SYNTHETIC TURF COUNCIL
EMEA

End of Life Statement for Synthetic Turf Sports Surfaces

Prepared by
The Environmental Working Group

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1 Introduction

The use of synthetic turf has grown dramatically since the year 2000 and is now used across the globe in a wide variety of sports, landscaping and leisure applications. Over 150 million m2 of synthetic turf were laid globally in 2016 and that market growth has already returned to pre-recession levels.

Since synthetic turf sports surfaces have a finite life, they eventually need to be replaced. It has been estimated that 98% of all synthetic turf sports surfaces will be replaced with another synthetic turf field. It is very rare for an old synthetic turf surface to be returned to natural turf, except in very special circumstances.

This growing amount of turf that has reached the end of its life needs to be managed responsibly, as it is classified as waste and it is a criminal offence in many parts of the globe to lift, transport and store used synthetic turf without a waste licence!

This summary report aims to provide some background and insight into the issues surrounding end of life synthetic turf and to offer guidance to the various interested parties on how best to handle synthetic turf at the end of its useful life.

2 Classification of Used Synthetic Turf

When synthetic turf reaches the end of its service life and is lifted to enable replacement, the old surface becomes a 'waste' material according to the EU Waste Framework Directive (Directive 2008/98/EC). This states that:-

"'Waste' means any substance or object which the holder discards or intends or is required to discard."

In the case of the infill within the pile of the carpet, this will have become contaminated over time, meaning that it cannot be classed as a suitable replacement for 'new' material in its untreated state, (i.e. the infill needs to be processed or cleaned before being suitable for reusing as an infill), meaning it is also classified as 'waste'. This refers to sand and polymeric materials used for infill.

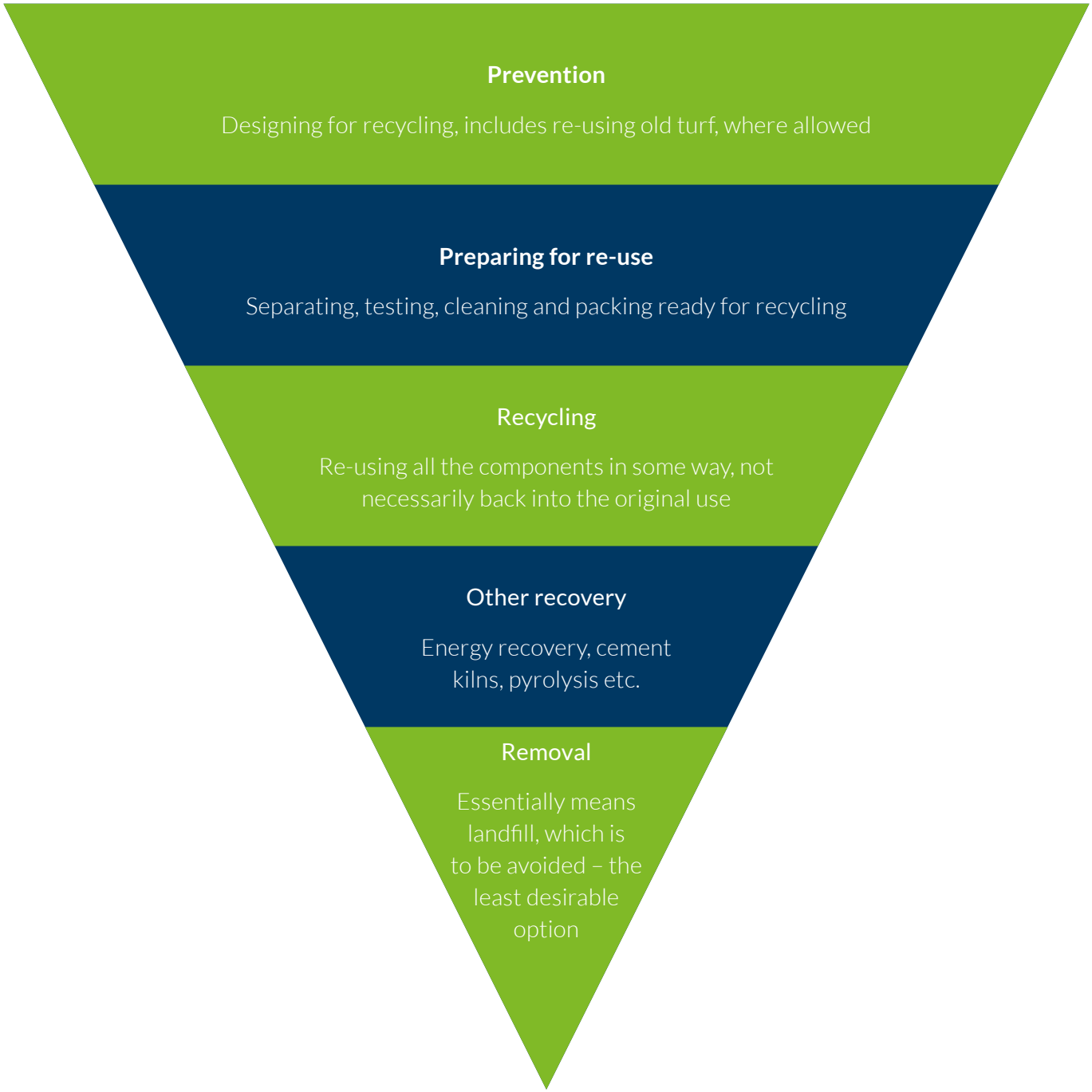
For this reason, a "final" test of the pitch status (and infill balance) should be made 6 months before the final replacement so that the tender correctly reflects what needs to be done with the end of life turf - i.e. recycling or removal.

