|-------|---|--|-----|---|-------|---|---|--|
|                        |                              |                            |          | From  | To   | From  | To    | Is the expanded uncertainty a relative one? | From   | To  | From  | To    | Is the expanded uncertainty a relative one? |   |  |
| AC-pH4                 | pH                           | aqueous pH buffer solution | pH       | 6.8   | 7.6  | 0.002   | 0.003 | No  | 6.8  | 7.2 | 0.003   | 0.003 | No  | PRM PTB-PHOA                                  | Temperature range 5 °C to 50 °C, data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approved on 06 December 2011 |
| AC-pH5                 | pH                           | aqueous pH buffer solution | pH       | 6.8   | 7.6  | 0.002   | 0.003 | No  | 7.2  | 7.6 | 0.003   | 0.003 | No  | PRM PTB-PHOB                                  | Temperature range 5 °C to 50 °C, data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approve don 06 December 2011 |
| AC-pH6                 | pH                           | aqueous pH buffer solution | pH       | 9   | 10.2 | 0.002   | 0.003 | No  | 9  | 9.4 | 0.003   | 0.003 | No  | PRM PTB-BO                                    | Temperature range 5 °C to 50 °C, data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approved on 06 December 2011 |

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In the case where an uncertainty range is given, the expanded uncertainty range spans from the smallest numerical value of the uncertainty to the largest numerical value of the uncertainty found within the quantity range.



The expanded uncertainties correspond to  $k = 2$  (level of confidence 95%)

| NMI Service Identifier | Measurement Service Category | Matrix                     | Quantity | Dissemination Range of Measurement Capability |      | Range of Expanded Uncertainties as Disseminated |       |   | Range of Certified Values in Reference Materials |      | Range of Expanded Uncertainties for Certified Value |       |   | Mechanism(s) for Measurement Service Delivery | Comments   |
|------------------------|------------------------------|----------------------------|----------|---|------|---|-------|---|--|------|---|-------|---|---|--|
|                        |                              |                            |          | From  | To   | From  | To    | Is the expanded uncertainty a relative one? | From   | To   | From  | To    | Is the expanded uncertainty a relative one? |   |  |
| AC-pH8                 | pH                           | aqueous pH buffer solution | pH       | 9   | 10.2 | 0.003   | 0.004 | No  | 9.8  | 10.2 | 0.004   | 0.004 | No  | PRM PTB-CAR                                   | Temperature range 5 °C to 50 °C, data given for 25 °C. Declared uncertainties do not include the uncertainty contribution due to the Bates-Guggenheim convention<br>Approved on 06 December 2011 |

**Amount of substance, Electrolytic conductivity, Germany, PTB (Physikalisch-Technische Bundesanstalt)**

In the case where an expanded uncertainty ranges is given, the expanded uncertainty range is expressed as the uncertainty of the smallest value of the quantity to the uncertainty of the largest value of the quantity.



The expanded uncertainties correspond to  $k = 2$  (level of confidence 95%)

| NMI Service Identifier | Measurement Service Category | Matrix                           | Quantity                  | Dissemination Range of Measurement Capability |      |      | Range of Expanded Uncertainties as Disseminated |        |      |   | Mechanism(s) for Measurement Service Delivery | Comments  |
|------------------------|------------------------------|----------------------------------|---------------------------|---|------|------|---|--------|------|---|---|---|
|                        |                              |                                  |                           | From  | To   | Unit | From  | To     | Unit | Is the expanded uncertainty a relative one? |   |   |
| ptb-QM-con-1           | Electrolytic conductivity    | aqueous solutions, mixed solvent | Electrolytic conductivity | 0.2   | 1.5  | mS/m | 0.002   | 0.0045 | mS/m | No  | Calibration of reference solutions            | Temperature range: 15 °C to 35 °C. Approved on 28 June 2018 |
| ptb-QM-con-2           | Electrolytic conductivity    | aqueous solutions, mixed solvent | Electrolytic conductivity | 1.5   | 15   | mS/m | 0.0009  | 0.009  | mS/m | No  | Calibration of reference solutions            | Temperature range: 15 °C to 35 °C. Approved on 28 June 2018 |
| ptb-QM-con-3           | Electrolytic conductivity    | aqueous solutions, mixed solvent | Electrolytic conductivity | 15  | 150  | mS/m | 0.0075  | 0.075  | mS/m | No  | Calibration of reference solutions            | Temperature range: 15 °C to 35 °C. Approved on 28 June 2018 |
| ptb-QM-con-4           | Electrolytic conductivity    | aqueous solutions, mixed solvent | Electrolytic conductivity | 0.15  | 1.5  | S/m  | 0.00006   | 0.0006 | S/m  | No  | Calibration of reference solutions            | Temperature range: 15 °C to 35 °C. Approved on 28 June 2018 |
| ptb-QM-con-5           | Electrolytic conductivity    | aqueous solutions, mixed solvent | Electrolytic conductivity | 1.5   | 25   | S/m  | 0.001   | 0.018  | S/m  | No  | Calibration of reference solutions            | Temperature range: 15 °C to 35 °C. Approved on 28 June 2018 |
| ptb-QM-con-6           | Electrolytic conductivity    | aqueous solution                 | Electrolytic conductivity | 5.5   | 5000 | μS/m | 0.028   | 9      | μS/m | No  | Calibration of inline conductivity sensors    | Temperature 25 °C. Approved on 28 June 2018                 |