SENBIS GREENFILL

HIGH PERFORMANCE
BIODEGRADABLE INFILL

- No microplastics
- No environmental pollution
- No health concerns
- No end-of-life waste issue

GreenFill

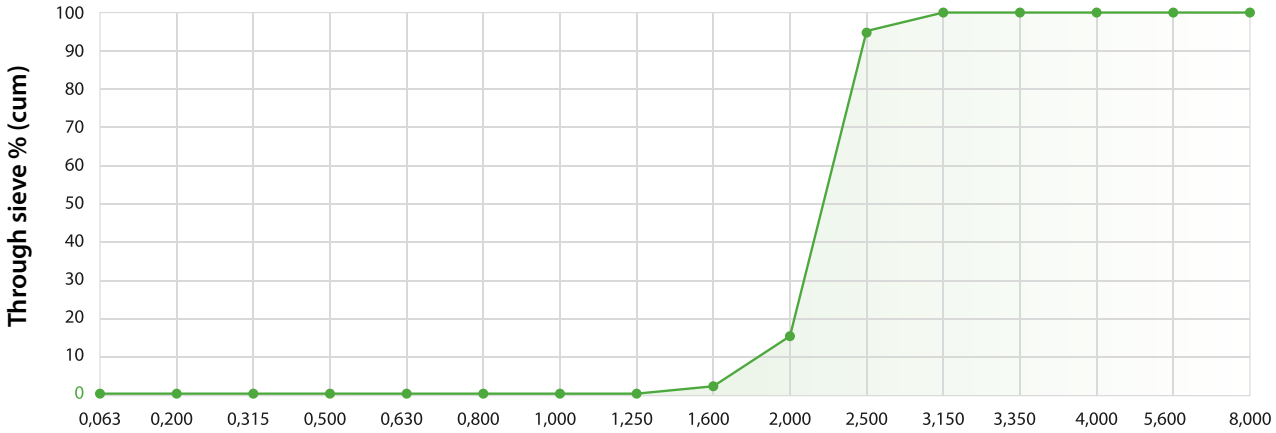
Biodegradable grass infill

SENBIS.COM/GREENFILL

TECHNICAL DATA

Property	Value	Standard
Colour	Black	MN/K0.1
Shape	Rugby shape/ cylindric (C2)	EN 14955
Smell	Odourless	-
Bulk density	0.35 ± 15% g/ml	EN 1097-3
Particle size distribution % between d and D	2.00 - 2.50 mm > 70%	EN 933-1
Abrasion resistance	98%	ISO 5074
Resistance to continuous load	71% deformation during load 15% residual deformation	MN/V1.3
Hot air aging 10 weeks 70°C	Resistant	-
Hot water aging 10 weeks 70°C	Not resistant	-
Cold water aging 10 weeks 20°C	Resistant	-
5000 hour UV-A exposure	Resistant	FIFA IMS 2015

Granular size distribution



THE NEED FOR A BIODEGRADABLE PERFORMANCE INFILL

In artificial sport turf systems often non degradable polymeric (plastic) granules, such as SBR, TPE and EPDM are used as an infill to support the fibers and provide impact resistance to reduce player injuries (source FIFA). Even though these infills are improving the sports performance of a pitch, they are controversial due to their negative environmental impact. Several research sources conclude that typically 1 to 5% of infill is lost annually[1]. The global infill demand in 2015 was about 1.300.000 tonnes[1]. Assuming 10 years life expectancy and 3% loss means approximately 400.000 tonnes end up in the environment each year. Europe is estimated to contribute up to 72.000 tonnes[1] of annual infill loss. Measures around the field can be taken to reduce the spread of infill, but can never fully avoid it.

CHANGING LEGISLATION AND PUBLIC OPINION

The European Chemical Agency (ECHA) proposes a EU wide restriction on the use of so called 'intentionally added microplastics' and is also specifically targeting infill used in artificial grass, due to these large numbers polluting the environment. The proposal makes an exemption for the use of natural materials and materials that are fully biodegradable. Compostability and 'oxo-biodegradability' is explicitly not leading to an exemption. Senbis GreenFill is a new innovative product that offers not only biodegradability, but also excellent sports performance.

GreenFill is the sustainable choice for any sports club that values performance, players health and the environment.

[1] Source: Report on microplastics to the European Commission; S. Hann et. all; Feb 2018.

SOIL BIODEGRADABLE AND COMPOSTABLE

GreenFill is both compostable and biodegradable. In both cases the infill is converted by microbes like bacteria's and fungi into water, CO_2 and humus. During composting more microbiological activities are taking place due to a higher availability of energetic organic material and typically higher temperatures. Therefore, the biodegradation during composting goes much faster than in soil.

