

New preliminary results from Silkeborgbanen:

Spreading of rubber granulate from artificial turf to surroundings can be prevented

In autumn 2022, the EU Commission put forward a draft legislative proposal to prevent or reduce the dispersal of microplastics intentionally added to the environment through products marketed within the EU. In connection with this, the Commission proposes a ban on sales and marketing of rubber granulate as infill material for the application in synthetic sports surfaces, including artificial turf pitches. The Commission suggests a 6-year phase-out period. It is expected that member states will vote on the proposal of the Commission in the REACH Committee on 1 March 2023.

Football – taking responsibility and taking care

Artificial turf pitches – and thus football – affect both people, the environment, the climate and not least the society that we all share. This is a position, a joint responsibility and an activity entailing commitment.

Silkeborg Municipality has installed two new, third-generation artificial turf pitches at the Søholt Sports Facility next to an existing artificial turf pitch and the JYSK Park football stadium on Ansvej in Silkeborg, Denmark. Apart from intending to create the best possible conditions for local football clubs practicing and playing at Søholt, Silkeborg Municipality is – in cooperation with the DBU and through a test and development project – looking to determine how to design,

maintain and use artificial turf pitches in an environmentally friendly way.

The test and development project Silkeborgbanen was open for play in June 2022. Since then, experts from Danish Technological Institute and engineering consultancy Sweco have analysed how much rubber granulate is discharged from the pitch, the reasons for such dispersal as well as where it goes.

Players carry off far less granulate than previously assumed

Initial analyses from Silkeborgbanen have shown considerably lower dispersal of microplastics than the volumes on which the EU Commission has based its proposal for a ban on rubber granulate used as infill in artificial turf. The Commission has used previous, estimated volumes of microplastics spread from pitches without containment barriers as the basis for their proposal. Initial analyses from Silkeborgbanen, which has been installed with containment barriers, have shown that players and coaches (incl. equipment such as e.g. balls and markers) leaving the artificial turf pitch via a specially designed clean-down exit area with mesh grating, only carry very small volumes of rubber granulate off the pitch – in total, less than 5 kg in one year.



Minimal dispersal via maintenance equipment – if simple instructions are followed

Brand new analyses from Silkeborgbanen now show that the spreading of rubber granulate via other known dispersal routes can be limited as well.

For the maintenance of artificial turf, tractors and other heavy equipment are used. At Silkeborgbanen, the greenkeeper cleans the surfaces of this equipment with compressed air after pitch maintenance. A new analysis from Danish Technological Institute shows that only very little rubber granulate is left on the equipment when it leaves the pitch.

We have only made one analysis of granulate dispersal via maintenance equipment. As long as the equipment is cleaned with compressed air, as is the case in Silkeborg, the volume of granulate that we found in connection with our first analysis will result in a total granulate dispersal via equipment of far less than one kilo a year, says Jacob Ask Hansen, Division Director at Danish Technological Institute.

Containment barriers prevent the spreading of rubber granulate

The experts from Danish Technological Institute also investigate whether containment barriers along the perimeter of the pitch can prevent dispersal of rubber granulate to surroundings. These new analyses indicate that pitch perimeter barriers can indeed prevent the spreading of microplastics.

Our initial analysis of barriers as containment measures is most encouraging. It shows that barriers work and that the height of barriers matters. It also shows, that the risk of dispersal to the surroundings is not the same all over the pitch. When we make further analyses, we should be able to state more precisely what the height of barriers should be in different places around the pitch; but at the moment, it looks as if 50 cm barriers – as described in the joint European guide for the construction of artificial turf pitches – are an efficient means to prevent the unintentional spreading of rubber granules, Jacob Ask Hansen says.

No rubber granules in the drainage water

The experts from Danish Technological



Institute and Sweco have also analysed drainage water samples from Silkeborgbanen.

