

Förteckning över ackrediterade metoder vid kemiska analyslaboratoriet

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| <u>Analysvariabler</u> | <u>Metod (referens)</u> | <u>Mätprincip</u> | <u>Mätområde¹</u> | <u>Mätosäkerhet</u> | <u>Haltområde</u> | <u>Provtyp</u> |
|--|---|------------------------------|------------------------------|---------------------|------------------------------|----------------|
| Absorbans, filtrerad Kyvettlängd 5 cm 254 nm 365 nm 420 nm 436 nm | SS-EN ISO 7887-2012, del B mod | Fotometri | | | | 1:1 |
| | | | 0,001-2 abs.enh./5cm | 5 % | | |
| | | | 0,001-2 abs.enh./5cm | 8 % | | |
| | | | 0,005-1 abs.enh./5cm | 10 % | | |
| | | | 0,005-1 abs.enh./5cm | 12 % | | |
| Aciditet <i>Buffertförmåga</i> | St Methods 16 th Ed. 402, Sid. 265-269 | Titrimetri | 0-0,100 mekv/l | 26 % | | 1:1 |
| Alkalinitet slutp.5,6 <i>Buffertförmåga</i> | SS-EN ISO 9963-2, utg.1, mod | Titrimetri | 0-4,0 mekv/l | 0,009 mekv/l 6% | < 0,1 mekv/l ≥ 0,1 mekv/l | 1:1 |
| Alkalinitet 5,4 + 4,5 <i>Buffertförmåga</i> | SS-EN ISO 9963-2, utg.1, mod | Titrimetri | 0,01-4 mekv/l | 7% | | |
| Ammoniumkväve <i>NH₄-N</i> | ISO 15923-1:2013 | Diskret analys, fotometri | 3-1000 µg/l | 4 µg/l 11% | <60 µg/l ≥ 60 µg/l | 1:1 |
| Fluorid <i>F</i> | SS-EN ISO 10304-1:2009 Sid. 265-269 mod. | Jonkromatografi | 0,05-2 mg/l | 0,010 mg/l 10% | < 0,10 mg/l ≥ 0,10 mg/l | 1:1 |
| Fosfatfosfor, <i>PO₄-P</i> | SS-EN ISO 15681-2:2018 mod. QuAAtro met. Q-064-05 Rev. 8 | Flödesanalys, Fotometri | 1-12 µg/l | 1 µg/l | | 1:1 |
| Fosfatfosfor, <i>PO₄-P</i> | ISO 15923-1:2013 | Diskret analys, Fotometri | 4-1000 µg/l | 2 µg/l 6% | < 60 µg/l ≥ 60 µg/l | 1:1 |
| Fosfor, totalt <i>Tot-P/ Total-P</i> | SS-EN ISO 6878:2005, mod Seal, Method No G-175-96 rev.2 för AAIII | Flödesanalys, Fotometri | 1-200 µg/l | 2 µg/l 10 % | < 10µg/l ≥ 10µg/l | 1:1 |
| Färg | SS-EN ISO 7887:2012, del C | Fotometri | 4-250 mg/l | 15% | | 1:1 |

