Ordinance on the Avoidance and the Disposal of Waste (Waste Ordinance, ADWO)

of 4 December 2015 (Status as of 1 January 2021)

The Swiss Federal Council,

on the basis of Articles 29, 30*a* letter c, 30*b* paragraph 1, 30*c* paragraph 3, 30*d* letter a, 30*h* paragraph 1, 39 paragraph 1, 45 and 46 paragraph 2 of the Environmental Protection Act of 7 October 1983[1] (EPA),
and Articles 9 paragraph 2 letter c, 16 letter c and 47 paragraph 1 of the Waters Protection Act from 24 January 1991[2],

ordains:

Chapter 1 Aim, Scope of Application and Definitions

Art. 1 Aim

This Ordinance aims to:

a. protect people, animals, plants and their biological communities, waters, the soil and the air from harmful effects or nuisances caused by waste;

b. to limit environmental pollution by waste through precautionary measures;

c. to encourage the sustainable use of natural raw materials through the environmentally sustainable recovery of waste.

Art. 2 Scope of application

This Ordinance applies to the avoidance and disposal of waste and to the construction and operation of waste disposal facilities. Special regulations on individual types of waste in other federal acts and ordinances are reserved.

AS **2015** 5699

1 SR **814.01**
2 SR **814.20**

Art. 3 Definitions

In this Ordinance:

a.[3] *municipal waste* means:
1. waste from households,
2. waste from businesses with fewer than 250 full-time employees the composition of which in ingredients and proportions is similar to waste from households,
3. waste from public authorities the composition of which in ingredients and proportions is similar to waste from households;

b. *undertaking* means a legal entity with its own identification number or such entities combined in a group with a jointly organised waste disposal system;

c. *special waste* means waste designated as special waste in the list of wastes issued in Article 2 of the Ordinance of 22 June 2005[4] on Movements of Waste (OMW);

d. *biogenic waste* means waste of vegetable, animal or microbial origin;

e. *construction waste* means waste produced in the construction, conversion or dismantling of fixed installations;

f. *excavated material* means material that is excavated or extracted in the course of construction work, with the exception of any topsoil and subsoil removed;

f[bis].[5] mercury waste:
1. waste that contains mercury or mercury compounds,
2. mercury or mercury compounds originating from the treatment of mercury waste in terms of number 1; the foregoing does not apply to mercury that has been authorised for export under Annex 1.7 Numbers 2.2.4 or 4.2 of the Chemical Risk Reduction Ordinance of 18 May 2005[6] (ORRChem),
3. mercury or mercury compounds that is or are no longer required in industrial processes;

g. *waste disposal facility* means an installation in which waste is treated, recovered, deposited or temporarily stored, with the exception of material extraction sites in which excavated material is recovered;

h.[7] ...

i. *composting facility* means a waste disposal facility in which biogenic waste decomposes while exposed to the air;

3 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
4 SR **814.610**
5 Inserted by No II 1 of the O of 25 Oct. 2017, in force since 1 Jan. 2018 (AS **2017** 5963).
6 SR **814.81**
7 Repealed by No I of the O of 12 Feb. 2020, with effect from 1 April 2020 (AS **2020** 801).

j.[8] *fermentation facility* means a waste disposal facility in which biogenic waste is allowed to ferment in the absence of air;

k. *landfill* means a waste disposal facility in which waste is deposited;

l. *incineration* means the treatment of waste at a temperature that is sufficiently high that substances hazardous to the environment are destroyed or physically or chemically bonded by mineralisation;

m. *state of the art* means the latest stage of development of procedures, installations and operating methods which:

1. have been successfully tested in comparable facilities or activities in Switzerland or abroad or have been used successfully in trials and may be used in other facilities or activities in accordance with the rules of the technology, and

2. is economically viable in a medium-sized and economically sound enterprise in the relevant industry.

Chapter 2 Planning and Reporting

Art. 4 Waste management plans

1 The cantons shall each draw up a waste management plan for their territory. It shall include in particular:

a. measures to avoid waste;

b. measures to recover waste;

c. the number of facilities required to dispose of municipal waste and other types of waste that the cantons are responsible for disposing of;

d. the landfill volume required and the locations of landfills (landfill plan);

e. the required catchment areas.

2 The cantons shall work together on their waste management plans, in particular on the matters mentioned in paragraph 1 letters c–e and shall if necessary designate intercantonal planning regions for this purpose.

3 They shall review their waste management plans every five years and amend them if necessary.

4 The cantons shall submit their waste management plans and the significant revisions thereof to the Federal Office for the Environment (FOEN).

Art. 5 Coordination with the spatial planning

1 The cantons shall take account of the results of the waste management plan relevant to spatial planning in their structure plans.

8 The correction of 19 July 2016 relates to the Italian text only (AS **2016** 2629).

2 They shall indicate the planned locations of landfills in the landfill plan in their structure plans and ensure that the required land use zones are set aside.

Art. 6 Reporting

1 Each year, the cantons shall draw up publicly accessible lists with the following information and submit the same to the FOEN:

a. quantities of types of waste mentioned in Annex 1 that are disposed of on their territory;

b.[9] facilities for treating construction waste and facilities for treating metallic waste on their territory in which more than 1000 t waste is treated each year;

c. other waste disposal facilities on their territory in which more than 100 t waste is disposed of each year.

2 The Federal Department of the Environment, Transport, Energy and Communications may the revise the types of waste specified in Annex 1 to take account of technical developments.

3 The cantons shall submit a report to the FOEN on request on the operation and condition of the landfills on their territory.[10] The report shall contain the following information in particular:

a. the quantity and type of the deposited waste as well as remaining quantities of existing landfills;

b. in the case of new landfills and alterations to existing landfill sites: evidence that the facilities on the site satisfy the requirements of Annex 2 numbers 2.1–2.4;

c. where applicable, any measures taken under Article 53 paragraph 4 to prevent possible harmful effects or nuisances being caused to the environment by landfills.

Chapter 3 Avoidance, Recovery and Deposit of Waste

Section 1 General Regulations

Art. 7 Information and advice

1 The environmental protection agencies shall inform and advise private individuals and authorities on how to avoid producing waste and to dispose of waste. Among other issues, they shall provide information on the recovery of waste and on measures to avoid throwing away small quantities of waste or leaving it lying around.

9 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
10 Amended by No I of the O of 21 Sept. 2018, in force since 1 Nov. 2018 (AS **2018** 3515).

2 Based on the reports from the cantons (Art. 6 para. 1), the FOEN shall publish reports on the quantities of waste disposed of throughout Switzerland and on existing waste disposal facilities as in Switzerland.

Art. 8 Training

In cooperation with the cantons and employment organisations, the Confederation shall ensure that persons carrying out activities in connection with the disposal of waste are taught the state of the art in their basic and continuing professional training.

Art. 9 Mixing ban

Waste of one types may not be mixed with other waste or with aggregates if this is primarily intended to reduce the pollutant content of the waste by dilution and thereby to comply with regulations on the consignment, recovery or landfill of waste.

Art. 10 Obligation to incinerate

Municipal waste and waste of similar composition, sewage sludge, combustible fractions of construction waste and other combustible waste must be incinerated in appropriate facilities, unless their constituents may be recovered.

Section 2 Avoidance of Waste

Art. 11

1 The FOEN and the cantons shall encourage the avoidance of waste through appropriate measures such as raising the awareness of and providing information to the public and businesses. In doing so, they shall work with the private sector organisations concerned.

2 Any person who manufactures products must organise the production processes according to the state of the art so that as little waste as possible is produced and any waste that is produced contains as few substances as possible that harm the environment.

Section 3 Recovery of Waste

Art. 12 General recovery obligation according to the state of the art

1 Waste must be recycled or recovered for energy provided recovery does less harm to the environment than:

a. any other form of disposal; and

b. the manufacture of new products or the acquisition of other heating fuels.

2 Recovery must be carried out according to the state of the art.

Art. 13 Municipal waste and waste of similar composition

1 The cantons shall ensure that that the recoverable parts of municipal waste such as glass, paper, cardboard, metals, garden waste and textiles are if possible collected separately and recycled.

2 They shall ensure that the following are collected and disposed of separately:

a. special waste from households;

b.[11] non-business-specific special waste of up to 20 kg per collection from businesses and public authorities with fewer than 10 full-time employment positions.

3 They shall ensure that the infrastructure required to comply with paragraphs 1 and 2 is provided, and in particular that collection points are set up. If necessary they shall also ensure that regular collections are made.

4 The proprietors of waste from businesses with 250 or more full-time employment positions must as far as possible and reasonable collect and recycle the recoverable parts of their waste that are similar in their composition to municipal waste.

Art. 14 Biogenic waste

1 Biogenic waste must be recovered solely by recycling or by fermentation, provided:

a. it is suitable for this purpose as a result of its properties, in particular its nutrient and pollutant content;

b. it has been collected separately; and

c. recovery is not prohibited by other provisions of federal law.

2 Biogenic waste that need not be recovered in accordance with paragraph 1 must as far as possible and reasonable simply be recovered for energy or incinerated in appropriate facilities. In doing so, its energy content must be used.

