Methoden voor bepaling van anionen

ONTWERPMETHODE MB 2024

Deze procedure vervangt de procedure CMA/2/I/C van augustus 2015.
Richtlijnen voor de conservering en bewaring van watermonsters worden gegeven in CMA/1/B.

MATRIX: GRONDWATER

De volgende analysemethoden kunnen gebruikt worden voor het bepalen van anionen in grondwater:

Chloride (a)	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • NBN EN ISO 10304-4:1999 Water quality - Determination of dissolved anions using liquid chromatography of ions. Part 4: Determination of chlorate, chloride and chlorite in water with low contamination (ISO 10304-4:1997) • ISO 9297:1989 Water quality – Determination of chloride – Silver nitrate titration with chromate indicator (Mohr's method) • NBN EN ISO 15682:2001 Water quality – Determination of chloride by flow analysis (CFA and FIA) and photometric or potentiometric detection (ISO 15682: 2000) • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium, chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Fluoride	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • ISO 10359-1:1992 Water quality – Determination of fluoride – Part 1: Electrochemical probe method for potable and light polluted water (b) (CMA/2/I/C.1.1) • NEN 6589:2005 Water - Potentiometrische bepaling van het gehalte aan totaal anorganisch fluoride met doorstroomsystemen (FIA en CFA) • CMA/2/I/C.1.2 Spectrofotometrische bepaling van opgelost fluoride met een doorstroomanalysesysteem
Nitraat	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • NBN EN ISO 13395:1996 Water quality – Determination of nitrite nitrogen and nitrate nitrogen and the sum of both by flow analyses (CFA en FIA) and spectrometric detection (ISO 13395:1996) (CMA/2/I/C.6) • ISO 7890-3:1988 Water quality – Determination of nitrate – Part 3: Spectrometric method using sulfosalicylic acid • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium, chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Nitriet	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007)

ONTWERPMETHODE MB 2024

	(CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • NBN EN ISO 13395:1996 Water quality – Determination of nitrite nitrogen and nitrate nitrogen and the sum of both by flow analyses (CFA en FIA) and spectrometric detection (ISO 13395:1996) (CMA/2/I/C.6) • NBN EN 26777:1993 Water quality – Determination of nitrite – Molecular absorption spectrometric method (ISO 6777:1984) • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium, chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Sulfaat	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • ISO 22743:2006 Water quality - Determination of sulfates - Method by continuous flow analysis (CFA) • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium, chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Totaal cyanide	• NBN EN ISO 14403-2:2012 Water quality – Determination of total cyanide and free cyanide by continuous flow analysis (ISO 14403-2:2012) (CMA/2/I/C.2.2) • ISO 6703-1:1984 Water quality – Determination of cyanide – Part 1: Determination of total cyanide (CMA/2/I/C.2.1)
Vrije cyanide	• NBN EN ISO 14403-2:2012 Water quality – Determination of total cyanide and free cyanide by continuous flow analysis (ISO 14403-2:2012) (CMA/2/I/C.2.3)
Chroom(VI)	• NBN EN ISO 10304-3:1997 Water quality - Determination of dissolved anions using liquid chromatography of ions. Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate (ISO 10304-3:1997) • EPA 218.6:1996 Determination of dissolved hexavalent chromium in drinking water, groundwater and industrial wastewater effluents by ion chromatography (CMA/2/I/C.7) • EPA 218.7:2011 Determination of hexavalent chromium in drinking water by ion chromatography with post-column derivatization and UV-Visible detection (CMA/2/I/C.7) • EPA 7199:1996 Determination of hexavalent chromium in drinking water, groundwater and industrial waste water effluents by ion chromatography (CMA/2/I/C.7) • ISO 11083:1994 Water quality – Determination of chromium(VI) – Spectrometric method using 1,5 diphenylcarbazide (c)

(a) Voor de bepaling van chloride wordt bij toepassing van de titrimetrische methode en de doorstroomanalysemethode steeds een totaal halogeen gehalte (chloride, bromide, jodide) bepaald. Ionenchromatografie daarentegen is in staat om selectief chloride te meten.

(b) Voor de bepaling van fluoride met ion-selectieve elektrode volgens ISO 10359-1 wordt het gebruik van de buffer zoals beschreven in DIN 38405-D4 aanbevolen. De validatiegegevens opgenomen in ISO 10359-1 zijn eveneens bepaald op basis van deze buffer.