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|---|--|------------------------------|--|--|---|----------------|
| Kemisk syreförbrukning <i>COD_{Mn}</i> | F.d. SS 02 81 18, utg1, mod | Titrimetri | 1-10 mg/l | 12% | | 1:1 |
| Klorid | SS-EN ISO 10 304-1:2009 mod | Jonkromatografi | 0,25-20 mg/l (0,007-0,6 mekv/l) ² | 0,05 mg/l (0,001 mekv/l) 6% | < 1 mg/l < 0,02 mekv/l) ≥ 1 mg/l (≥ 0,02 mekv/l) | 1:1 |
| Klorofyll α | SS 02 81 46, utg 1 mod. | Fotometri | >0,5 µg/l | 16 % (Bias ej tagen hänsyn till i beräkningen) | | 1:1 |
| Konduktivitet <i>Elektrisk ledningsförmåga</i> | SS-EN 27888, utg1 | | 0,1-150 mS/m | 10% 5% | < 10 mS/m ≥ 10 mS/m | 1:1 |
| Kväve, totalt <i>Tot-N/TNb/Total-N</i> | SS EN 12260:2004 | Förbränning | 50-10000 µg/l | 15% | | 1:1 |
| Nitrit- + nitratkväve <i>NO₂-N + NO₃-N/ NO_X</i> | ISO 15923-1:2013 | Diskret analys, Fotometri | 3-2000 µg/l | 4 µg/l 12% | < 50 µg/l ≥ 50 µg/l | 1:1 |
| Nitrit- + nitratkväve <i>NO₂-N + NO₃-N/ NO_X</i> | SS-EN ISO 13395:1997 | Flödesanalys, Fotometri | 1-700 µg/l | 2 µg/l 7% | < 20 mg/l ≥ 20 mg/l | 1:1 |
| Organiskt kol, totalt <i>TOC</i> | SS-EN 1484, utg. 1 Shimadzu Inst.manual | Förbränning | 0,5-100 mg/l | 10% 11% | < 20 mg/l ≥ 20 mg/l | 1:1 |
| pH <i>Vattnets surhet</i> | SS-EN ISO 10523:2012, mod | | 3-10 pH-enh. | 0,28 pH-enheter | | 1:1 |
| Sulfat <i>SO₄</i> | SS-EN ISO 10 304-1:2009 mod | Jonkromatografi | 0,48-80 mg/l (0,01 – 1,7 mekv/l) ² | 0,31 mg/l (0,006 mekv/l) 6% | < 5 mg/l < 0,10 mekv/l) ≥ 5 mg/l (≥ 0,10 mekv/l) | 1:1 |
| Suspenderande ämnen <i>Slamhalt</i> | SS-EN 872:2005, mod | Gravimetri | ≥1 mg/l | 22 % | | 1:1 |

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|--|-------------------------|-------------------|---|---------------------------------------|--|----------------|
| Suspenderande ämnen <i>Slamhalt</i> | Intern metod: Susp. 20 | Gravimetri | 3-1000 mg/l | 27 % | | 1:1 |
| Syre, löst <i>O₂</i> | SS-EN 25813, utg. 1 mod | Titrimetri | 0-20 mg/l | 5 % | | 1:1 |
| Syre, löst <i>O₂</i> | ISO 17289:2014 | Optisk givare | 0,1-20 mg/l | 5 % | | 1:1 |
| Turbiditet <i>Grumlighet</i> | SS-EN ISO 7027-1:2016 | Fotometri | 0,2-250 FNU | 0,42 FNU 5 % | < 5 FNU ≥ 5 FNU | 1:1 |
| Metaller i vatten | | | | | | 1:1 |
| Aluminium <i>Al</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 3-5000 µg/l | 3 µg/l 8 % | < 40 µg/l < 40 µg/l | |
| Järn <i>Fe</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 3-5000 µg/l | 5 µg/l 10 % | < 40 µg/l ≥ 40µg/l | |
| Kalcium <i>Ca</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-125 mg/l (0,001-6,2 mekv/l) ² | 0,05 mg/l (0,0025 mekv/l) 9 % | < 1,0 mg/l <0,05 mekv/l) ≥ 1,0 mg/l (≥ 0,05 mekv/l) | |
| Kalium <i>K</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,04-12,5 mg/l (0,001-0,3 mekv/l) ² | 0,02 mg/l (0,0006 mekv/l) 10 % | < 0,2 mg/l <0,005 mekv/l) ≥ 0,2 mg/l (≥ 0,005 mekv/l) | |
| Kisel <i>Si</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-10 mg/l | 16 % | | |
| Magnesium <i>Mg</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-12,5 mg/l (0,001-1,0 mekv/l) ² | 0,015 mg/l (0,0012 mekv/l) 10 % | < 0,2 mg/l <0,02 mekv/l) ≥ 0,2 mg/l (≥ 0,02 mekv/l) | |

| <u>Analysvariabler</u> | <u>Metod (referens)</u> | <u>Mätprincip</u> | <u>Mätområde¹</u> | <u>Mätosäkerhet</u> | <u>Haltområde</u> | <u>Provtyp</u> |
|------------------------|-------------------------|-------------------|---|------------------------------------|--|----------------|
| Mangan <i>Mn</i> | SS-EN ISO 17294-2:2016 | ICP-MS | ICP-MS | 1 µg/l 10 % | < 10 µg/l ≥ 10µg/l | |
| Natrium <i>Na</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-62,5 mg/l (0,001-2,7 mekv/l) ² | 0,03 mg/l (0,001 mekv/l) 6 % | < 0,5 mg/l <0,02 mekv/l) ≥ 0,5 mg/l (≥ 0,02 mekv/l) | |
| Strontium <i>Sr</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,3-250 µg/l | 1,0 µg/l 7 % | < 10 µg/l ≥ 10µg/l | |
| Arsenik <i>As</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-10 µg/l | 10 % | | |
| Barium <i>Ba</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-50 µg/l | 10 % | | |
| Bly <i>Pb</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-10 µg/l | 10 % | | |
| Kadmium <i>Cd</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,004-10 µg/l | 30 % 10 % | < 1,0 µg/l ≥ 1,0µg/l | |
| Kobolt <i>Co</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,008-10 µg/l | 10 % | | |
| Koppar <i>Cu</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-20 µg/l | 10 % | | |
| Krom <i>Cr</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,03-10 µg/l | 20% | | |
| Molybden <i>Mo</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,05-2 µg/l | 20 % | | |
| Nickel <i>Ni</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-10 µg/l | 10% | | |