Art. 15 Phosphorus-rich waste

1 Phosphorus must be recovered from municipal waste water, from sewage sludge from central waste water treatment plants or from the ash produced by the incineration of such sewage sludge and then recycled.

2 Phosphorus in animal and bone meal must be recycled, unless the animal and bone meal is used as animal feedstuffs.

11 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).

3 When recovering phosphorous from waste in accordance with paragraph 1 or 2, the pollutants in the waste must be removed according to the state of the art. If the phosphorous recovered is used to manufacture a fertiliser, the requirements of Annex 2.6 Number 2.2.4 ORRChem[12] must also be met.[13]

Art. 16 Information on the disposal of construction waste

1 In the case of construction work, when applying for the building permit, the builder must provide the authority responsible with information on the nature, quality and quantity of the waste produced and on the plans for its disposal if:

a. it is probable that more than 200 m^3 construction waste will be produced; or

b. construction waste containing substances that are hazardous to the environment or to health, such as polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), lead or asbestos, is expected.

2 If the builder has prepared a waste management plan in accordance with paragraph 1, it must prove to the authority responsible for the building permit at its request on completion of the construction work that the waste produced has been disposed of accordingly to the authority's requirements.

Art. 17 Separation of construction waste

1 In the case of construction work, special waste must be separated and disposed of separately from other waste. The following construction waste must be kept separate on the construction site:

a. removed topsoil and subsoil, if possible without being mixed;

b. unpolluted excavated material, excavated material that satisfies the requirements of Annex 3 number 2, and other excavated material, if possible without being mixed;

c. excavated asphalt, concrete rubble, road surface rubble, mixed rubble, brick rubble and plaster, if possible without being mixed;

d. further recyclable waste such as glass, metals, timber and plastics, if possible without being mixed;

e. combustible waste that is not recyclable;

f. other waste.

2 If the separation of other construction waste on the construction site is not operationally possible, the waste must be separated in suitable facilities.[14]

3 The authority may require further separation if additional parts of the waste may be recovered thereby.

12 SR **814.81**
13 Amended by Annex No 1 of the O of 31 Oct. 2018, in force since 1 Jan. 2019 (AS **2018** 4205).
14 The correction of 19 July 2016 relates to the Italian text only (AS **2016** 2629).

Art. 18 Removed topsoil and subsoil

[1] Removed topsoil and subsoil must be recovered in full if possible provided:

a. it is suitable for the intended recovery owing to its properties;

b. it meets the benchmark values in Annexes 1 and 2 of the Ordinance of 1 July 1998[15] on the Pollution of Soil (SoilPO); and

c. it does not contain foreign substances or invasive alien organisms.

[2] In the case of recovery, the topsoil and subsoil must be processed in accordance with Articles 6 and 7 SoilPO.

Art. 19 Excavated material

[1] Excavated material that satisfies the requirements of Annex 3 number 1 (unpolluted excavated material), must be recovered to the fullest extent possible as follows:

a. as construction material on building sites or landfills;

b. as raw material for the manufacture of construction materials;

c. for the refilling of material extraction sites; or

d. for permitted landscaping work.

[2] Excavated material that satisfies the requirements of Annex 3 number 2 must be recovered to the fullest extent possible as follows:

a. as a raw material for the manufacture of hydraulic or bituminous bound construction materials;

b. as construction material for landfills of Types B–E;

c.[16] as a raw material in the manufacture of cement clinker;

d.[17] in the case of civil engineering work, on the site where the material is produced, provided any treatment required for the material is carried out on or directly adjacent to the site; Article 3 of the Contaminated Sites Ordinance of 26 August 1998[18] (CSO) remains reserved.

[3] Excavated material that does not satisfy the requirements of Annex 3 number 2 may not be recovered. The foregoing does not apply to recovery at a cement works in accordance with Annex 4 number 1 and the recovery of excavated material that satisfies the requirements of Annex 5 number 2.3:[19]

a. as construction material for landfills of Types C–E; or

b.[20] as part of the remediation of the contaminated site that produces the material; a any treatment required for the material is carried out at or directly adjacent to the contaminated site.

15 SR **814.12**
16 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
17 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
18 SR **814.680**
19 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
20 The correction of 19 July 2016 relates to the Italian text only (AS **2016** 2629).

Art. 20 Mineral waste from the demolition of buildings and other structures

[1] Excavated asphalt containing up to 250 mg PAH per kg, road surface rubble, mixed rubble and brick rubble must to the fullest extent possible be recovered as raw material for the manufacture of construction materials.

[2] Excavated asphalt containing more than 250 mg PAH per kg may not be not recovered.

[3] Concrete rubble must be recovered to the fullest extent possible as raw material for the manufacture of construction materials or as construction material for landfills.

Art. 21 Lightweight fraction from the shredding of waste containing metal

Metal fragments must be removed from the lightest fraction obtained by shredding waste containing metal (the lightweight fraction) and recycled.

Art. 22 Sludge and sweepings from street gullies

[1] Recoverable parts such as chippings, sand and gravel must be separated from sludge and sweepings from street gullies that are primarily of mineral composition and recycled.

[2] The remaining parts of street sweepings in accordance with paragraph 1 and other street sweepings, municipal waste or waste of similar composition or with high biogenic content must be incinerated in appropriate facilities.

Art. 23 Electric arc furnace slag[21]

Electric arc furnace slag may only be recovered with the consent of the cantonal authority if:[22]

a. recovery is carried out in the course of construction work in hydraulically or bituminously bound form or under a surface impermeable to water; and

b. the electric arc furnace slag originates from the manufacture of unalloyed or low alloyed steels subsequent to 1989.

Art. 24 Recovery of waste in the production of cement and concrete

[1] Waste may be used as a raw material, as raw meal corrective substances, as heating fuels or as additives or aggregates in the production of cement and concrete provided it satisfies the requirements under Annex 4. However, mixed municipal waste may not be used as a raw material or as a heating fuel even if collected and subsequently sorted.

[2] Dusts from the exhaust filtering at facilities producing cement clinker must be recovered as aggregates for grinding cement clinker or as additives in the production of cement. The heavy metal content of the cement produced must not exceed the limit values in Annex 4 number 3.2.

21 The correction of 3 Oct. 2017 relates to the French text only (AS **2017** 5137).
22 The correction of 3 Oct. 2017 relates to the French text only (AS **2017** 5137).

Section 4 Landfilling of Waste

Art. 25 General regulations[23]

[1] Waste may only be deposited in landfills if the landfills satisfy the requirements of Annex 5. The construction and operating licence may include additional restrictions.

[2] If landfills comprise two or more compartments separated by structural measures, the requirements for the deposit of each type of waste apply to the compartment in which the respective type is deposited.

[3] Liquid, explosive, infectious and combustible waste may not be deposited.

Art. 25*a*[24] Mercury waste

[1] Mercury waste in terms of Article 3 letter f^{bis} numbers 1 and 2 are environmentally compatible and must be disposed of according to the state of the art.

[2] Mercury waste in terms of Article 3 letter f^{bis} number 3 are environmentally compatible and must be treated and deposited according to the state of the art.

Chapter 4 Waste Disposal Facilities

Section 1 General Regulations

Art. 26 State of the art

[1] Waste disposal facilities must be constructed and operated according to the state of the art.

[2] Every ten years, the proprietors of waste disposal facilities must review whether their facility corresponds to the state of the art, and carry out any modifications required.

Art. 27 Facility

[1] Proprietors of waste disposal facilities must:

a.[25] operate the facilities so that no harmful effects or nuisances are occasioned to the environment if possible;

b. check the waste on receipt and ensure that only acceptable waste is disposed of in the facilities;

c. dispose of residues forming in the facilities in an environmentally compatible manner;

23 Inserted by No II 1 of the O of 25 Oct. 2017, in force since 1 Jan. 2018 (AS **2017** 5963).
24 Inserted by No II 1 of the O of 25 Oct. 2017, in force since 1 Jan. 2018 (AS **2017** 5963).
25 The correction of 19 July 2016 relates to the French text only (AS **2016** 2629).

d. ensure that the energy content of the waste is exploited as far as possible in its disposal;

e.[26] keep a record of the accepted quantities of the types of waste mentioned in Annex 1 with details of their origin and of the residues and emissions arising in the facilities, and submit that record to the authority each year; the foregoing does not apply to temporary storage sites in accordance with Articles 29 and 30;

f. ensure that they themselves and their staff have the required specialist knowledge to operate the facilities properly and provide the authority on its request with the relevant proof of basic and continuing education and training;

g. check and maintain the facilities regularly and in particular verify by measuring emissions whether the requirements of environmental and waters protection legislation are being met;

h. in the case of mobile facilities, ensure that waste produced at the operation site concerned is treated.

2 Proprietors of waste disposal facilities that dispose of more than 100 t waste each year must draw up operating regulations that in particular specify the requirements for the operation of the facilities. They shall submit the regulations to the authority for feedback.

Art. 28 Supervision and rectification of defects

1 The authority shall check regularly whether a waste disposal facility complies with the environmental regulations.

2 If it identifies defects, it shall require the proprietor of the facility to rectify the same within reasonable time.

Section 2 Temporary Storage Sites

Art. 29[27] Construction

1 Temporary storage sites may only be constructed if the requirements of environmental and in particular waters protection legislation are satisfied.

