METHODEN VOOR DE BEPALING VAN ELEMENTEN

Richtlijnen voor de conservering en bewaring van watermonsters worden gegeven in CMA/1/B.

MATRICES: GRONDWATER, ELUATEN, DESTRUCTIEVLOEISTOFFEN

ELEMENTEN

Voor grondwater en eluaten dient geen ontsluiting te worden uitgevoerd. De analysen worden uitgevoerd op de gefiltreerde (0.45 µm) monsters. Enkel indien een neerslag wordt waargenomen, dient een ontsluiting te worden uitgevoerd conform CMA/2/I/A.6.1 of CMA/2/I/A.6.3.

Voor bodem, vaste en pasteuze afvalstoffen dient een destructie te worden uitgevoerd conform CMA/2/II/A.3.

Voor secundaire grondstoffen die als bodemverbeterende middel/meststof worden aangewend, dient de destructie te worden uitgevoerd conform tabel B.4.1 vermeld in methode CMA/6/A *Prestatiekenmerken*.

De volgende analysetechnieken kunnen gebruikt worden voor de bepaling van de elementen in grondwater, eluaten en destructievloeistoffen:

antimoon	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • NEN 6433:1993 Water – Bepaling van het gehalte aan antimoon met behulp van atomaire absorptiespectrometrie (hydridegeneratietechniek). Ontsluiting met salpeterzuur en zoutzuur • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2) • ISO 20280:2007 Soil quality -- Determination of arsenic, antimony and selenium in aqua regia soil extracts with electrothermal or hydride-generation atomic absorption spectrometry
arseen	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 11969: 1996 Water quality – Determination of arsenic – Atomic absorption spectrometric method (hydride technique) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • NEN 6432:1993 Water – Bepaling van het gehalte aan arseen met behulp van atomaire absorptiespectrometrie (hydridegeneratietechniek). Ontsluiting met salpeterzuur en zoutzuur. • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2) • ISO 20280:2007 Soil quality -- Determination of arsenic, antimony and selenium in aqua regia soil extracts with electrothermal or hydride-

	generation atomic absorption spectrometry
barium	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements
cadmium	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 8288: 1986 Water quality – Determination of cobalt, nickel, copper, zinc, cadmium and lead – Flame atomic absorption spectrometric methods • ISO 5961: 1994 Water quality: Determination of cadmium by atomic absorption spectrometry • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
chroom	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • EN 1233: 1996 Water quality – Determination of chromium – Atomic absorption spectrometric methods • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
kobalt	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 8288: 1986 Water quality – Determination of cobalt, nickel, copper, zinc, cadmium and lead – Flame atomic absorption spectrometric methods • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
koper	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 8288: 1986 Water quality – Determination of cobalt, nickel, copper, zinc, cadmium and lead – Flame atomic absorption spectrometric methods • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines

	• ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
lood	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 8288: 1986 Water quality – Determination of cobalt, nickel, copper, zinc, cadmium and lead – Flame atomic absorption spectrometric methods • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
mangaan	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
molybdeen	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
nikkel	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 8288: 1986 Water quality – Determination of cobalt, nickel, copper, zinc, cadmium and lead – Flame atomic absorption spectrometric methods • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
seleen	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled

	plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • NEN 6434:1993 Water – Bepaling van het gehalte aan seleen met behulp van atomaire absorptiespectrometrie (hydridegeneratietechniek). Ontsluiting met salpeterzuur en zoutzuur • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2) • ISO 20280:2007 Soil quality -- Determination of arsenic, antimony and selenium in aqua regia soil extracts with electrothermal or hydride-generation atomic absorption spectrometry
thallium	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
tin	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements
vanadium	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)
zink	• ISO 11885:2007 Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (CMA/2/I/B.1) • ISO 8288: 1986 Water quality – Determination of cobalt, nickel, copper, zinc, cadmium and lead – Flame atomic absorption spectrometric methods • ISO 17294-1: 2004 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 1: General guidelines • ISO 17294-2: 2003 Water quality – Application of inductively coupled plasma mass spectrometry (ICP-MS) – Part 2: Determination of 62 elements • EN ISO 15586:2003 Water quality – Determination of trace elements using atomic absorption spectrometry with graphite furnace (CMA/2/I/B.2)

KWIK

Voor de bepaling van kwik in grondwater en eluaten is het toepassen van een ontsluiting afhankelijk van de conserverings- en bepalingstechniek.
Bij de bepaling van kwik met CV-AAS en CV-AFS (CMA/2/I/B.3) en BrCl als conservering reagens dient voor grondwater en eluaten geen ontsluiting te worden uitgevoerd.
Bij de bepaling van kwik met CV-AAS en CV-AFS (CMA/2/I/B.3) en kaliumdichromaat als conservering reagens dient zowel grondwater als de eluaten ontsloten te worden zoals beschreven in CMA/2/I/A.6.1 of CMA/2/I/A.6.3.
Bij de bepaling van Hg met ICP-MS dient onafhankelijk van de conservering voor grondwater en eluaten geen ontsluiting te worden uitgevoerd.

Voor bodem, vaste en pasteuze afvalstoffen dient een destructie te worden uitgevoerd conform CMA/2/II/A.3.

Voor secundaire grondstoffen die als bodemverbeterende middel/meststof worden aangewend, dient de destructie te worden uitgevoerd conform tabel B.4.1 vermeld in methode prestatiekenmerken CMA/6/A.

De volgende analysetechnieken kunnen gebruikt worden voor de bepaling van kwik in grondwater, eluaten en destructievloeistoffen:

Kwik	• ISO 17852:2006 Water quality -- Determination of mercury -- Method using atomic fluorescence spectrometry • EN 12338: 1998 Water quality: Determination of mercury – enrichment methods by amalgamation • EPA 200.8 Determination of trace elements in waters and wastes by inductively coupled plasma- mass spectrometry. • ISO 5666: 1999 Water quality: Determination of mercury • EN 1483: 1997 Water quality – Determination of mercury (CMA/2/I/B.3) • EPA 7473:1998 Mercury in solids and solutions by thermal decomposition, amalgamation, and atomic absorption spectrophotometry