Maintenance to mitigate environmental concerns

Unintentionally created microplastic fragments caused by yarn breaking down in service

Maintenance to mitigate environmental concerns

Background

- Why yarns in artificial turf breakdown
- Early studies on this issue
- Field observations
- Maintenance is the key
- Keeping things in perspective
- Potential outcome of studies
- What is likely to come from Europe

SYNTHETIC TURF COUNCIL EMEA

Maintenance to mitigate environmental concerns

Background

How does Europe define secondary microplastics when it relates to artificial turf fibres?

Maintenance to mitigate environmental concerns

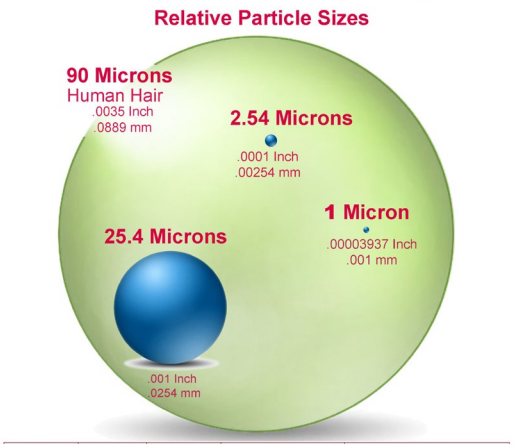
Some definitions

Microplastic:

A material consisting of synthetic polymer containing particles or fibres, to which additives or other substances may have been added, and where ≥ 1% w/w of particles or fibres have:

a. For particles all dimensions between 0.1 µm ≤ *x* ≤ 5mm

b. for fibres, a length of between 3nm ≤ *x* ≤ 15mm and length to diameter ratio of >3

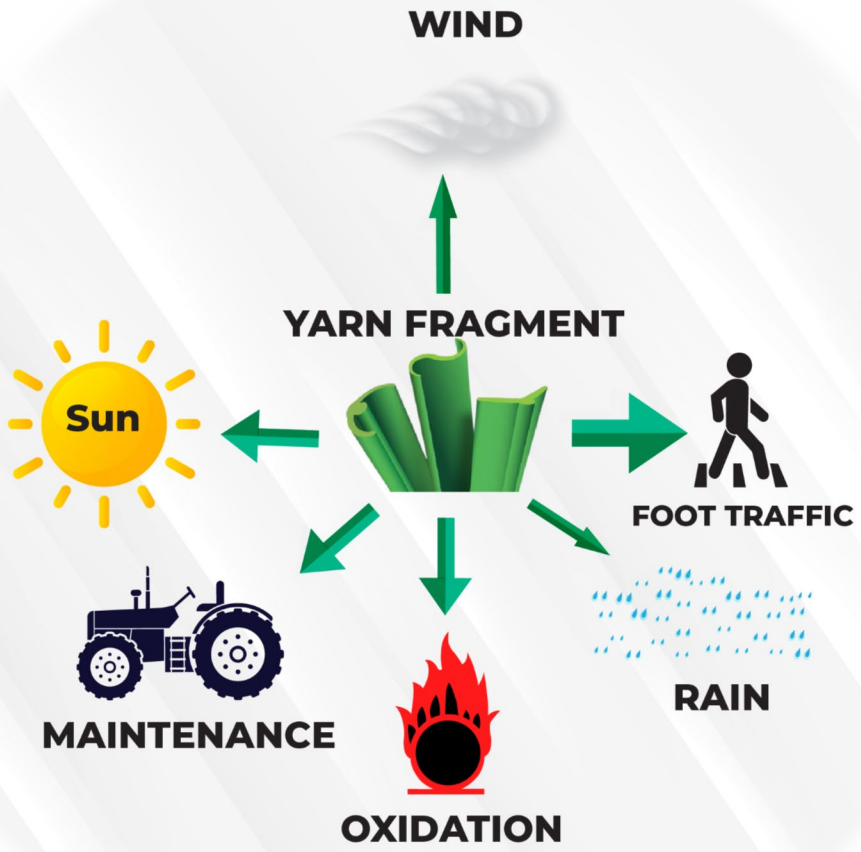


Diameter Micron	Diameter Inches	Diameter mm	Circular Area square Microns	Volume of sphere cubic Microns
1.000	0.00003937	0.001000	0.7854	0.5236
2.540	0.0001000	0.002540	5.067	8.580
25.40	0.001000	0.02540	506.7	8,580
90.17	0.003550	0.09017	6,386	383,900
254.0	0.01000	0.2540	50,670	8,580,000
2,540	0.1000	2.540	5,067,000	8,580,000,000
25,400	1.000	25.40	506,700,000	8,580,000,000,000
254,000	10.00	254.0	50,670,000,000	8,580,000,000,000,000
2,540,000	100.0	2540	5,067,000,000,000	8,580,000,000,000,000,000