2 At landfills, the material in temporary storage sites must satisfy the requirements for the type of landfill concerned

3 The waste stored temporarily must be kept separate from the waste landfill.

26 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
27 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).

Art. 30 Operation and provision of security[28]

[1] Waste may be temporarily stored for a maximum of five years. On expiry of the storage period, the authority may on one occasion only extend the temporary storage by no more than five years provided suitable disposal was demonstrably not possible within the previous storage period.

[2] Waste suitable for fermentation and decomposition that is compressed into bales may be temporarily stored in landfills of types C-E and at facilities for the incineration of waste.[29]

[3] The cantonal authority may require the proprietors of temporary storage sites to provide security in the form of a bank guarantee or insurance to cover the costs of a damaging event.[30]

[4] ...[31]

Section 3 Facilities for the Incineration of Waste

Art. 31 Construction

Facilities may be constructed for the incineration of waste provided the structural elements guarantee that:

a. no diffuse waste gases are emitted;

b.[32] at facilities that treat liquid waste with a flashpoint below 60 °C and infectious special waste, such waste can be placed in the incineration chamber separately from the other waste and as directly as possible.

Art. 32 Operation

[1] Only waste that is suitable for incineration may be treated in facilities for the incineration of waste.

[2] Proprietors of facilities must operate them so that:

a. at least 55 per cent of the energy content of municipal waste and waste of similar composition is used outside the facilities;

b. on treatment, halogenated organic compounds are broken down as completely as possible and only reform to a minimal extent;

c.[33] special waste that contains more than one per cent by weight of organically bonded halogens is treated at a minimum temperature of 1100 °C for at least 2 seconds; the authority may permit other minimum temperatures and treatment times if it is proven that this does not result in more residues from in-

28 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
29 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
30 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
31 Repealed by No I of the O of 12 Feb. 2020, with effect from 1 April 2020 (AS **2020** 801).
32 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
33 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).

cineration and that the residues do not contain higher levels of organic pollutants such as PAKs, PCDDs, PCDFs or PCBs;

d.[34] liquid waste with a flashpoint below 60 °C and infectious special waste are placed in the incineration chamber separately from the other waste and as directly as possible;

e. the slag contains no more than two per cent by weight unburned parts, measured as total organic carbon (TOC);

f. in the event of disruption to operations, the treatment of any waste in the incineration chamber is completed;

g. at facilities that incinerate municipal waste or waste of similar composition, metals are recovered from the filter ash.

Section 4 Composting and Fermentation Facilities

Art. 33 Construction

[1] Composting and fermentation facilities that accept more than 100 t waste each year must be constructed on a surface impermeable to water; the foregoing does not apply to windrows at field-edge composting sites. A windrow may be used for one year at the most in any three-year period.

[2] The structural elements must guarantee that:

a. the waste water on any surface impermeable to waters can be collected, discharged and if necessary treated;

b. gaseous effluents produced in closed spaces can be treated if necessary;

c. suitable measures are taken to prevent or reduce emissions of greenhouse gases.

[3] Storage capacity in the facility of at least three months for compost and solid digestates and of at least five months for liquid digestates must be available or contractually guaranteed. The authority may require a longer storage capacity for facilities in the mountain region or in unfavourable climatic or special agronomic conditions.

Art. 34 Operation

[1] In composting and fermentation facilities that accept more than 100 t of waste each year, biogenic waste may only be allowed to decompose or ferment if it is suitable for the relevant procedure due to its properties, and in particular its nutrient and pollutant content, and for recovery as fertiliser as defined in Article 5 of the Fertiliser Ordinance of 10 January 2001[35] (FertO). Waste that is fermented in facilities for

34 Amended by No I of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).
35 SR **916.171**

co-fermentation in waste water treatment plants is exempt from the requirement of suitability as fertiliser.

2 Packaged biogenic waste may only be allowed to decompose or ferment in composting and fermentation facilities in accordance with paragraph 1 other than waste water treatment plants if:

a. the packaging is bio-degradable and suitable for the procedure concerned; or

b. the packaging is as far as possible removed before or during decomposition or fermentation.

3 The regulations in the FertO and the ORRChem[36] relating to compost and digestates also apply.

Section 5 Landfills

Art. 35 Types of landfills

1 The following types of landfills may be constructed and operated:

a. Type A for waste in accordance with Annex 5 number 1;

b. Type B for waste in accordance with Annex 5 number 2;

c. Type C for waste in accordance with Annex 5 number 3:

d. Type D for waste in accordance with Annex 5 number 4;

e. Type E for waste in accordance with Annex 5 number 5.

2 Landfills may have compartments for different types in accordance with paragraph 1.

3 Where landfills are made up of two or more compartments, the requirements for the relevant type of waste apply to the compartments concerned.

Art. 36 Location and structure of landfills

1 The requirements specified in Annex 2 apply to the location and the structure of landfills.

2 Type E landfills may not be constructed underground. Other landfills may be constructed underground with the FOEN's consent provided:

a. the waste is deposited in a stable cavity until the end of the after-care phase;

b. it is demonstrated that the landfills, with the exception of Type A landfills, cannot harm the environment until the end of the after-care phase;

c. in the case of Type D landfills, only slag is deposited that originates from facilities in which municipal waste or waste of similar composition is incinerated and appropriate measures are taken to prevent the build-up of gases.

36 SR **814.81**

3 In cases where it is permitted under the waters protection legislation to divert a body of flowing water for the construction of a landfill:

a. the bodies of water must be diverted around the landfill;

b. it must be ensured that no water can intrude into the landfill.

Art. 37 Minimum volume

1 Landfills must be of at least the following exploitable volumes:

a. Type A: 50 000 m^3;

b. Type B and Type C: 100 000 m^3;

c. Type D and Type E: 300 000 m^3.

2 If landfills comprise compartments for different types, the type of compartment with the largest exploitable minimum volume determines the minimum volume of the entire landfill

3 The cantonal authorities may with the FOEN's consent authorise the construction of landfills with lower volumes if this is appropriate given the geographical circumstances.

Art. 38 Authorisation

1 Any person who wishes to construct a landfill or a compartment requires a construction permit from the cantonal authority.

2 Any person who wishes to operate a landfill or a compartment requires an operating licence from the cantonal authority.

Art. 39 Construction permit

1 The cantonal authority shall grant the construction permit for a landfill or a compartment provided:

a. the requirements for landfill volume and the location of the landfill are indicated in the waste management plan;

b. the requirements under Article 36 for the location and building of landfills are met.

2 In the construction permit, it shall specify:

a. the type the landfill or of the compartment;

b. any restrictions on the acceptable waste in accordance with Annex 5;

c. further requirements and conditions that are necessary for compliance with the environmental and waters protection legislation.

Art. 40 Operating licence

1 The cantonal authority shall grant the operating licence for a landfill or a compartment if:

a. the landfill structure has been constructed in accordance with the approved construction plans;

b. operating regulations in accordance with Article 27 paragraph 2 are available; and

c. a preliminary plan for closure is available together with proof that the costs of closure in accordance with the preliminary plan and for the anticipated after-care will be covered.

2 It shall verify compliance with paragraph 1 letter a on the basis of documentation from the applicant and by carrying out an on-site inspection of the landfill structure.

3 The authority shall specify the following in the operating licence:

a. the type the landfill or of the compartment;

b. any catchment areas;

c. any restrictions on the waste acceptable in accordance with Annex 5;

d. measures to comply with the operating requirements in accordance with Article 27 paragraph 1, in particular the frequency of inspections;

e. monitoring of the collected leachate and if applicable of the groundwater in accordance with Article 41;

f. if applicable, the inspections of the degassing systems and analyses of the landfill gases in accordance with Article 53 paragraph 5;

g. further requirements and conditions necessary to comply with the environmental and waters protection legislation.

4 The authority shall limit the operating licence to no more than five years.

Art. 41 Monitoring of collected leachate and the groundwater

1 The proprietors of landfills must analyse the collected leachate at least twice each year.

2 They must analyse the ground water at least twice each year if monitoring is required to protect waters as a result of the hydrogeological conditions. For Type A landfills, groundwater monitoring is only required if they are located above exploitable underground waters or in the adjoining zones required for their protection.

3 If monitoring of the groundwater is required in accordance with paragraph 2, proprietors must ensure that groundwater samples may be taken in the immediate vicinity of the landfill or the compartment, and if possible at three locations in the downstream area and one location in the upstream area.

4 They must document the analyses and submit the results to the authority.

Art. 42 Closure plan

1 The proprietor of a landfill or a compartment shall submit a plan for carrying out the required closure work to the cantonal authority at the earliest three years and at the latest six months before the closure of the landfill.

2 The cantonal authority shall approve the plan if:

a. it satisfies the requirements of Annex 2 number 2.5 for surface closure;

b. there is a guarantee that the requirements for the facilities under Annex 2 numbers 2.1–2.4 will be met for the entire after-care phase;

c. if applicable, provision is made in accordance with Article 53 paragraph 4 for measures to ensure that the landfill causes no harm or nuisance to the environment.

