Environmental Compatibility – Recent Developments

Summary

Introduction

Synthetic turf areas are by now well established in almost all sport facilities. In addition to appropriate material and technical properties which ensure the required safety- and sport-functions the environmental compatibility of synthetic turf areas has to be guaranteed during and after their use.

Essential environmental and health aspects are

- the possible contamination of soil and groundwater by soluble pollutants of the materials used for the construction of synthetic turf areas
- health hazard for residents and users of sport areas by release of gases and dangerous particles
- the possible release of pollutants during disposal, e.g. during incineration

Requirements for environmental compatibility

A basic requirement is legal compliance during and after the intended use of the synthetic turf. On top of that no negative impact on soil, groundwater and air should occur at all.

For the assessment of possible environmental impacts in Germany and Austria technical guidelines have been established within the last years. Both guidelines include the analysis of extracts from the individual system compounds. According to the Austrian OISS-guideline an examination of the whole synthetic turf system is permittable (Austrian percolation test) if necessary.

The German and Austrian methods are quite similar but differ in the following points:

- Extraction of heavy metals: except the determination of zinc, DIN V18035-7 prescribes the use carbon dioxide saturated water. The OISS guideline prescribes the use of normal water and in some cases lower threshold limits.
- Toxicity tests: DIN V18035-7 allows an inhibition of nitrification of maximum 50%. Three are no regulations for elastic fillers. The OISS guideline requires the

performance of toxicity test according EN ISO 11384 part 2. The LID is not allowed to be higher than 4.

- Polycyclic aromatic hydrocarbons (PAH): According the OISS guideline PAH have to be assessed by use of carbon black.

In table 1 the DIN- and OISS requirements are summarized.

Table 1: Environmental compatibility – requirements on the individual compounds of synthetic turf systems (In case of the OISS guideline these requirements apply to the whole system too)

Parameter	**OISS requirements**	**DIN V18035-7 requirements**
DOC Dissolved organic carbon	≤ 20 mg/l [2]) ≤ 40 mg/l [3])	≤ 20 mg/l [2]) ≤ 40 mg/l [3])
EOX (extractable organic halocarbons)	≤ 100 mg/l [4])	≤ 100 mg/l [4])
PAH [5]) Polycyclic aromatic hydrocarbons	≤ 0,002 mg/l	----
Lead (Pb)	≤ 0,03 mg/l	≤ 0,04 mg/l
Cadmium (Cd)	≤ 0,003 mg/l	≤ 0,005 mg/l
Chrom (Cr) total	≤ 0,03 mg/l	≤ 0,05 mg/l
Chrom VI (CrVI) [6])	≤ 0,008 mg/l [6])	≤ 0,008 mg/l [6])
Mercury (Hg)	≤ 0,001 mg/l	≤ 0,001 mg/l
Zinc (Zn)	≤ 0,5 mg/l	≤ 3,0 mg/l ≤ 0,5 mg/l
Tin (Sn)	≤ 0,05 mg/l	≤ 0,05 mg/l
Toxicity	LID (G_L) ≤ 4 [7])	≤50% resp. Non
Biological aerobic degradation	If necessary	If necessary
Odor	description	description
External nature	description	description

[2]) without considering the EOX in total

[3]) without considering the EOX in total

[4]) guide value, measured in mg/kg (total)

[5]) for carbon black coloured or filled materials

[6]) Standardized detection methods (spectral photometric or ion chromatographic method) for CrVI are available only for concentrations ≥ 0,05 mg/l. Therefore only total Chromium of 0,008 mg/l maximum meet this requirement. In any other case alternative non standardized detection methods for CrVI (e.g. coulometric methods) have to be applied to verify CrVI concentrations of ≤ 0,008 mg/l.

[7]) A LID value (GL) ≤ 4 should be reached from state of the art. Materials with higher toxicity have to show in an additional extraction procedure to DIN 6.11.2 (2nd test from the analyzed material) that they meet or even nearly meet the requirement.

In addition to [7]) at present higher toxicity of infill rubber is tolerated by ÖISS with a time limit until end of 2004. That period was chosen to allow producers to define new compositions to fully meet the requirement.

Further actions

There is a special problem arising from the increasing use of recycling material for elastic infills due to their high variation in quality. According to OISS the use of these materials is permittable, but measures for quality assurance have to be proven. The conformity of the actually used products to the requirements of the initial performance test has to be proven by means of the inspection test.

At the moment examinations or studies on the real environmental impacts of synthetic turf areas during their use are hardly available. However these studies would be essential to assess the suitability of existing “laboratory” test procedures and to identify the need for additional regulations.