



Environmental compatibility concept according DIN 18035

Test procedures and background



Structure

- Environmental basic statements of the DIN 18035
- Background of Quality Assurance
- Generalisation Findings
- Points of Criticism
- Future Outlook

- First Investigations by German authorities in the 1990's
- Result: no relevant dangers by use of artificial playgrounds
- Draft of a standard

DIN E 18035-6 synthetic surfaces for outdoor sports areas
(2004)

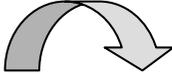
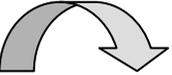
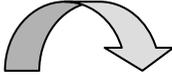
DIN E 18035-7 synthetic turf surfaces for outdoor sports
surfaces (2002)



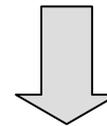
parameter	synthetic turf surfaces			synthetic surfaces		
	origin [mg/kg]	48 h leachat neutral [mg/l]	48 h leachat acid [mg/l]	origin [mg/kg]	48 h leachat neutral [mg/l]	48 h leachat acid [mg/l]
DOC		< 20 / < 40			< 20 / < 40	
EOX	<100			<100		
Pb			<0,04			<0,04
Cd			<0,005			<0,005
Cr			<0,05			<0,05
Cr-VI			<0,008			<0,008
Hg			<0,001			<0,001
Zn		< 0,5*	< 3			< 3
Sn			<0,05			<0,05
Toxicity			< 50 %**			collection experiance

parameter	48 h leachat neutral [mg/l]	48 h leachat acid [mg/l]	remark	ko condition
DOC	> 20 / < 40 > 40		consideration EOX	x
EOX				EOX > 100 mg/kg
Zn*	> 0,5 > 1	> 20	consideration Zn acid leachat	x x

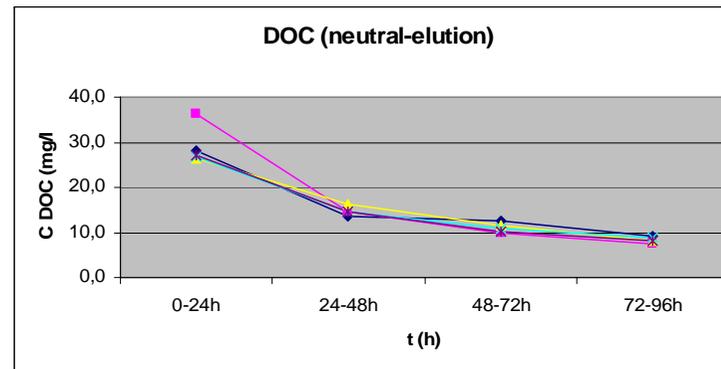
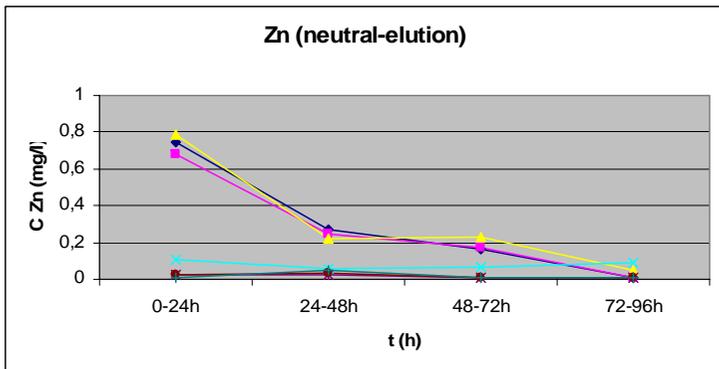
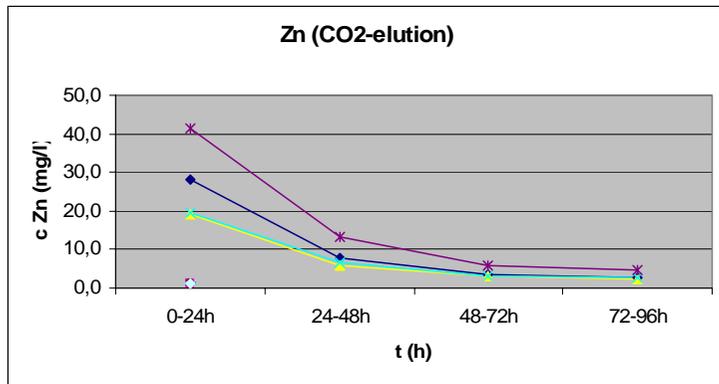
* synthetic turf areas

- complex spectrum of organic compounds
 lump parameter DOC
- Chlorinated paraffin and other halogenated organic compounds
 lump parameter EOX
- Long-range soluble heavy metals
 acid elution (CO₂-gassing)
- easily available Zinc cations
 neutral elution L/S ratio 10:1

Differences between 24 - 48 h elution from the commonly applied 24 h-elution



Recording of the mobilisation of dangerous compounds



- Nitrification test or luminescence bacteria test in the 24-48 h neutral elution
- Only assessments for elastic baselayers and synthetic turf
- Experiences are collected in the field of toxicity by synthetic surfaces and infill materials in synthetic turf surfaces

Assessment is based on the German Legislation

- German Soil Protection Law (Groundwater is the point of compliance)
- the Guide for Recycling of Mineral Product (Groundwater is the point of compliance)



Länderarbeitsgemeinschaft Abfall

Synthetic turf areas

- Turf
toxicity << 50 %,
exception – enhanced values for DOC, Zn
- Base layer all requirements fulfilled
- Infill material
 - SBR
toxicity in 75 % all samples < 50%
in general Zn requirements fulfilled
 - EPDM (S) always toxic (benzothiazols)
 - EPDM (P) all requirements fulfilled
 - TPE all requirements fulfilled

Synthetic surfaces –
all requirements fulfilled

- Relation between extraction methods and existing release
- Extraction with CO₂ saturated water
- Preparation method of test bodies
- Importance of toxicity tests

- Change elution method (CEN/TS 14405 as well as the batch test such as EN 12457)
- Change saturated CO₂ Elution test into pH dependence test such as prEN 14429
- The use of tank test for synthetic surfaces is recommended
- No necessity to exceed the parameter list
- Luminescence bacteria test with an attenuation level GL 8, if the DOC exceeds the 10 ppm level