Art. 43 After-care

1 The after-care phase for a landfill or a compartment begins after the closure of the landfill or the compartment and lasts for 50 years. The cantonal authority shall reduce the after-care phase provided harmful effects or nuisances to the environment are no longer expected. The after-care phase shall however last for at least:

a. 5 years in the case of landfills or compartments of Types A and B;

b. 15 years in the case of landfills or compartments of Types C, D and E.

2 The proprietor of a landfill or a compartment must ensure for the entire after-care phase that:

a. the facilities satisfy the requirements of Annex 2 number 2.1–2.4 and are regularly inspected and maintained;

b. the ground water, collected leachate and the landfill gases are monitored, provided monitoring in accordance with Article 41 and Article 53 paragraph 5 is required.

3 The proprietor must ensure that the surface soil fertility is monitored for five years following closure of a landfill or a compartment.

4 The cantonal authority shall specify the duration of the after-care phase and the obligations of the proprietor of the landfill in accordance with the paragraphs 2 and 3 in the final operating licence for the landfill or compartment fest. It may exempt Type A landfills or compartments from requirements mentioned in paragraphs 2 and 3.

Chapter 5 Final Provisions

Section 1 Implementation

Art. 44 Responsibilities of the Confederation and cantons

1 The cantons shall implement this Ordinance, unless they assign implementation to the Confederation.

2 If federal authorities are required to apply other federal acts or international law agreements or decisions that relate to matters regulated in this Ordinance, they shall also implement this Ordinance. Article 41 paragraphs 2 and 4 EPA govern the

involvement of the FOEN and the cantons; statutory duties of confidentiality are reserved.

Art. 45 Geoinformation

The FOEN shall specify the minimum geodata models and representation models for basic geographical data under this Ordinance; in this respect it is designated as the specialist federal authority in Annex 1 to the Geoinformation Ordinance of 21 May 2008[37].

Art. 46 FOEN implementation guide

The FOEN shall issue an implementation guide on the application of this Ordinance, and in particular on the state of the art for waste disposal. In doing so, it shall work with the federal agencies, cantons and private sector organisations concerned.

Section 2 Repeal and Amendment of other Legislation

Art. 47 Repeal of other legislation

The Technical Ordinance on Waste of 10 December 1990[38] is repealed.

Art. 48 Amendment of other legislation

The amendment of other legislation is regulated in Annex 6.

Section 3 Transitional Provisions

Art. 49 Municipal waste

[1] Articles 3 letter a and 13 paragraph 4 apply from 1 January 2019.

[2] Until 31 December 2018, waste from households and waste of similar composition is deemed to be municipal waste.

Art. 50[39] Reporting

The duty to report in accordance with Article 6 applies from 1 January 2021.

37 SR **510.620**

38 [AS **1991** 169 628, **1993** 3022 No IV 4, **1996** 905, **1998** 2261 Art. 26, **2000** 703 No II 15, **2004** 3079 Art. 43 para. 2 No 2, **2005** 2695 No II 11 4199 Annex 3 No II 6, **2007** 2929 4477 No IV 32, **2008** 2809 Annex 2 No 10 4771 Annex No II 1, **2009** 6259 No II III, **2011** 2699 Annex 8 No II 1]

39 Amended by No I of the O of 21 Sept. 2018, in force since 1 Nov. 2018 (AS **2018** 3515).

Art. 51 Phosphorus-rich waste

The duty to recover phosphorus in accordance with Article 15 applies from 1 January 2026.

Art. 52 Excavated asphalt

[1] Excavated asphalt containing more than 250 mg PAH per kg may be recovered in the course of construction work until 31 December 2025 provided:

a. the excavated asphalt contains no more than 1000 mg PAH per kg and is mixed in appropriate facilities with other material so that it contains no more than 250 mg PAH per kg on recovery; or

b. the excavated asphalt is used with consent the cantonal authority so that no emissions of PAH occur. The cantonal authority shall record the precise level of PAH in the excavated asphalt as well as the location of recovery and shall retain the information for at least 25 years.

[2] Excavated asphalt containing more than 250 mg PAH per kg may be deposited until 31 December 2025 in a landfill of Type E.

Art. 52*a*[40] Wood ash

Filter ash and dust from the incineration of wood that is not wood fuel as defined in Annex 5 number 31 paragraph 2 of the Air Pollution Control Ordinance of 16 December 1985[41] (OAPC) may be deposited until 1 November 2023 in landfills of types D and E (Annex 5 Nos 4.1 and 5.1).

Art. 53 Existing landfills and compartments

[1] Landfills and compartments that came into operation before this Ordinance comes into force may continue in operation provided the requirements for granting an operating licence in accordance with Article 40 are met by 31 December 2020 at the latest.

[2] The cantonal authority shall assess by by 31 December 2020 at the latest whether the landfills or compartments will cause harm or nuisance to the environment or whether they are likely to cause harm or nuisance within 50 years of closure (risk assessment). The proprietors of the landfills shall provide the authority with the data required for this purpose.

[3] Where the risk assessment finds that a landfill or compartment is causing harm or nuisance to the environment or that there is a specific danger of such harm or nuisance, the landfill or compartment may not continue in operation unless improvements are made in accordance with the CSO[42].

[4] Where the risk assessment finds that a landfill or compartment is likely to cause harm or nuisance within 50 years of closure or that there is a specific risk of such

40 Inserted by No I of the O of 21 Sept. 2018, in force since 1 Nov. 2018 (AS **2018** 3515).
41 SR **814.318.142.1**
42 SR **814.680**

harm or nuisance, the landfill or compartment may continue in operation, provided the potential harm or nuisance is prevented through appropriate measures.

5 The proprietor of an existing landfill or an existing compartment with degassing systems must arrange for these facilities to be regularly inspected by an expert until the end of operations and for the landfill gases to be analysed at least twice a year.

Art. 54 Other existing waste disposal facilities

1 Waste disposal facilities other than landfills and compartments that come into operation before this Ordinance comes into force must satisfy the requirements of this Ordinance for structural modifications by 31 December 2020 at the latest. The other requirements apply from the date on which this Ordinance comes into force, subject to paragraphs 2 and 3.

2 The duty under Article 32 paragraph 2 letter a to use at least 55 per cent of the energy content of municipal waste and waste of similar composition in facilities for the incineration of waste applies from 1 January 2026.

3 The duty under Article 32 paragraph 2 letter g to recover metals from filter ash produced in the treatment of municipal waste and waste of similar composition applies from 1 January 2026. Until that date, filter ash may be deposited in hydraulically bound form without the recovery of metals in Type C landfills or compartments provided there are no available treatment capacities for recovery.[43]

Section 4 Commencement

Art. 55

This Ordinance comes into force on 1 January 2016.

43 Amended by No I of the O of 11 Dec. 2020, in force since 1 Jan. 2021 (AS **2020** 6283).

Annex 1[44]
(Art. 6 para. 1 and 27 para. 1)

Types of waste

Code	Description of the waste
	Class 1: Chemical waste
1101	Non-halogenated solvents
1102	Halogenated solvents
1103	Chemical reaction residues
1104	Engine oils
1105	Other technical oils (without PCBs)
1106	Oils containing PCBs
1107	Tars and carbonaceous wastes
1108	Acids and alkalis
1109	Emulsions
1110	Paint and varnish wastes
1111	Adhesive and sealant wastes
1112	Explosive waste, ammunition
1113	Saline waste
1114	Photographic waste and chemicals
1115	Ink wastes
1116	Toner and coating powders
1117	Catalytic converters
1118	Liquid heating fuels
1119	Gases in pressure vessels
1120	Biocides, wood preservatives and similar chemicals
1121	Other hazardous chemical waste
1301	Chemical waste not subject to OMW controls
	Class 2: Medical waste
2101	Waste carrying a risk of contamination or infection
2102	Used medicines and solid pharmaceutical waste
2103	Medical waste with risk of injury
2104	Non-infectious medical waste
2301	Medical waste not subject to OMW controls
	Class 3: Metallic waste
3101	Cable scrap containing hazardous substances
3102	Other metallic special waste
3201	Cable scrap
3202	Scrap metal debris and cargo waste
3301	Metals from communal and other collections
3302	Metallic waste not subject to OMW controls
	Class 4: Mineral waste
4101	Excavation waste contaminated by hazardous substances
4102	Excavated asphalt containing more than 1000 mg PAH per kg
4103	Mixed construction waste that hazardous substances include
4104	Waste from the exploitation of natural resources
4105	Waste containing asbestos
4106	Other special mineral waste