In summary whenever a synthetic turf surface reaches the end of its service life it must be classified as a waste and any materials separated from the surface are also classified as waste until they have been fully recovered and are suitable for reuse.

The restrictions listed above form part of European law, but similar legislation will be in place in other developed countries. Where there is no legislative framework in place, ESTC requires that its members comply with similar guidelines.

The basic principles of the handling of waste are defined in the Waste Hierarchy, which seeks to ensure waste is handled in the most sustainable way by ranking waste management options according to what is best for the environment. It gives highest priority to preventing waste in the first place. When waste is created, it gives precedence to preparing it for reuse, then recycling, then energy recovery, and finally removal (e.g. landfill).

The Waste Hierarchy



* Derived from the revised Waste Framework (Directive 2008/98/EC)

According to the various levels of the waste hierarchy, the industry should be supporting the following:

2.1 Prevention

- Infill free systems: This is a key opportunity for synthetic turf - avoiding waste problems in the future. Since infills represent >90% of the turf, any research into developing infill free turf should be encouraged, although it would take up to 10 years for any benefit to be seen. NB: At present, infill free turf has a much lower life expectancy.
- Longer life turf: This would delay the need for early replacement. An 11 year life, for example, would reduce the annual turf consumption for replacement by 10%.
- Improved shock pads: Shock pads which can be used over several use cycles. The new turf is simply laid over the existing shock pad

2.2 Preparing for re-use

- Re-use of synthetic turf: It is possible for an owner to send their old turf away for re-use, provided that is specified at the time of lifting, and provision is made for any residual waste to be appropriately handled. As mentioned before, this only delays the inevitable recycling and would be of limited use. In addition, the quality of the turf would deteriorate further and be more difficult to recycle.
- Alternative turf construction: It is possibly advantageous to look at different synthetic turf structures (different backings, knitted systems, etc.,) provided they ease recycling at end of life. At present, these different constructions do not seem to be able to differentiate between each type of turf - from a recycling perspective. Certain materials (such as polyesters) should be avoided, as they can interfere with some polyolefin recycling processes.

2.3 Recycling

- Re-use/repurposing of infills: Since infill materials represent >90% of the total turf construction, they are obvious for recycling. At least two ESTC members are currently investing heavily in waste collection and infill cleaning and separation.
- Shock pads: If they have to be lifted, shock pads can also by reprocessed by the SBR granule producers or polyolefin types can be returned to a suitable processor for recycling
- Recycling of PP/LLDPE etc.: Synthetic turf carpet is made from a mixture of polyolefins (PP and LLDPE), polyamide (nylon), and latex, hot melt, PU or knitted backings. These materials represent a valuable source of mixed polymers for recycling, if suitable processes can be developed. Separation of the various polymers into pure enough polymers is expensive, and often lower quality grades are recycled into low value items such as flower pots etc.
- Up-cycling of turf: Up-cycling is the conversion of waste materials into higher value products, such as wood/lumber, rather than cheaper materials. Several manufacturers are attempting to develop up-cycling processes for synthetic turf, but have run into cost difficulties - usually due to high transport costs and the need to thoroughly clean the turf before processing. There are new processes available to up-cycle slightly contaminated polymers, but these will require some development to bring to completion, as well as refining of the value (cost) chain for replacing the turf.

2.4 Energy Recovery

Although energy recovery is in the "least preferred" part of the waste hierarchy, it is used to recover the inherent energy stored in the various components of the synthetic turf in order to reduce the consumption of virgin fuels. The main components of synthetic turf, including the rubber infills, have a calorific value close to heating oils in the magnitude of up to 40 mega joules per kilo.

This can be used to dispose of the whole synthetic turf construction or the residues left over from other forms of recycling. There are several options:-

- Pyrolysis: This is using heat treatment to chemically convert the polymeric parts of used turf (yarns, backings and infill) into a usable fuel e.g. diesel fuel
- Cement kilns: Synthetic turf can often be used as a co-fuel in the manufacture of cement.
- District heating: Many countries use district heating as a means of reducing inefficiencies in local heat production (e.g. domestic central heating)

2.5 Landfill

Vehicle tyres, and therefore SBR infill, are already prohibited for disposal in landfill. In addition land filling is getting more expensive and could soon be outlawed by the EU. The use of landfill should be considered the worst option for used synthetic turf and ESTC recommends that this option should be avoided at all times.

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