No contamination exceeding the Danish environmental objectives for Danish freshwater environments has been shown. Generally, most values are around or below Danish requirements in relation to drinking water. Nor have we found any microrubber – i.e. rubber granules or rubber granulate residue – in the drainage water, says Jonas Aagaard, engineer at Sweco, continuing:

We have also tested rain water and drainage water for PFAS. Results show PFAS values below the Danish limit values for aquatic environments and around or below the Danish requirements in relation to drinking water. In respect of PFAS, we have analysed both rain water and drainage water from an artificial turf pitch with rubber granulate as infill as well as an artificial turf pitch with sand as infill. Nothing in our study indicates that rubber granulate as infill material should be a significant source of PFAS contamination, Jonas Aagaard rounds off.

Silkeborgbanen.eu will regularly be updated with results from Silkeborgbanen.

Facts about the Silkeborg pitch (Silkeborgbanen)

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The actual test pitch – Silkeborgbanen – is also referred to as Pitch 8. It is an 11-a-side pitch with an extra area at the western end of the pitch. The total area of the field is 9,442 m².

If the EU chooses 7 g/m² as the upper limit for annual dispersal of microplastics from an artificial turf pitch to the surroundings, this means that 66 kg of rubber granulate per annum is the maximum amount which may be dispersed from the Silkeborg pitch to the surroundings.

A graphic model made available at Silkeborgbanen.eu illustrates different zones showing:

- Where infill granulate should be (Green Zone)
- Where infill may be – but from where it should not spread (Yellow Zone)
- Where infill granulate should generally not be found (Red Zone)



ENVIRONMENTALLY FRIENDLY MEASURES FOR ARTIFICIAL TURF PITCHES WITH GRANULATE INFILL

The Municipality of Silkeborg (Silkeborg Kommune) is expanding the facilities at Søholt with a new artificial turf field. Planning the new pitch as a test and development project in cooperation with the Danish Football Association (DBU), the municipality is looking to show how to construct, maintain and use artificial turf pitches in an environmentally friendly way. Pitch construction is based on recommendations from the joint European guide for the construction of artificial turf pitches - CEN report (DS/CEN/TR 17519).



FIELD DESIGN

- 1 SYSTEM CONSTRUCTION**
Classic artificial turf system construction with a 25 mm e-layer, 40 mm artificial turf yarn with a stabilising sand layer and performance infill in the form of ELI rubber granulate.
- 2 INFILL CONTAINMENT**
An infill containment barrier - min. height: 290 mm, max. height: 590 mm - is mounted along the perimeter fencing, preventing granulate spread into the red no-go zone. Part of the test and development project is to analyse the effectiveness of different fencing heights.
- 3 ENTRANCE / EXIT AREAS**
Mesh grating is installed as granulate traps at the test field as well as at the main entrance/exit area. Granules will be collected, cleaned and put back onto the pitch in so far as possible. Part of the project is testing to determine the most efficient design of entrance/exit areas.



- 4 BOOT BRUSH STATIONS**
User-friendly boot brush stations are installed at entrance/exit areas to prevent granulate spread from the yellow in-between zone; and signs make players aware that correct use of the facility equals taking good care of the environment.
- 5 WINTER MAINTENANCE**
Deposit snow in the green zone along the pitch perimeter or along the long side of the pitch - alternatively, in the yellow in-between zone.
- 6 DRAINAGE**
Surface water from downpour remains - and seeps into the ground - within the area.

● GREEN ZONE - WHERE INFILL SHOULD BE

● YELLOW ZONE - FROM WHERE INFILL SHOULD NOT SPREAD

● RED ZONE - WHERE INFILL SHOULD NOT BE FOUND

PITCH MAINTENANCE

- 7 MAINTENANCE EQUIPMENT**
Maintenance equipment should stay within the area of the green and yellow zones. Maintenance staff is aware that correct maintenance equals taking good care of the environment.
- 8 CLEANING MACHINERY**
Maintenance personnel must clean machinery used for other pitch facilities, before such machinery leaves the yellow in-between zone.

PITCH CONSTRUCTION

- 9 SAFE STORAGE OF INFILL**
During pitch construction, granulate is safely stored inside the yellow in-between zone. Subsequent to pitch opening, granulate is safely stored at the municipality storage facility.
- 10 PITCH RENEWAL**
In future, when the pitch needs to be renewed, the pitch owner must ensure environmentally safe clean-up and disposal.