44 Revised by No II of the O of 21 Sept. 2018, in force since 1 Nov. 2018 (AS **2018** 3515).

Code	Description of the waste
4107	Refractory materials
4201	Contaminated excavation waste not containing hazardous substances[45]
4202	Excavated asphalt containing from 250 to 1000 mg PAH per kg
4203	Mixed and contaminated construction waste not containing hazardous substances
4301	Uncontaminated excavation waste[46]
4302	Lightly contaminated excavation waste[47]
4303	Concrete rubble
4304	Mixed rubble
4305	Brick rubble
4306	Uncontaminated plaster
4307	Excavated asphalt containing up to 250 mg PAH per kg
4308	Road surface rubble
4309	Glass waste from communal and other collections
4310	Other glass waste not subject to OMW controls
4311	Other mineral waste not subject to OMW controls
	Class 5: Systems, machines, vehicles and accessories as well as electrical and electronic appliances
5101	Lead-acid batteries and lead accumulators
5102	Other batteries and accumulators
5103	Components of electrical/electronic appliances containing PCBs
5104	Components of electrical-/electronic appliances containing other hazardous substances
5105	Vehicle and machine parts
5201	End-of-life vehicles
5202	Used tyres
5203	Electrical/electronic appliances containing hydro- or fully halogenated chlorofluorocarbons (CFCs)
5204	Other electrical/electronic appliances and components
5301	Components from used electrical/electronic appliances not subject to OMW controls
	Class 6: Biogenic waste
6101	Problematic wood residues
6201	Cooking oils and fats excluding those from communal and other collections
6202	Waste wood
6301	Natural wood
6302	Residual wood
6303	Biogenic waste from communal and other collections
6304	Biogenic waste from agriculture, industry and commerce
	Class 7: Sludges and treatment residues
7101	Slag and ash
7102	Flue gas cleaning-residues
7103	Combustible lightweight fractions from the shredding of waste containing metal
7104	Filter, absorbent and ion exchange materials
7105	Street and farmyard sludges
7106	Other sludges and industrial waste water
7107	Sludges containing oil and treatment residues

45 Excavation material that does not meet the requirements of Annex 3 number 2.
46 Excavation material that meets the requirements of Annex 3 number 1.
47 Excavation material that meets the requirements of Annex 3 number 2.

Code	Description of the waste
7108	Other treatment residues
7201	Fine material from construction waste separation
7301	Sewage sludge from the communal waste water treatment and faecal sludge
7302	Sludges and treatment residues not subject to OMW controls
7303	Combustible sludges and treatment residues
7304	Fine material from the processing of construction rubble
	Class 8: Other types of waste
8101	Special waste from the communal collections
8301	Street sweepings
8302	Fire debris
8303	Paper and cardboard waste from communal and other collections
8304	Other paper- and cardboard waste
8305	Plastic waste from communal and other collections
8306	Other plastic waste
8307	Textile waste and clothing from communal and other collections
8308	Other Textile waste and clothing
8309	Other combustible waste from communal and other collections
8310	Other combustible waste

Annex 2
(Art. 6 para. 3, 36 para. 1, 42 para. 2 and 43 para. 2)

Requirements for location and construction of landfills

1 Landfill location

1.1 Waters protection and natural hazards

1.1.1 Landfills may not be constructed in groundwater protection zones and groundwater protection areas.

1.1.2 Landfills may not be located in an area at high risk of flooding, rockfalls, landslides or erosion.

1.1.3. Landfills and compartments of Types B, C, D and E may not be located above exploitable underground waters or in adjoining zones required for the protection of such waters. The foregoing does not apply to the construction of a Type B landfill or compartment in the zone adjoining exploitable underground waters.

1.1.4 Landfills and compartments of Types A and B that are located above exploitable underground waters or in adjoining zones required for the protection of such waters must lie at least 2 m above the highest maximum natural ten-year groundwater level. In the case of a recharge installation, the actual level of the water table applies if it is higher than the maximum ten-year high.

1.2 Subsoil

1.2.1 The subsoil and the surrounding area of the landfill, if necessary, taking account of structural measures, must guarantee the landfill's long-term stability and prevent any deformation that may in particular adversely affect the proper functioning of the required facilities under number 2.

1.2.2 In the case of landfills and compartments of Type B in the zone adjoining exploitable underground waters and of Types C, D and E, the thickness, homogeneity and ability to retain contaminants of the subsoil and the surrounding area, if necessary taking account of technical improvement measures, must guarantee that the groundwater will not be adversely affected in the long term. The following minimum requirements apply:

a. In the case of Type B landfills and compartments there must be a 2 m thick, largely homogeneous natural geological barrier with a mean hydraulic conductivity (k) of $1.0 \times 10\text{-}7$ m/s or the subsoil must be supplemented according to state-of-the-art civil engineering practice by at least 3 homogenous mineral layers with a mean k of $1.0 \times 10\text{-}8$ m/s that together have an overall thickness of 60 cm. If supplementing the subsoil, only material that satisfies the requirements of Annex 3 number 1 may be used.

b. In the case of landfills of Types C, D and E there must be a 7 m thick, largely homogeneous, natural geological barrier with a mean k of 1.0×10^{-7} m/s or a 2 m thick, largely homogeneous, natural geological barrier with a mean k of 1.0×10^{-7} m/s that is supplemented according to state-of-the-art civil engineering practice by at least 3 homogenous mineral layers with a mean k of 1.0×10^{-9} m/s that together have an overall thickness of 60 cm. When supplementing the subsoil, only material that satisfies the requirements of Annex 3 number 1 may be used.

1.2.3 In the case of landfills and compartments of Types C and D, the requirements of number 1.2.2 letter b need not be met if:

a. the landfill or the compartment cannot be constructed at a location that satisfies the requirements of number 1.2.2 letter b;

b. the landfill or the compartment is not constructed on karstic rock; and

c. the subsoil is supplemented according to state-of-the-art civil engineering practice by at least 3 homogenous mineral layers with a mean k of 1.0×10^{-9} m/s that together have an overall thickness of 80 cm. When supplementing the subsoil, only material that satisfies the requirements of Annex 3 number 1 may be used.

1.2.4 Compliance with number 1.2.1 must be verified by foundation analyses and settlement calculations that take account of the waste deposited. Compliance with numbers 1.2.2 and 1.2.3 must be verified by geological and hydrogeological tests.

2 Landfill structure

2.1 General regulations

2.1.1 The design and selection of materials must guarantee that the required facilities will function safely until the end of the after-care phase. Account must be taken of physical, chemical and biological processes which may occur in the landfill during construction, operation and after closure.

2.1.2 Landfills and compartments of Type B in the zone adjoining exploitable underground waters and of Types C, D and E must be constructed in such a way that the waste water does not accumulate and can drain away freely by gravity to the point of entry into a body of water or the public sewer system.

2.2 Liner

2.2.1 The base and sides of landfills and compartments of Types C, D and E must be sealed with a liner that prevents the leaching of waste water during operations and until the end of the after-care phase, and which allows waste water to collect. The following are permitted:

a. Mineral liner: it must be at least 80 cm thick and have a mean k of less than or equal to 1 x 10-9 m/s. It must be installed in at least three layers

and each layer must be compacted separately and protected against drying out.

b. Liner made of an asphalt: it must be at least 7 cm thick, be laid on a suitable foundation and binder layer and compacted so that the cavity content, measured by means of a sample, is no more than 3 per cent.

c. Liner made of plastic membrane: it must be at least 2.5 mm thick and be laid on a mineral seal constructed in accordance with letter a that is at least 50 cm thick.

d. Other liners: laboratory and field tests must prove that these are at least equivalent to the liners described in letters a–c.

2.2.2 When selecting and fitting the liner, account must be taken of the structure of the subsoil, the slope of the base and sides of the landfill and the characteristics of the drainage layer.

2.2.3 Only mineral materials that satisfy the requirements of Annex 3 number 1 may be used for mineral liners.

2.2.4 The efficacy of the liners must be tested and documented during construction and before the covering.

2.3 Partitioning of compartments

2.3.1 Partitions between compartments of Types A and B must guarantee that no water from the Type B compartment enters the Type A compartment.

2.3.2 Partitions between compartments where at least one is of Type C, D or E must guarantee no exchange of substances takes place between the compartments. The following are permitted:

a. Mineral partitions: they must be 80 cm thick and have a mean k of less than or equal to 1×10^{-9} m/s.

b. Other partitions: proof must be provided by means of laboratory and field tests that the partitions are equivalent to a mineral partition in accordance with letter a.

2.3.3 Partitions between compartments must be made as vertical as possible and the waste that is less susceptible to settlement must be deposited in the lower compartment.

2.3.4 For mineral partitions of compartments only mineral material that meets the following limit values may be used:

a. Annex 3 number 1 letter c between compartments of Type A and other compartments;

b. Annex 5 number 2.3 letters b and c between compartments of Type B and compartments of Types C, D and E;

c. Annex 5 number 4.4 between compartments of Types C, D and E.

2.4 Drainage

2.4.1 The drainage system must guarantee that leachate produced is collected and discharged.

2.4.2 Landfills and compartments of Type A must have a drainage system if drainage is required to ensure the stability of the landfill or of the compartment.

2.4.3 Landfills and compartments of Type B must have a drainage system if they are located in the zone adjoining exploitable underground waters or drainage is required to ensure the stability of the landfill or of the compartment.

2.4.4 Landfills and compartments of Types C, D and E must have a drainage system made up of the following elements:

a. a drainage layer above the base and sides made of material that satisfies the requirements of Annex 5 number 2.3;

b. drainage conduits laid in the drainage layer to collect and discharge the leachate;

c. if water can enter from the subsoil and the sides: a suitable system under the liner.

