Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

Austrian environmental requirements for alternative and waste materials used in earthworks

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Materials used in earthworks in Austria - I

- (clean) soil excavation material excavated on site
- fractions of soil excavation material after treatment (cleaning, remove of contaminations or technical conditioning)
- natural aggregates made from excavation material
- Tunnel excavation material (with or without treatment)

Materials used in earthworks in Austria - II

- Soil excavation material from other building operations
- Recycled aggregates made from construction and demolition waste, railway ballast, technical layers
- blast furnace slags (as by-product)

Situation in Austria

- has a lot of easy available natural resource of soil and rock materials
- no relevant sources of material from mining and only a few steel/iron plants
- most important fractions include tunnel excavation material and soil excavation material originated on various building site
- Recycled and natural aggregates and slags (including reclaimed asphalt or concrete) are mainly used for technical layers or the production of new asphalt or concrete.

Relevant Regulations

- Austrian Construction & Demolition waste ordinance 2015 (generation and end-of-waste status for recycled aggregates and steel slags)
- Waste-Management plan / chapter 4.9. guideline/regulation for recycling of excavated soil material
- End-of-waste ordinance for excavation material (in development)

Limit values for recycled aggregates (C&D waste ordinance)

Parameter	Measurement unit	Quality class U-A	Quality class U-B
eluate at 1:10 L/S			
pH-value		7,5 1) bis 12,5 2)	
el. conductivity	mS/m	150 2) 3)	150 2) 3)
Chromium total	mg/kg DM	0,60	1,0 4)
Copper	mg/kg DM	1,0	2,0
Nickel	mg/kg DM	0,40	0,60
Ammonium-N	mg/kg DM	4,0	8,0
Chloride	mg/kg DM	800	1 000
Nitrite-N	mg/kg DM	2,0	2,0
Sulphate	mg/kg DM	2 500	6 000 4) 5)
TOC	mg/kg DM	100	200
Total content			
Lead	mg/kg DM	150	150/500 6) 7)
Chromium total	mg/kg DM	90/300 7)	90/700 7)
Copper	mg/kg DM	90/300 7)	90/500 7)
Nickel	mg/kg DM	60/100 7)	60 8)
Mercury 9)	mg/kg DM	0,70	0,70
Zinc	mg/kg DM	450	450
HC-Index 10)	mg/kg DM	150	200
∑16PAH (EPA)	mg/kg DM	12,0	20
impurities			
FL 11)	cm^3/kg	≤ 4	≤ 5
Rg+X 12)	M-%	≤ 1	≤ 1

Quality classes and applications (C&D waste ordinance)