| <u>Analysvariabler</u> | <u>Metod (referens)</u> | <u>Mätprincip</u> | <u>Mätområde¹</u> | <u>Mätosäkerhet</u> | <u>Haltområde</u> | <u>Provtyp</u> |
|------------------------|-------------------------|-------------------|------------------------------|---------------------|-------------------------|----------------|
| Selen <i>Se</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,08-10 µg/l | 40 % 15 % | < 1,0 µg/l ≥ 1,0µg/l | |
| Vanadin <i>V</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-10 µg/l | 10% | | |
| Zink <i>Zn</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,4-100 µg/l | 20 % 10 % | < 2,0 µg/l ≥ 2,0µg/l | |
| Uran <i>U</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,003-10 µg/l | 20 % | | |

Förklaringar:

Provtyper

- 1 Vatten
- 1:1 Sötvatten/Bassängbad
- 1:2 Dricksvatten
- 1:3 Havsvatten/Brackvatten
- 1:4 Avloppsvatten/Lakvatten

Fotnoter

¹Mätområde avser metodens arbetsområde vid analys. Den nedre gränsen motsvarar rapporteringsgränsen= LOQ. Vid halter över den övre gränsen kan provet spädas ner till aktuellt arbetsområde.

² Vid analys erhålls svaret i mg eller µg/l men vid rapportering räknas det om till mekv/l.

List of accredited analytical methods at the geochemical laboratory

| <u>Analysis Variable</u> | <u>Method (reference)</u> | <u>Measuring principle</u> | <u>Range¹</u> | <u>Uncertainty</u> | <u>Level</u> | <u>Matrix</u> |
|---|---|----------------------------------|--------------------------|--------------------|------------------------------|---------------|
| Absorbance, filtered Cuvette length 5 cm 254 nm 365 nm 420 nm 436 nm | SS-EN ISO 7887-2012, del B mod | Photometry | | | | 1:1 |
| | | | 0,001-2 abs unit/5cm | 5 % | | |
| | | | 0,001-2 abs unit/5cm | 8 % | | |
| | | | 0,005-1 abs unit/5cm | 10 % | | |
| | | | 0,005-1 abs unit/5cm | 12 % | | |
| Acidity <i>Buffering capacity</i> | St Methods 16 th Ed. 402, Sid. 265-269 | Titrimetry | 0-0,100 meqv/l | 26 % | | 1:1 |
| Alkalinity end pt 5,6 <i>Buffering capacity</i> | SS-EN ISO 9963-2, utg.1, mod | Titrimetry | 0-4,0 meqv/l | 0,009 mekv/l 6% | < 0,1 meqv/l ≥ 0,1 meqv/l | 1:1 |
| Alkalinity end pt 5,4 + 4,5 <i>Buffering capacity</i> | SS-EN ISO 9963-2, utg.1, mod | Titrimetry | 0,01-4 meqv/l | 7% | | |
| Ammonium nitrogen <i>NH₄-N</i> | ISO 15923-1:2013 | Discrete analysis, Photometry | 3-1000 µg/l | 4 µg/l 11% | <60 µg/l ≥ 60 µg/l | 1:1 |
| Fluoride <i>F</i> | SS-EN ISO 10304-1:2009 Sid. 265-269 mod. | Ion chromatography | 0,05-2 mg/l | 0,010 mg/l 10% | < 0,10 mg/l ≥ 0,10 mg/l | 1:1 |
| Orthophosphate, <i>PO₄-P</i> | SS-EN ISO 15681-2:2018 mod. QuAAtro met. Q-064-05 Rev. 8 | Flow analysis, Photometry | 1-12 µg/l | 1 µg/l | | 1:1 |
| Orthophosphate, <i>PO₄-P</i> | ISO 15923-1:2013 | Discrete analysis, Photometry | 4-1000 µg/l | 2 µg/l 6% | < 60 µg/l ≥ 60 µg/l | 1:1 |
| Total phosphorus <i>Tot-P/ Total-P</i> | SS-EN ISO 6878:2005, mod Seal, Method No G-175-96 rev.2 för AAIII | Flow analysis, Photometry | 1-200 µg/l | 2 µg/l 10 % | < 10µg/l ≥ 10µg/l | 1:1 |
| Color of water | SS-EN ISO 7887:2012, del C | Photometry | 4-250 mg/l | 10% | | 1:1 |