2.4.5 Where the landfill is made up of two or more compartments that require a drainage system, the systems for the individual compartments must be independent of each other and it must be possible to check each system individually.

2.4.6 Collected leachate must be discharged into a body of water or into the public sewer system in accordance with the requirements of the waters protection legislation.

2.4.7 If collected, untreated leachate is discharged into a body of water, structural measures must be taken to ensure that the waste water can be checked at any time and if necessary can be treated or discharged into a waste water treatment plant.

2.4.8 Drainage conduits must be laid so that they have a minimum incline of 2 per cent after settlement is completed.

2.4.9 A suitable means of access must be provided to ensure that it is possible to carry out checks and maintenance work on the main conduits and other essential parts of the system at all times.

2.4.10 Landfills or compartments of Types C, D and E must be fitted with systems such as collecting pipes or siphons on drainage conduits that guarantee that the gaseous effluents can be collected where this is necessary to guarantee the soil fertility or for safety reasons.

2.5 Surface closure

2.5.1 If no more waste is to be deposited, the surface of the landfills must be closed as follows:

a. The incline of the surface must be sufficient to allow proper drainage.
b. An appropriate seal and a drainage layer provided to prevent precipitation water from infiltrating into the landfill if this is required due to the composition of the leachate produced. Any settlement the landfill or of the compartment must first be allowed to take place.
c. The surface must be landscaped to appear as natural as possible and, if not used for agriculture, must be planted with site-appropriate vegetation.
d. Culverted waters in the vicinity of the landfill must be uncovered and channelled around the landfill.

2.5.2 Only materials that satisfy the requirements of Annex 3 number 1 may be used for the uppermost thirds of the seal and the drainage layer. The lower layers of the seal may use materials that satisfy the requirements for deposit in the corresponding type of landfill and which are suitable for use in construction terms.

2.5.3 If measures are taken to prevent the landfill from causing harm or nuisance to the environment, implementation of the measures must be delayed until after the final closure of the surface if this is necessary to ensure the stability of the closed surface. Until then, appropriate measures must be taken to prevent erosion.

Annex 3
(Art. 17 para. 1 and 19)

Requirements applicable to excavated material

1 Excavated material must be recovered in accordance with Article 19 paragraph 1 if:

a. it consists to at least 99 per cent by weight of loose or broken rock and other mineral construction waste;

b. it does not contain any foreign substances such as municipal waste, biogenic waste or other non-mineral construction waste; and

c. the substances that it contains do not exceed the following limit values (total content) or any excess is not due to human activities:

Substance	Limit value in mg/kg of dry matter
Antimony	3
Arsenic	15
Lead	50
Cadmium	1
Chromium, total	50
Chromium (VI)	0.05
Copper	40
Nickel	50
Mercury	0.5
Zinc	150
Cyanide, total	0.5
Volatile chlorinated hydrocarbons (CHCs)*	0.1
Polychlorinated biphenyls (PCBs)**	0.1
Aliphatic hydrocarbons C_5–C_{10}***	1
Aliphatic hydrocarbons C_{10}–C_{40}	50
Monocyclic aromatic hydrocarbons (BTEX)****	1
Benzene	0.1
Polycyclic aromatic hydrocarbons (PAHs)*****	3
Benzo[*a*]pyrene	0.3

* ∑7 CHCs: dichlormethane, trichlormethane, tetrachlormethane, *cis*-1,2-dichlorethylene, 1,1,1-trichlorethane, trichlorethylene (Tri), perchlorethylene (Per)

** ∑6 congeners × 4.3 (IUPAC No): 28, 52, 101, 138, 153, 180

*** $\sum C_5$- bis C_{10}-hydrocarbons: area of FID chromatogram between *n*-pentane and *n*-decane multiplied by the response factor of *n*-hexane, minus ∑BTEX

**** ∑6BTEX: benzene, toluene, ethyl benzene, *o*-xylene, *m*-xylene, *p*-xylene

***** ∑16 EPA-PAH: naphthalene, acenaphthylene, 1,2-dihydroacenaphthylene, fluorene, phenanthrenw, anthracene, fluoranthene, pyrene, benz[*a*]anthracene, chrysene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, dibenz[*a,h*]anthracene, benzo[*g,h,i*]perylene, and indeno[1,2,3-*c,d*]pyrene

2 Excavated material must be recovered in accordance with Article 19 paragraph 2 if:

a. it consists to at least 95 per cent by weight of loose or broken rock and other mineral construction waste;

b. foreign substances such as municipal waste, biogenic waste or other non-mineral construction waste have as far as possible been removed; and

c. the substances that it contains do not exceed the following limit values (total content) or any excess is not due to human activities:

Substance	Limit value in mg/kg of dry matter
Antimony	15
Arsenic	15
Lead	250
Cadmium	5
Chromium, total	250
Chromium (VI)	0.05
Copper	250
Nickel	250
Mercury	1
Zinc	500
Volatile chlorinated hydrocarbons (CHCs)*	0.5
Polychlorinated biphenyls (PCB)**	0.5
Aliphatic hydrocarbons C_5–C_{10}***	5
Aliphatic hydrocarbons C_{10}–C_{40}	250
Monocyclic aromatic hydrocarbons (BTEX)****	5
Benzene	0.5
Polycyclic aromatic hydrocarbons (PAH)*****	12.5
Benzo[*a*]pyrene	1.5
Total organic carbon (TOC)	10 000

*, **, ***, ****, ***** see explanatory notes for number 1 letter c

3 If no limit values have been set for substances detected in the excavated material, the authority shall assess the waste with the FOEN's consent in the specific case in accordance with the regulations on environmental and waters protection legislation.

Annex 4[48]
(Art. 19 para. 3 and 24)

Requirements applicable to waste from the production of cement and concrete

1 Using waste as a raw material and as a corrective substance to raw meal

1.1 Waste may be used as a raw material in the production of cement clinker if the following limit values (total content) are not exceeded and the cement clinker produced satisfies the requirements of number 1.4:

Substance	limit in mg/kg of dry matter
Antimony	30
Arsenic	30
Lead	500
Cadmium	5
Chromium, total	500
Cobalt	250
Copper	500
Nickel	500
Mercury	1
Thallium	3
Zinc	2 000
Tin	100
Volatile chlorinated hydrocarbons (CHCs)*	10
Polychlorinated biphenyls (PCB)**	10
Aliphatic hydrocarbons C_5–C_{10}***	100
Aliphatic hydrocarbons C_{10}–C_{40}	5 000
Monocyclic aromatic hydrocarbons (BTEX)****	10
Benzene	1
Polycyclic aromatic hydrocarbons (PAH)*****	250
Benzo[*a*]pyrene	3
Total organic carbon (TOC)	50 000

* ∑7 CHCs: dichlormethane, trichlormethane, tetrachlormethane, *cis*-1,2-dichlorethylene, 1,1,1-trichlorethane, trichlorethylene (Tri), perchlorethylene (Per)
** ∑6 congeners × 4.3 (IUPAC No): 28, 52, 101, 138, 153, 180
*** ∑C_5- bis C_{10}-hydrocarbons: area of FID chromatogram between *n*-pentane and *n*-decane multiplied by the response factor of *n*-hexane, minus ∑BTEX
**** ∑6BTEX: benzene, toluene, ethyl benzene, *o*-xylene, *m*-xylene, *p*-xylene
***** ∑16 EPA-PAH: naphthalene, acenaphthylene, 1,2-dihydroacenaphthylene, fluorene, phenanthrenw, anthracene, fluoranthene, pyrene, benz[*a*]anthracene, chrysene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, dibenz[*a,h*]anthracene, benzo[*g,h,i*]perylene, and indeno[1,2,3-*c,d*]pyrene

48 Revised by No II of the O of 12 Feb. 2020, in force since 1 April 2020 (AS **2020** 801).

1.2 The authority may permit higher levels of organic substances in specific cases if proof is provided that appropriate measures are being taken to satisfy the requirements of the Air Pollution Control Ordinance of 16 December 1985[49] (APCO) relating to limiting emissions of the substances concerned.

1.3 Waste that consists primarily of calcium, aluminium, iron or silicon may be used as raw meal corrective substances if it:

a. contains no more than 10 mg cadmium per kg;

b. does not exceed the limit values in number 1.1 for mercury, thallium and for organic substances; and

c. makes up no more than 5 per cent by weight of the total quantity of raw material and raw meal corrective substances.

1.4 Excavated material may be used for producing cement clinker provided:

a. the limit values in number 1.1 are not exceeded or any excess is not due to human activities;

b. the limit values in number 1.1 for cadmium, mercury, thallium and organic substances are not exceeded or the requirements of number 1.2 are satisfied; and

c. the cement clinker produced satisfies the requirements of number 1.6.

1.5 Sludges from the processing of excavated material in accordance with number 1.4 may be used for producing cement clinker provided:

a. the limit values in number 1.1 for cadmium, mercury, thallium and organic substances are not exceeded or the requirements of number 1.2 are satisfied; and

b. the cement clinker produced satisfies the requirements of number 1.6.