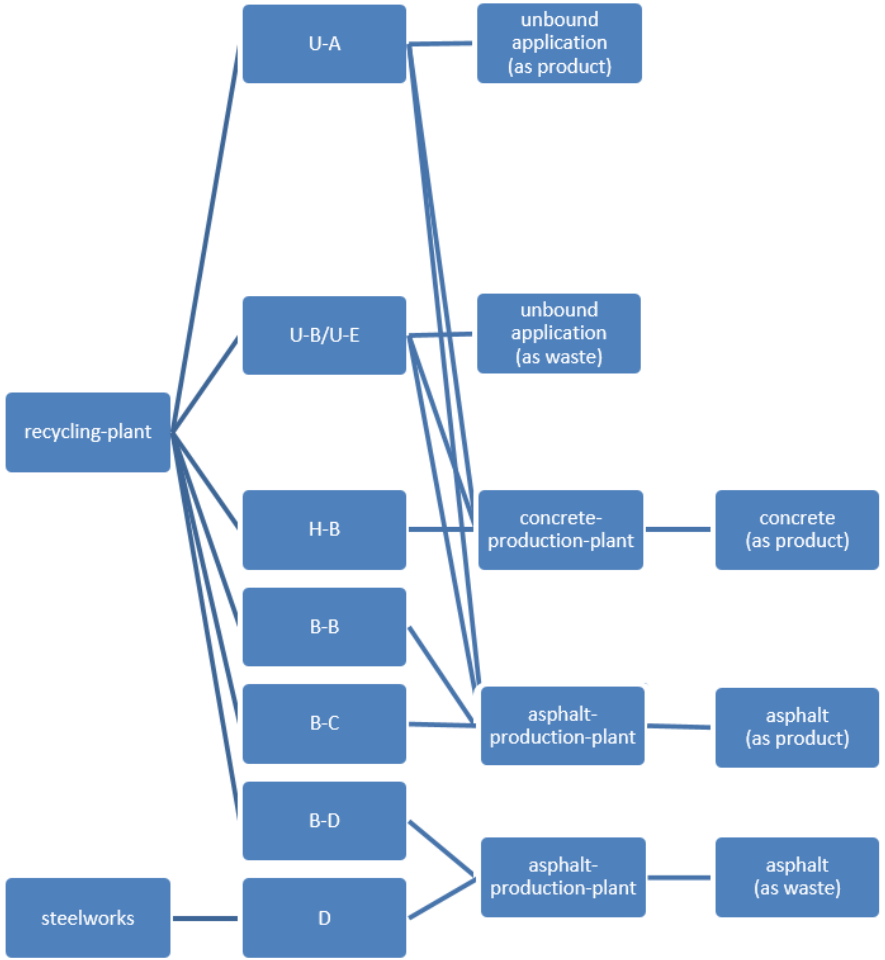

Table 80: Initial soil analysis – Total contents

Parameters [mg/kg DM]	Quality class A1	Quality class A2-G	Quality class A2	Quality class BA
Arsenic (as As)	20[5]	30	30	50/200[5,6]
Lead (as Pb)	100[5]	100	150	150/500[5,6]
Cadmium (as Cd)	0.5[1,5]	1.1	1.1	2/4[5,6]
Chromium, total (as Cr)	90[5]	90	90	300/500[5, 6]
Cobalt (as Co)	50[5]	30	50	50[5]
Copper (as Cu)	60[5]	60	90	100/500[5, 6]
Nickel (as Ni)	60[5]	55	60	100/500[5, 6]
Mercury (as Hg)	0.5[5]	0.7	0.7	1/2[5,6]
Zinc (as Zn)	150[5]	300	450	500/1,000[5,6]
BTEX[8]	0.5	1	1	1
HC index	50/100/200[2,4]	20[7]	50/100/200[2]	50/100/200[2,4]
PAH (16 compounds)	2	2	4	4
PAH (Benz[a]pyrene)	0.2	0.2	0.2	0.4
PCB (7 compounds)[8]	0.1	0.1	0.1	1
TOC (as C)	-[3]	5,000[7]	10,000[3]	10,000[3, 4]

[1] *1 mg/kg DM at a pH value ≥ 6; pH value according to ÖNORM L 1083*

[2] *50 mg/kg DM for excavated soil and material with TOC ≤ 5,000mg/kg DM*

100mg/kg DM for excavated soil and material with TOC > 5,000 mg/kg DM and ≤ 20,000mg/kg DM

200mg/kg DM for excavated soil and material with TOC > 20,000mg/kg DM

[3] *The specific values of the recultivation guidelines apply to the production of recultivation layers where these relate to installation.*

[4] *Exceptions may be permitted for excavated soil containing humus and peat in individual cases in consultation with the authorities.*

[5] *Each field sample must also be analysed for pollution in the fraction < 2mm if the material is to be recovered in the form of a recultivation layer for agricultural purposes (class A1) or as a recultivation layer for agricultural purposes in areas with a similar pollution profile (class BA).*

[6] *If the content of a pollutant in excavated soil material is due to geogenic factors, the limit value may be exceeded up to the higher indicated limit value.*

[7] *In individual cases, a total TOC content of up to 10,000 mg/kg DM may be determined in consultation with the authority. In this case, the limit value for the HC index is 100 mg/kg DM.*