| <u>Analysis Variable</u> | <u>Method (reference)</u> | <u>Measuring principle</u> | <u>Range¹</u> | <u>Uncertainty</u> | <u>Level</u> | <u>Matrix</u> |
|--|--|----------------------------------|--|---|--|---------------|
| Chemical oxygen demand <i>COD_{Mn}</i> | F.d. SS 02 81 18, utg1, mod | Titrimetri | 1-10 mg/l | 12% | | 1:1 |
| Chloride <i>Cl</i> | SS-EN ISO 10 304-1:2009 mod | Ion chromatography | 0,25-20 mg/l (0,007-0,6 meqv/l) ² | 0,05 mg/l (0,001 meqv/l 6% | < 1 mg/l < 0,02 meqv/l ≥ 1 mg/l (≥ 0,02 meqv/l) | 1:1 |
| Chlorofyll α | SS 02 81 46, utg 1 mod. | Photometry | >0,5 µg/l | 16 % (Bias ej tagen hänsyn till i beräkningen) | | 1:1 |
| Electrical conductivity | SS-EN 27888, utg1 | | 0,1-150 mS/m | 10% 5% | < 10 mS/m ≥ 10 mS/m | 1:1 |
| Nitrogen, total <i>Tot-N/TNb/Total-N</i> | SS EN 12260:2004 | Combustion | 50-10000 µg/l | 15% | | 1:1 |
| Sum of oxidized nitrogen <i>NO₂-N + NO₃-N/ NO_X</i> | ISO 15923-1:2013 | Discrete analysis, Photometry | 3-2000 µg/l | 4 µg/l 12% | < 50 µg/l ≥ 50 µg/l | 1:1 |
| Sum of oxidized nitrogen <i>NO₂-N + NO₃-N/ NO_X</i> | SS-EN ISO 13395:1997 | Flow analysis, Photometry | 1-700 µg/l | 2 µg/l 7% | < 20 mg/l ≥ 20 mg/l | 1:1 |
| Total organic carbon <i>TOC</i> | SS-EN 1484, utg. 1 Shimadzu Inst.manual | Combustion | 0,5-100 mg/l | 10% 11% | < 20 mg/l ≥ 20 mg/l | 1:1 |
| pH | SS-EN ISO 10523:2012, mod | | 3-10 pH-units | 0,28 pH-units | | 1:1 |
| Sulphate <i>SO₄</i> | SS-EN ISO 10 304-1:2009 mod | Ion chromatography | 0,48-80 mg/l (0,01 – 1,7 meqv/l) ² | 0,31 mg/l (0,006 meqv/l 6% | < 5 mg/l < 0,10 meqv/l ≥ 5 mg/l (≥ 0,10 meqv/l) | 1:1 |
| Suspended solids <i>Suspended matter</i> | SS-EN 872:2005, mod | Gravimetry | ≥1 mg/l | 22 % | | 1:1 |
| Suspended solids <i>Suspended matter</i> | Intern metod: Susp. 20 | Gravimetry | 3-1000 mg/l | 27 % | | 1:1 |