1.6 The heavy metal content of cement clinker produced using waste may not exceed the following limit values (total content), or any excess is not due to human activities:

Substance	Limit in mg/kg
Antimony	15
Arsenic	15
Lead	250
Cadmium	5
Chromium, total	250
Cobalt	125
Copper	250
Nickel	250
Zinc	750
Tin	50

49 SR **814.318.142.1**

2 Using waste as heating fuel

2.1 In the production of cement clinker the following waste may be used as heating fuels in the main and second firing if the cement clinker produced satisfies the requirements of number 1.4:

a. waste that primarily consists of rubber and does not contain any mercury, such as used tyres;

b. waste wood and wood residues, with the exception of waste wood and wood residues that have been impregnated with wood preservatives in a printing process, are coated with halogenated organic compounds or have been treated intensively with wood preservatives such as pentachlorophenol, unless they are treated in the firing process at a minimum temperature of 1100 °C for at least 2 seconds;

c. unmixed paper, cardboard, textile or plastic waste, unless recycling according to the state of the art is possible;

d. organic solvents and used oil, with the exception of organic solvents and used oil that do not meet the limit values for PCBs and halogenated organic substances in number 2.2 letter a, unless they are treated in the firing process at a minimum temperature of 1100 °C for at least 2 seconds;

e. sewage sludge from central waste water treatment plants, animal and bone meal, provided any phosphorus has been removed beforehand in accordance with Article 15.

2.2 Other waste may be used as heating fuel in the main and second firing, provided the cement clinker produced satisfies the requirements of number 1.4 and the waste:

a. does not exceed not exceed the following limit values (total content):

Substance	Limit in mg/kg
Antimony	300
Arsenic	30
Lead	500
Cadmium	5
Chromium, total	500
Cobalt	250
Copper	500
Nickel	500
Mercury	1
Thallium	3
Zinc	4 000
Tin	100
Polychlorinated biphenyls (PCB)*	10
Halogenated organic substances, as chloride	10 000

* Σ6 congeners × 4.3 (IUPAC_No.): 28, 52, 101, 138, 153, 180

b. does not contain medical waste;

c. does not contain unsafe waste, such as explosive or self-igniting waste.

2.3 The authority may permit higher levels in specific cases if proof is provided that:

a. appropriate measures are being taken to satisfy the requirements of the APCO relating to limiting emissions of the substances concerned; and

b. the heavy metal content of the cement clinker produced does not exceed the following limit values (total content), or any excess is not due to human activities:

substance	limit in mg/kg
Antimony	7.5
Arsenic	7.5
Lead	125
Cadmium	2.5
Chromium, total	125
Cobalt	62.5
Copper	125
Nickel	125
Zinc	750
Tin	25

3 Using waste as additives and aggregates

3.1 In grinding cement clinker and producing cement and concrete, the following waste may be used as additives or aggregates:

a. plaster from the gas desulphurisation of coal-fired power stations and from the construction industry;

b. fly ash;

c. paper ash;

d. ash from the incineration of wood;

e. granulated blast furnace slag from the production of iron;

f. other waste that complies with the limit values in Annex 3 number 2 letter c;

g. electric arc furnace slag from the production of unalloyed or low alloyed steels after 1989.

3.2 In the production of cement, dusts from the exhaust filtering of facilities producing cement clinker may be used as additives or aggregates provided the heavy metal content of the manufactured cement does not exceed the following limit values:

Substance	mg/kg
Cadmium	2
Mercury	0,5
Thallium	2

4 Proof and modification of the limit values

4.1 Proprietors of facilities producing clinker, cement or concrete must provide proof that the requirements of numbers 1–3 are being met. In doing so, they may with the consent of the authority limit chemical analyses to those substances in the case of which a contamination of waste is likely in view of the type and origin of the waste.

4.2 If waste contains substances hazardous to the environment for which there are no limit values in numbers 1–3, the authority shall specify a limit value in each individual case with the FOEN's consent in accordance with the regulations in the environmental and waters protection legislation.

Annex 5[50]
(Art. 19 para. 3, 25 para. 1, 35 para. 1, 39 para. 2 and 40 para. 3)

Requirements for landfill waste

1 Type A acceptable waste

The following waste may be deposited in Type A landfills and compartments, provided it is not contaminated with other waste:

a. excavated material that satisfies the requirements of Annex 3 number 1, provided recoverable material is removed beforehand;

b. gravel-wash sludge from the treatment of excavated material in accordance with letter a;

c. removed topsoil and subsoil if they meet the benchmark values in Annexes 1 and 2 SoilPO[51];

d. bedload from sediment retention basins.

2 Type B acceptable waste

2.1 The following waste may be deposited in Type B landfills and compartments, provided it is not contaminated with other waste:

a. acceptable waste for Type A landfills and compartments;

b. flat glass and packaging glass;

c. waste produced after firing in the production of ceramic products, bricks, tiles and stoneware;

d. electric arc furnace slag from the production of unalloyed or low alloyed steels after 1989;

e. excavated asphalt containing up to 250 mg PAH per kg;

f. mineral waste with bound asbestos fibres;

g. construction waste other than that mentioned in the letters a, e and f at least 95 per cent by weight of which consists of stones or rocklike material, provided recyclable parts are removed beforehand.

2.2 Vitrified residues may be deposited in Type B landfills and compartments provided no exchange of substances with other waste can occur and the following requirements are met:

a. The vitrified residues must originate from a process that results in a homogeneous melt. This result is normally achieved if the melt reaches a temperature of at least 1200 °C.

b. The silica content must amount to at least 25 per cent by weight and the weight ratio of silica to calcium oxide must amount to at least 0.54.

c. The vitrified residues may not be ground before being deposited.

50 Revised by No II of the O of 21 Sept. 2018, in force since 1 Nov. 2018 (AS **2018** 3515).
51 SR **814.12**

d. The solubility of the vitrified residues must be so low that following a three-day period of leaching at 90°C the concentration of silicon in the eluate is less than 12 mg/l and that of calcium is less than 15 mg/l. The 100–125 µm fraction of the ground vitrified residues is used for the leaching test. In that test, 50 mg of the ground residues is analysed in 100 ml water.

e. Particulate metals contained in the wastes are to be recovered prior to, during or after incineration.

f. The heavy metal content of the vitrified residues may not exceed the following limit values (total content):

Substance	Limit in mg/kg
Lead	1000
Cadmium	10
Chromium	4000
Copper	3000
Nickel	500
Zinc	6000

In specific cases and in agreement with the Federal Office, the authority may permit higher heavy metal concentrations in the operating licence if this results in less environmental impact than any other form of disposal.

2.3 Other waste may be deposited in Type B landfills and compartments provided:

a. at least 95 per cent by weight of the dry matter of the waste must consist of stones or rocklike material;

b. it does not exceed the following limit values (total content):

Substance	Limit in mg/kg dry matter
Antimony	30
Arsenic	30
Lead	500
Cadmium	10
Chromium, total	500
Chromium (VI)	0,1
Copper	500
Nickel	500
Mercury	2
Zinc	1 000
Volatile chlorinated hydrocarbons (CHCs)*	1
Polychlorinated biphenyls (PCB)**	1
Aliphatic hydrocarbons C_5–C_{10}***	10
Aliphatic hydrocarbons C_{10}–C_{40}	500

Substance	Limit in mg/kg dry matter
Monocyclic aromatic hydrocarbons (BTEX)****	10
Benzene	1
Polycyclic aromatic hydrocarbons (PAH)*****	25
Benzo(*a*)pyren	3
Total organic carbon (TOC)	20 000

* ∑7 CHCs: dichlormethane, trichlormethane, tetrachlormethane, *cis*-1,2-dichlorethylene, 1,1,1-trichlorethane, trichlorethylene (Tri), perchlorethylene (Per)
** ∑6 congeners × 4.3 (IUPAC No): 28, 52, 101, 138, 153, 180
*** $\sum C_5$- bis C_{10}-hydrocarbons: area of FID chromatogram between *n*-pentane and *n*-decane multiplied by the response factor of *n*-hexane, minus ∑BTEX
**** ∑6BTEX: benzene, toluene, ethyl benzene, *o*-xylene, *m*-xylene, *p*-xylene
***** ∑16 EPA-PAH: naphthalene, acenaphthylene, 1,2-dihydroacenaphthylene, fluorene, phenanthrenw, anthracene, fluoranthene, pyrene, benz[*a*]anthracene, chrysene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, dibenz[*a,h*]anthracene, benzo[*g,h,i*]perylene, and indeno[1,2,3-*c,d*]pyrene

c. the proportion of soluble salts in the untreated waste does not exceed 0.5 per cent by weight;

d. the limit values for the substances listed in the following tables are not exceeded in the eluate of the waste. To determine this, the waste must be submitted to a leaching test over a period of 24 hours in distilled water:

Substance	Limit
Ammonia/Ammonium	0.5 mg N/L
Fluoride	2.0 mg/L
Nitrite	1.0 mg/L
Dissolved organic carbon (DOC)	20.0 mg C/L
Cyanide (free)	0.02 mg CN/L

2.4 The limit in number 2.3 letter b for TOC does not apply to removed topsoil and subsoil, unless the excess is due to human activities.