As Senbis GreenFill does biodegrade in soil it allows clubs to have a sustainable solution to the current microplastic problems with conventional infills. In addition the option of composting gives an **end-of-life solution** for the infill. This reduces costs for waste disposal compared to other (polluted) infills.

CLEAN AND SAFE

Besides microplastics, infills can contain (eco)toxic components which may cause harm to nature or to players. GreenFill has been extensively evaluated via independent toxicological tests, which all lead to the conclusion that Greenfill is both clean and safe for the use as infill in artificial grass.

- **Complies with toy norm DIN EN 71-3**
- **Free of SVHC Hazardous substance according to REACH**
- **Complies with NF 90-112 regarding DOC, EOX and heavy metals**
- **Free of 18-PAH's according to AfPS GS 2014-01**

INSTALLATION, MAINTENANCE AND PLAYER EXPERIENCE

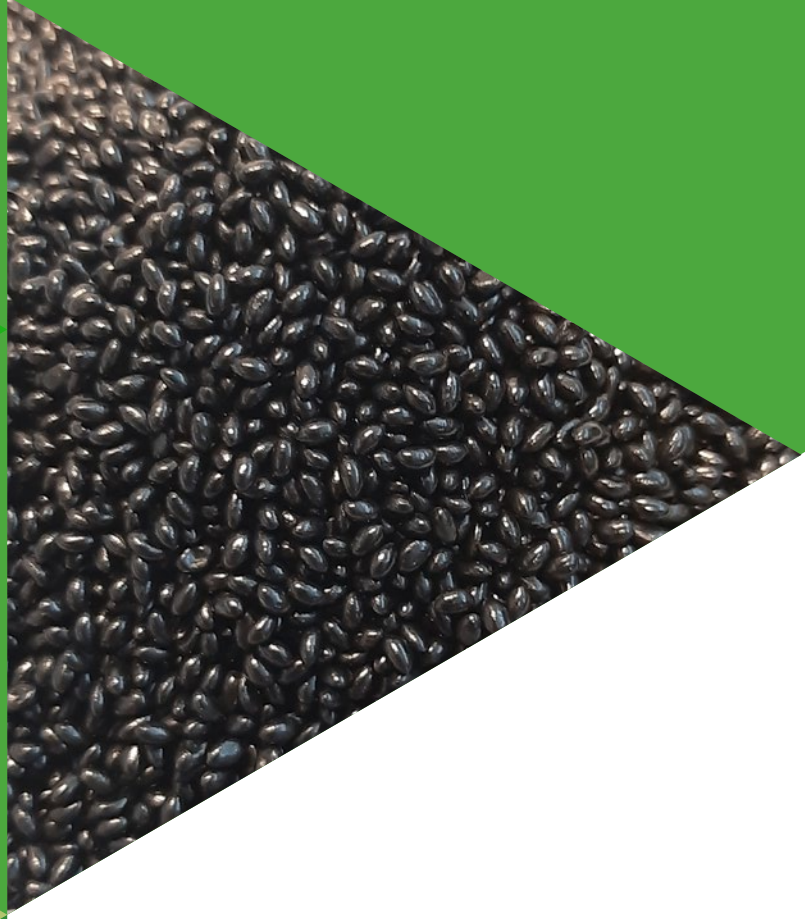
In September 2019 a pilot soccer field of 20x30 meter has been installed with GreenFill at SC Erica in the Netherlands. The installation performed out by Antea Sport and the maintenance is carried out by the club. The infill proves to be very easy to handle. Regarding the player experience the club reported that the infill provides good shock absorption due to elastic properties. In particular the young players mentioned that the infill has a soft touch which is more comfortable when making slidings or when falling.

Several artificial turf system suppliers have obtained a FIFA Quality PRO certification with the GreenFill. The overall system performance depends on the choice of grass and shockpad, which can be provided by these suppliers.

Opening pilot field at SC Erica in The Netherlands, 2019

AVAILABILITY AND SUPPLY OF GREENFILL

GreenFill is produced in the EU via a large scale process. Due to the high availability of reliable high quality raw materials, the availability of GreenFill itself is also secured. GreenFill is sold to turf system suppliers. These suppliers have to evaluate and certify their systems with GreenFill before entering the market. The companies TenCate GreenFields, CSC Ceelen, EdelGrass and Antea Sport have already certified their systems with GreenFill and received the highest standard of FIFA Quality Pro. Interested parties can contact these suppliers directly to receive more information on GreenFill and the certified systems.



SENBIS
SUSTAINABLE PRODUCTS

Senbis Sustainable Products

+31 591 308 150
sales@senbis.com
www.senbis.com

Eerste Bokslootweg 17
7821 AT Emmen
The Netherlands