| <u>Analysis Variable</u> | <u>Method (reference)</u> | <u>Measuring principle</u> | <u>Range¹</u> | <u>Uncertainty</u> | <u>Level</u> | <u>Matrix</u> |
|---|---------------------------|----------------------------|---|---------------------------------------|--|---------------|
| Oxygen, dissolved <i>O₂</i> | SS-EN 25813, utg. 1 mod | Titrimetri | 0-20 mg/l | 5 % | | 1:1 |
| Oxygen, dissolved <i>O₂</i> | ISO 17289:2014 | Optical sensor | 0,1-20 mg/l | 5 % | | 1:1 |
| Turbidity | SS-EN ISO 7027-1:2016 | Photometry | 0,2-250 FNU | 0,42 FNU 5 % | < 5 FNU ≥ 5 FNU | 1:1 |
| Metaller i vatten | | | | | | 1:1 |
| Aluminium <i>Al</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 3-5000 µg/l | 3 µg/l 8 % | < 40 µg/l < 40 µg/l | |
| Iron <i>Fe</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 3-5000 µg/l | 5 µg/l 10 % | < 40 µg/l ≥ 40µg/l | |
| Calcium <i>Ca</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-125 mg/l (0,001-6,2 meqv/l) ² | 0,05 mg/l (0,0025 meqv/l) 9 % | < 1,0 mg/l <0,05 meqv/l) ≥ 1,0 mg/l (≥ 0,05 meqv/l) | |
| Potassium <i>K</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,04-12,5 mg/l (0,001-0,3 meqv/l) ² | 0,02 mg/l (0,0006 meqv/l) 10 % | < 0,2 mg/l <0,005 meqv/l) ≥ 0,2 mg/l (≥ 0,005 meqv/l) | |
| Silica <i>Si</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-10 mg/l | 16 % | | |
| Magnesium <i>Mg</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-12,5 mg/l (0,001-1,0 meqv/l) ² | 0,015 mg/l (0,0012 meqv/l) 10 % | < 0,2 mg/l <0,02 meqv/l) ≥ 0,2 mg/l (≥ 0,02 meqv/l) | |
| Manganese <i>Mn</i> | SS-EN ISO 17294-2:2016 | ICP-MS | ICP-MS | 1 µg/l 10 % | < 10 µg/l ≥ 10µg/l | |

| <u>Analysis Variable</u> | <u>Method (reference)</u> | <u>Measuring principle</u> | <u>Range¹</u> | <u>Uncertainty</u> | <u>Level</u> | <u>Matrix</u> |
|--------------------------|---------------------------|----------------------------|---|-----------------------------------|--|---------------|
| Sodium <i>Na</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-62,5 mg/l (0,001-2,7 meqv/l) ² | 0,03 mg/l (0,001 meqv/l 6 % | < 0,5 mg/l <0,02 meqv/l) ≥ 0,5 mg/l (≥ 0,02 meqv/l) | |
| Strontium <i>Sr</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,3-250 µg/l | 1,0 µg/l 7 % | < 10 µg/l ≥ 10µg/l | |
| Arsenic <i>As</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-10 µg/l | 10 % | | |
| Barium <i>Ba</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-50 µg/l | 10 % | | |
| Lead <i>Pb</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-10 µg/l | 10 % | | |
| Cadmium <i>Cd</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,004-10 µg/l | 30 % 10 % | < 1,0 µg/l ≥ 1,0µg/l | |
| Cobalt <i>Co</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,008-10 µg/l | 10 % | | |
| Copper <i>Cu</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,01-20 µg/l | 10 % | | |
| Chromium <i>Cr</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,03-10 µg/l | 20% | | |
| Molybdenum <i>Mo</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,05-2 µg/l | 20 % | | |
| Nickel <i>Ni</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-10 µg/l | 10% | | |
| Selenium <i>Se</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,08-10 µg/l | 40 % 15 % | < 1,0 µg/l ≥ 1,0µg/l | |

| <u>Analysis Variable</u> | <u>Method (reference)</u> | <u>Measuring principle</u> | <u>Range¹</u> | <u>Uncertainty</u> | <u>Level</u> | <u>Matrix</u> |
|--------------------------|---------------------------|----------------------------|--------------------------|--------------------|-------------------------|---------------|
| Vanadium <i>V</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,02-10 µg/l | 10% | | |
| Zinc <i>Zn</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,4-100 µg/l | 20 % 10 % | < 2,0 µg/l ≥ 2,0µg/l | |
| Uranium <i>U</i> | SS-EN ISO 17294-2:2016 | ICP-MS | 0,003-10 µg/l | 20 % | | |

Explanations:

Matrix:

- 1 Water
- 1:1 Surface water/Swimming pool water
- 1:2 Drinking water
- 1:3 Sea water/Brackish water
- 1:4 Waste water/Leachate

Footnotes

¹ Measuring range refers to the working area of the method for analysis. The lower limit corresponds to the limit of quantification = LOQ. At levels above the upper limit, the sample can be diluted to the current working area.

² When the analysis is done, the answer is obtained in mg or µg/l but before reporting, it is converted to meqv/l.