Maintenance to mitigate environmental concerns

Mechanisms for yarn breakdown in artificial turf

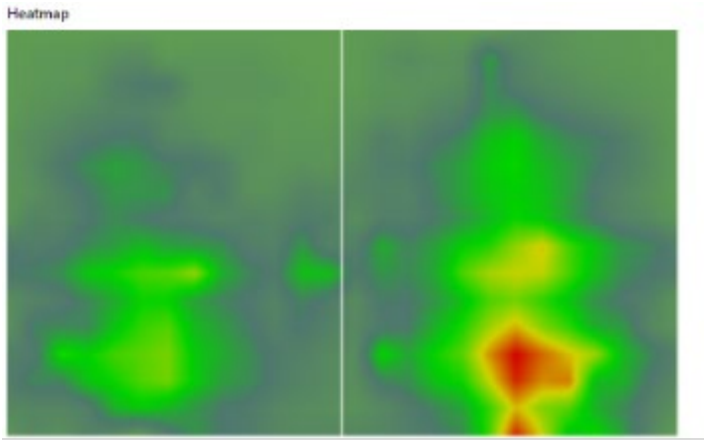
Maintenance to mitigate environmental concerns



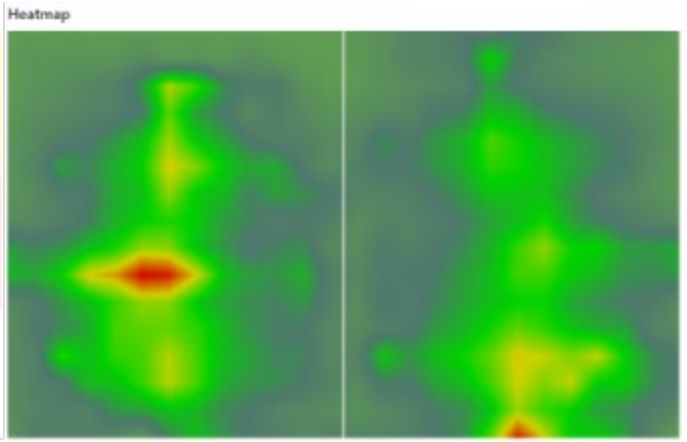
- Mechanisms for yarn breakdown in artificial turf
- Hours/type of use/amount of foot traffic
- Environmental factors
- Quality of product installed
- Maintenance
- Type of infill used

SYNTHETIC TURF COUNCIL EMEA

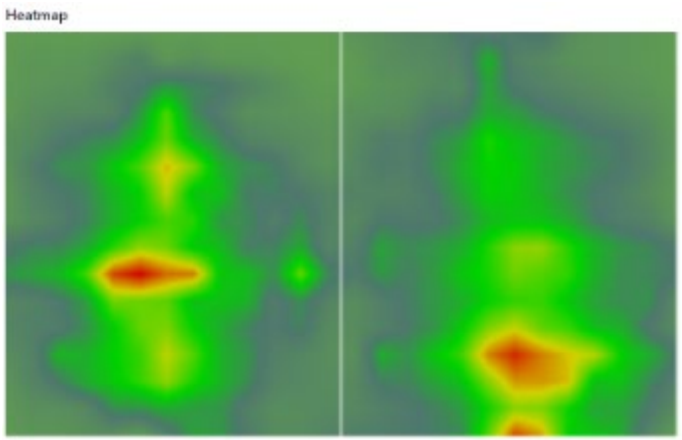
Maintenance to mitigate environmental concerns



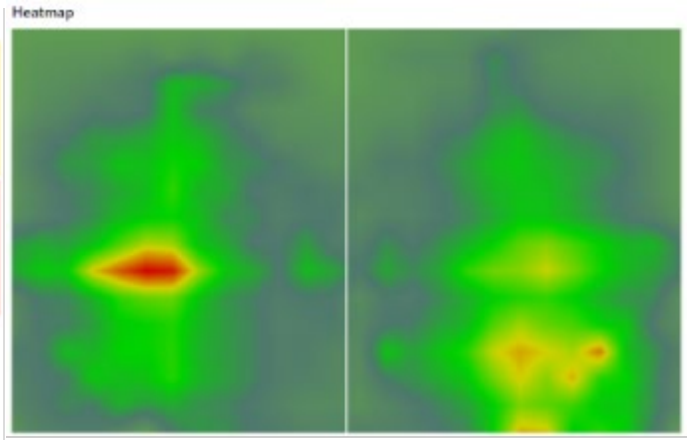
December 2022
Usage Hours: 256.42
Player Hours: 3508.80