3 Type C acceptable waste

3.1 The following waste may be deposited in Type C landfills and compartments, provided it satisfies the requirements of the numbers 3.2–3.5:

a. residues from flue gas cleaning from facilities in which municipal waste or waste of similar composition is incinerated, provided metals are recovered beforehand in accordance with Article 32 paragraph 2 letter g;

b. residues from flue gas cleaning in the incineration of waste in industry and commerce that are not similar to municipal waste;

c. residues from the treatment of waste water produced in facilities for the incineration of waste;

d. furnace linings;

e. other metal-containing, inorganic and poorly soluble waste, provided the metals are recovered beforehand.

3.2 The waste must meet the following requirements:

a. No pollutants may be released in the long-term.

b. The proportion of soluble salts in the waste may not exceed 3 per cent by weight.

c. On contact with other waste, water or air, the waste cannot form gases or readily water-soluble substances.

d. the limit values for the substances listed in the following tables are not exceeded in the eluate of the waste. To determine this, the waste must be submitted to two tests. Water continually saturated with carbon dioxide must be used as leaching agent in test 1, while distilled water must be used in test 2.

Test 1

Substance	Limit	
Aluminium	10.0	mg/L
Arsenic	0.1	mg/L
Barium	5.0	mg/L
Lead	1.0	mg/L
Cadmium	0.1	mg/L
Chromium-(III)	2.0	mg/L
Cobalt	0.5	mg/L
Copper	0.5	mg/L
Nickel	2.0	mg/L
Mercury	0.01	mg/L
Zinc	10.0	mg/L
Tin	2.0	mg/L

Test 2

Substance	Limit
Ammonia/Ammonium	5.0 mg N/L
Cyanide (free)	0.1 mg CN-/L
Chromium-(VI)	0.1 mg/L
Fluoride	10.0 mg/L
Nitrite	1.0 mg/L
Sulfite	1.0 mg/L
Sulfide	0.1 mg/L
Phosphate	10.0 mg P/L
Dissolved organic carbon (DOC)	20.0 mg C/L
pH value	6–12

3.3 The total content of polychlorinated dibenzo[1,4]dioxins (PCDDs) and polychlorinated dibenzofurans (PCDF) in residues from flue gas cleaning in accordance with number 3.1 letters a and b may not exceed 1 µg per kg. The calculation of the content is carried out on the basis of the toxicity equivalency factors (TEF) according to the state of the art.

3.4 The content in organic substances of waste in accordance with number 3.1 letters c–e may not exceed the following limit values (total content):

Substance	Limit in mg/kg dry matter
Volatile chlorinated hydrocarbons (CHCs)*	1
Polychlorinated biphenyls (PCB)**	1
Aliphatic hydrocarbons C_5–C_{10}***	10
Aliphatic hydrocarbons C_{10}–C_{40}	500
Monocyclic aromatic hydrocarbons (BTEX)****	10
Benzene	1
Polycyclic aromatic hydrocarbons (PAH)*****	25
Benzo(*a*)pyrene	3
Total organic carbon (TOC)	20 000

*, **, ***, ****, ***** See the explanatory notes for number 2.3 letter b

3.5 The total mercury content of waste containing metal, and inorganic or poorly soluble waste in accordance with number 3.1 letter e may not exceed 5 mg per kg in relation to the dry matter,.

4 Type D acceptable waste

4.1 The following waste may be deposited on landfills and compartments of Type D:

a. filter ash from facilities in which municipal waste or waste of similar composition is incinerated, provided metals in accordance with Article 32 paragraph 2 letter g are recovered beforehand;

b. screen glass, after its coating has been completely removed;

c. vitrified residues in accordance with number 2.2;

d. slag containing no more than 20 000 mg TOC per kg from facilities in which special waste is incinerated;

e. filter ash that has undergone acid scrubbing;

f. bed and grate ash as well as filter ash and dust from the thermal use of wood fuel in accordance with Annex 5 number 31 paragraph 1 of the Air Pollution Control Ordinance of 16 December 1985[52] (OAPC);

g. bed and grate ash from the incineration of wood that is not wood fuel as defined in Annex 5 number 31 paragraph 2 OAPC containing no more than 20 000 mg TOC per kg;

h. non-combustible mineral shot butt material.

4.2 The total content of PCDDs and PCDFs in filter ash in accordance with number 4.1 letters a and e may not exceed 1 µg per kg. The calculation of the content is carried out on the basis of the toxicity equivalency factors (TEF) according to the state of the art.

4.3 Slag from facilities in which municipal waste or waste of similar composition is incinerated may be deposited in Type D landfills or compartments if:

a. the non-ferrous particulate metals contained in the slag have been recovered beforehand at least to the extent that their proportion in the slag does not exceed 1.5 per cent by weight. In order to determine the content in non-ferrous metals, the slag is ground to a particle size of 2 mm;

b. it contains no more than 20 000 mg TOC per kg.

4.4 Forms of ash from the incineration of sewage sludge and non-combustible mineral shot butt material may be deposited in Type D landfills or compartments provided:

a. they do not exceed the following limit values (total content):

Substance	Limit in mg/kg in dry matter
Antimony	50
Arsenic	50
Lead	2 000
Cadmium	10
Chromium, total	1 000

52 SR **814.318.142.1**

Substance	Limit in mg/kg in dry matter
Chromium (VI)	0,5
Copper	5 000
Nickel	1 000
Mercury	5
Zinc	5 000
Volatile chlorinated hydrocarbons (CHCs)*	1
Polychlorinated biphenyls (PCB)**	1
Aliphatic hydrocarbons C_5–C_{10}***	10
Aliphatic hydrocarbons C_{10}–C_{40}	500
Monocyclic aromatic hydrocarbons BTEX****	10
Benzene	1
Polycyclic aromatic hydrocarbons (PAH)*****	25
Benzo(*a*)pyrene	3
Total organic carbon (TOC)	20 000
*, **, ***, ****, ***** See the explanatory notes for number 2.3 letter b	

b. the concentration of free cyanide in the eluate of the waste does not exceed 0.02 mg per l; to determine this, the waste must be submitted to a leaching test over a period of 24 hours in distilled water.

5 Type E acceptable waste

5.1 The following waste may be deposited in Type E landfills and compartments of:

a. residues from the treatment of grit chamber waste resulting from sewer cleaning;

b. waste arising from floods or fires, provided it has been roughly sorted and cannot be disposed of in any other way;

c. the non-combustible, fine fraction of residues from the mechanical treatment of construction waste, unless it exceeds the limit values of number 5.2 letter a for PCBs and PAHs;

d. non-combustible construction waste made up of composite materials;

e. waste containing asbestos;

f. bed and grate ash as well as filter ash and dust from the thermal use of wood fuel in accordance with Annex 5 number 31 paragraph 1 OAPC;

g. bed and grate ash from the incineration of wood that is not defined as wood fuel in Annex 5 number 31 paragraph 2 OAPC containing no more than 50 000 mg TOC pro kg.

5.2 Other waste may be deposited in Type E landfills and compartments provided:

a. it does not exceed the following limit values (total content):

Substance	Limit in mg/kg dry matter
Antimony	50
Arsenic	50
Lead	2 000
Cadmium	10
Chromium, total	1 000
Chromium (VI)	0,5
Copper	5 000
Nickel	1 000
Mercury	5
Zinc	5 000
Volatile chlorinated hydrocarbons (CHCs)*	5
Polychlorinated biphenyls (PCB)**	10
Aliphatic hydrocarbons C_5–C_{10}***	100
Aliphatic hydrocarbons C_{10}–C_{40}	5 000
Monocyclic aromatic hydrocarbons BTEX****	100
Benzene	1
Polycyclic aromatic hydrocarbons (PAH)*****	250
Benzo(*a*)pyrene	10
Total organic carbon (TOC)	50 000

*, **, ***, ****, ***** See the explanatory notes for number 2.3 letter b

b. the proportion of soluble salts in the untreated waste does not exceed 5 per cent by weight;

c. the concentration of free cyanide in the eluate of the waste does not exceed 0.03 mg per l; to determine this, the waste must be submitted to a leaching test over a period of 24 hours in distilled water.

5.3 In specific cases, the cantonal authority may with the FOEN's consent authorise the deposit of waste that is not in mentioned number 5.1 and which does not satisfy the requirements of number 5.2, provided no form of disposal other than landfill is technically feasible.

5.4 Waste that is permitted in Type A landfills and compartments may be deposited in Type E landfills and compartments as a levelling layer before surface closure, provided no waste in accordance with numbers 5.1-5.3 is used.

6 Proof and amendment of the limit values

6.1 Proprietors of waste must prove that the requirements in numbers 1–5 have been met. In doing so, they may with the consent of the authority limit

chemical analyses to those substances in the case of which a contamination of waste is likely in view of the type and origin of the waste.

6.2 If waste contains substances hazardous to the environment for which there are no limit values in numbers 1–5, the authority shall specify a limit value in each individual case with the FOEN's consent in accordance with the regulations in the environmental and waters protection legislation.

Annex 6
(Art. 48)

Amendment of other legislation

The following enactments are amended as follows:

…[53]

53 The amendments may be consulted under AS **2015** 5699.