[8] *Only investigat in the event of suspicion*

Parameters [mg/kg DM]	Quality class A1	Quality class A2-G	Quality class A2	Quality class BA
pH-value[5]	-[4]	6.5-9.5	Specific value: 4.5-9.5[4]	Specific value: 4.5-9.5[4]
Electrical conductivity [5] [mS/m]	50	50	50	150
Evaporation residue	-[1]	5,000	-[1]	-[1]
Aluminium (as Al)	-[1]	-[1]	-[1]	-[1]
Antimony (as Sb)	-[1]	0.06	-[1]	-[1]
Arsenic (as As)	0.3	0.1	0.3	0.5
Barium (as Ba)	10	5	10	10
Lead (as Pb)	0.3	0.1	0.3	0.5
Cadmium (as Cd)	0.03	0.03	0.03	0.05
Chromium, total (as Cr)	0.3	0.3	0.3	0.5
Cobalt (as Co)	1	0.1	1	1
Iron (as Fe)	-[1]	-[1]	-[1]	-[1]
Copper (as Cu)	0.6	0.6	0.6	2
Molybdenum (as Mo)	0.5	0.35	0.5	0.5
Nickel (as Ni)	0.4	0.2	0.4	0.4
Mercury (as Hg)	0.01	0.01	0.01	0.01
Selenium (as Se)	0.1	0.1	0.1	0.1
Silver (as Ag)	0.2	0.2	0.2	0.2
Zinc (as Zn)	4	4	4	4
Tin (as Sn)	2	0.5	2	2
Ammonium (as N)	8	3.5[6]	8	8[3]
Cyanide - easily releasable (as CN)	0.2	0.1	0.2	0.2
Fluoride (as F)	20	15	20	20
Nitrate (as N)	100	70	100	100
Nitrite (as N)	2	0.5[6]	2	2[3]
Phosphate (as P)	5	1[6]	5	5[3]
Sulphate (as SO_4)	2,500	1,500	2,500	2,500[7]
AOX (as Cl)	0.3[2]	0.3[2]	0.3[2]	0.3[2]
HC index	5	1	5	5
Phenol index	-[1]	0.05	-[1]	-[1]
aAnion-active tensides (as MBAS)[8]	1	1	1	1
TOC (as C)	-[1]	100	100[9]	100[9]

[1] *The value must be determined and indicated in the analysis report.*

[2] *Is also deemed as compliant if the EOX parameter is no higher than 0.3 mg/kg DM.*

[3] *A threefold limit value can be determined in consultation with the authority.*

[4] *The relevant measurement methods and figures from the recultivation guidelines on the pH value apply.*

[5] *Where excavated material is landfilled, the limit values for the pH value and electrical conductivity, as published in Annex 1 of the Landfill Ordinance of 2008, apply.*

[6] *In consultation with the authority, a limit value of up to 8 mg/kg for ammonium, up to 2 mg/kg for nitrite and up to 5 mg/kg for phosphate may be determined in individual cases.*

[7] *Exceptions may be applied for excavated soil containing gypsum in individual cases in consultation with the authorities.*

[8] *Only investigate in the event of suspicion*

[9] *Limit value does not apply for soil recultvation material*

Table 78: Areas of applications and necessary quality classes for underground backfilling and soil recultivation

Quality class	Agricultural soil recultivation	Non-agricultural soil recultivation	Underground backfilling	Underground backfilling in and directly above groundwater
A1[3]	YES	YES	YES[1]	NO
A2	NO	YES	YES	NO
A2-G[3]	NO	YES	YES	YES
BA	YES[2, 4]	YES[2]	YES[2]	NO

[1] *Only in the event of compliance with the limit values as well for total TOC as for TOC in eluate from quality class A2.*

[2] *Only in areas with comparable contamination in consultation with the locally competent authority.*

[3] *For waste fractions from the treatment of contaminated excavated materials, an assignment to A1 or A2-G is not permitted.*

[4] *Agricultural soil recultivation with waste fractions from the treatment of contaminated excavated material is not permitted.*

General environmental considerations

- Material used in earthworks generally involves high masses, so possible contaminations/impurities can lead to relevant emissions even if relative content or leaching behavior is low
- Materials used in earthworks can be exposed to draining water and/or ground water which can cause ecological relevant disturbance
- Geogenic contamination, which is of no concern as imbedded in mountain formations, can be of ecological relevance if crushed and spread out

End-of-waste ordinance for excavation material (in development)

- Regulation for recycling and end of waste of excavation material (including tunnel arisings)
- End-of-waste status for materials Quality classes A1, A2 and A2-G
- End-of-waste status for Quality class BA (higher oganogenic content and minor contamination) only for high-grad recycling (aggregates for production of concrete and asphalt)
- End-of-waste status has to be announced using an electronic upload system of the ministry of environment; upload has to include analysis report of the material

Thank You!

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