June 2022
Usage Hours: 359.42
Player Hours: 6134.34

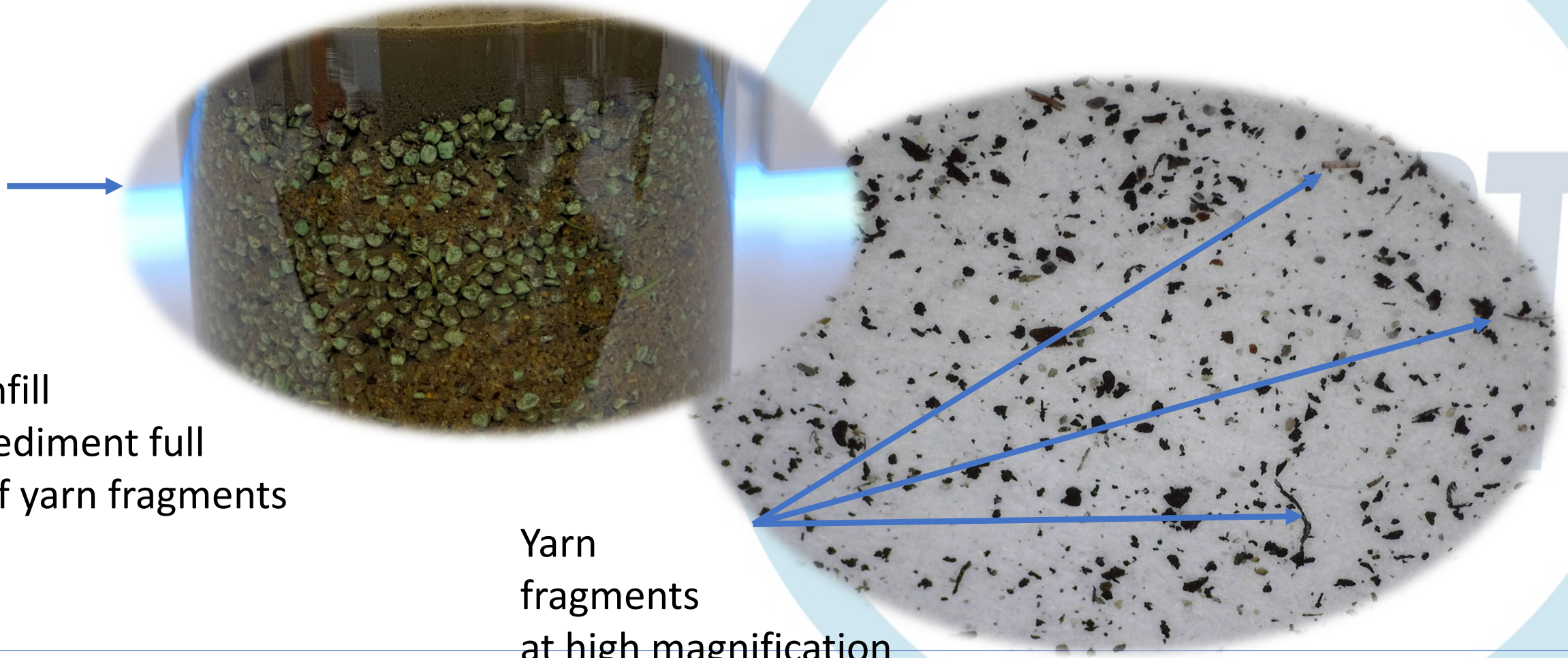


September 2022
Usage Hours: 327.33
Player Hours: 5628.04



March 2022
Usage Hours: 339.58
Player Hours: 6430.58

Maintenance to mitigate environmental concerns



Infill
sediment full
of yarn fragments

Yarn
fragments
at high magnification

Maintenance to mitigate environmental concerns

Early studies on the durability of yarns

Modified Lisport XL work

WEAR PROJECT

YARN BREAKDOWN

EXAMPLES OF SITE OBTAINED SAMPLES 7 TO 8 YEARS OLD

Centre Spot
John Cumming Stadium
(2011)

Penalty Spot
John Cumming Stadium
(2011)

Penalty Spot
Broadwood
(2012)

Goalmouth
Broadwood
(2012)

Centre Spot
Glasgow Green
(2015)

Goal Mouth
Glasgow Green
(2015)