(c) Bij toepassing van de rechtstreekse methode zonder IC scheiding conform ISO 11083:1994 zijn verschillende interferenties mogelijk. Bij aanwezigheid van oxiderende

en/of reducerende bestanddelen dient de in de norm beschreven voorbehandelings-procedure gevolgd te worden.

ONTWERPMETHODE MB 2024

MATRIX: ELUATEN

De volgende analysemethoden kunnen gebruikt worden voor het bepalen van anionen in eluaten:

Chloride (a)	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • NBN EN ISO 10304-4:1999 Water quality - Determination of dissolved anions using liquid chromatography of ions. Part 4: Determination of chlorate, chloride and chlorite in water with low contamination (ISO 10304-4:1997) • ISO 9297:1989 Water quality – Determination of chloride – Silver nitrate titration with chromate indicator (Mohr's method) • NBN EN ISO 15682:2001 Water quality – Determination of chloride by flow analysis (CFA and FIA) and photometric or potentiometric detection (ISO 15682: 2000) • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium, chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Fluoride	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • ISO 10359-1:1992 Water quality – Determination of fluoride – Part 1: Electrochemical probe method for potable and light polluted water (b) (CMA/2/I/C.1.1) • NEN 6589:2005 Water - Potentiometrische bepaling van het gehalte aan totaal anorganisch fluoride met doorstroomsystemen (FIA en CFA) • CMA/2/I/C.1.2 Spectrofotometrische bepaling van opgelost fluoride met een doorstroomanalysesysteem
Nitriet	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • NBN EN ISO 13395:1996 Water quality – Determination of nitrite nitrogen and nitrate nitrogen and the sum of both by flow analyses (CFA en FIA) and spectrometric detection (CMA/2/I/C.6) • NBN EN 26777:1993 Water quality – Determination of nitrite – Molecular absorption spectrometric method (ISO 6777:1984) • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium, chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Sulfaat	• NBN EN ISO 10304-1:2009 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007) (CMA/2/I/C.3) en ISO 10304-1:2007/Cor 1:2010 • ISO 22743:2006 Water quality - Determination of sulfates - Method by continuous flow analysis (CFA) • ISO 15923-1:2013 Water quality – Determinations of ions by a discrete analysis system and spectrophotometric detection – Part 1: Ammonium,

	chloride, nitrate, nitrite, orthophosphate, silicate and sulfaat (CMA/2/I/C.8)
Totaal cyanide	• NBN EN ISO 14403-2:2012 Water quality – Determination of total cyanide and free cyanide by continuous flow analysis (ISO 14403-2:2012) (CMA/2/I/C.2.2) • ISO 6703-1:1984 Water quality – Determination of cyanide – Part 1: Determination of total cyanide (CMA/2/I/C.2.1)
Chroom(VI)	• NBN EN ISO 10304-3:1997 Water quality - Determination of dissolved anions using liquid chromatography of ions. Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate (ISO 10304-3:1997) • EPA 218.6:1996 Determination of dissolved hexavalent chromium in drinking water, groundwater and industrial wastewater effluents by ion chromatography (CMA/2/I/C.7) • EPA 218.7:2011 Determination of hexavalent chromium in drinking water by ion chromatography with post-column derivatization and UV-Visible detection (CMA/2/I/C.7) • EPA 7199:1996 Determination of hexavalent chromium in drinking water, groundwater and industrial waste water effluents by ion chromatography (CMA/2/I/C.7) • ISO 11083:1994 Water quality – Determination of chromium(VI) – Spectrometric method using 1,5 diphenylcarbazide (c)

(a) Voor de bepaling van chloride wordt bij toepassing van de titrimetrische methode en de doorstroomanalysemethode steeds een totaal halogeen gehalte (chloride, bromide, jodide) bepaald. Ionenchromatografie daarentegen is in staat om selectief chloride te meten.

(b) Voor de bepaling van fluoride met ion-selectieve elektrode volgens ISO 10359-1 wordt het gebruik van de buffer zoals beschreven in DIN 38405-D4 aanbevolen. De validatiegegevens opgenomen in ISO 10359-1 zijn eveneens bepaald op basis van deze buffer.

(c) Bij toepassing van de rechtstreekse methode zonder IC scheiding conform ISO 11083:1994 zijn verschillende interferenties mogelijk. Bij aanwezigheid van oxiderende en/of reducerende bestanddelen dient de in de norm beschreven voorbehandelings-procedure gevolgd te worden.

ONTWERPMETHODE MB 2024