WEAR PROJECT

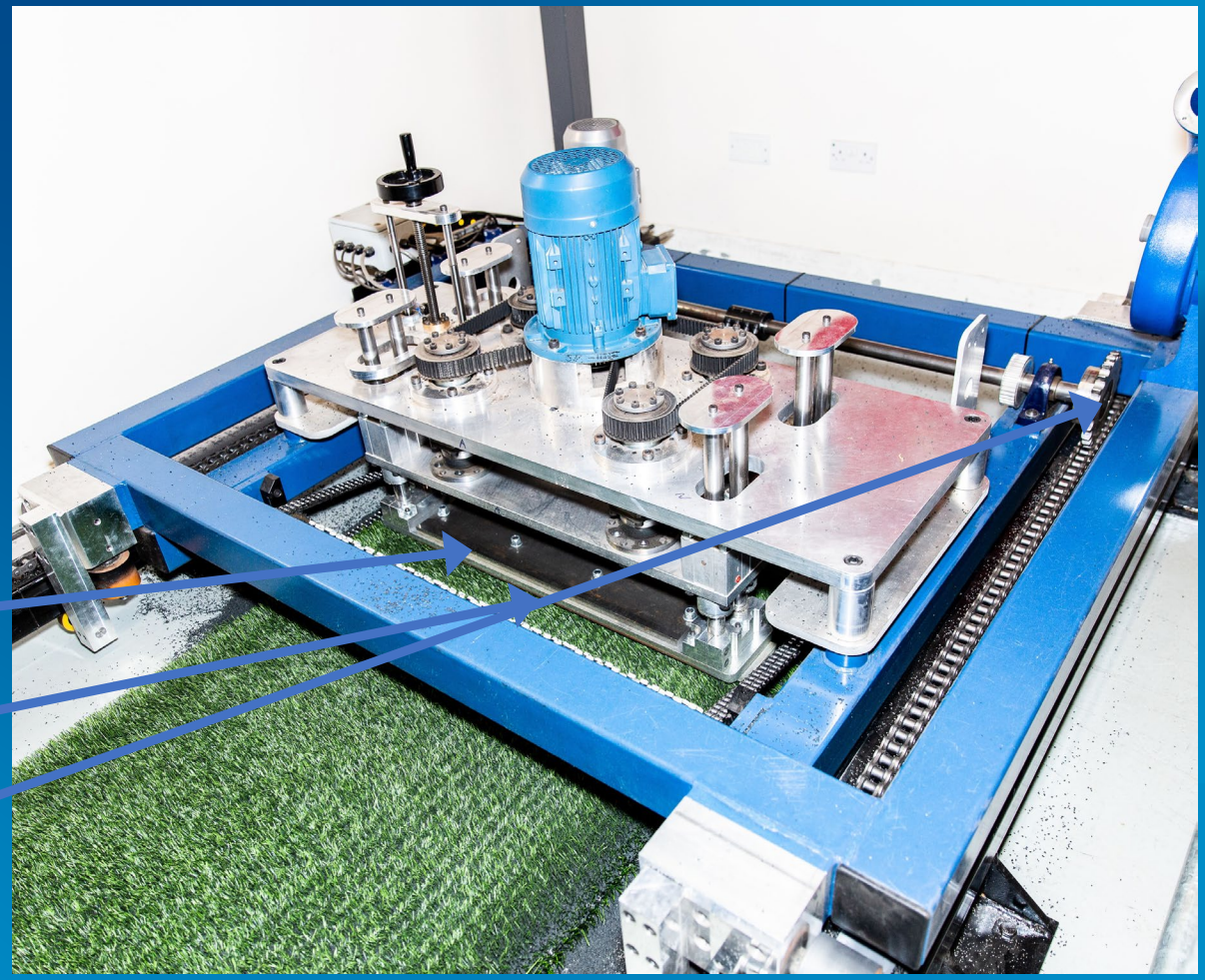
RESEARCH LISPORT XL SET UP

HEAVY WEIGHT PLATES, GRIT SOLE MATERIALS, GEARING ADDED

HEAVY PLATES ADDED

GRIT IMPREGNATED SOLE MATERIALS ADDED

GEARING ADDED TO SLOW ROLLER BY 40%



RESEARCH LISPORT XL

WEAR PROJECT

NEW PRODUCT APPERANCE FOLLOWING 6000 CYCLES IN **RESEARCH LISPORT XL**

THIS SAMPLE WAS EVALUATED IN THE LABORATORY

POST TESTED SAMPLE LOOKS LIKE WORN TURF

WEAR PROJECT

EXTENT OF YARN FRAGMENTATION FOLLOWING 6000 CYCLES IN LISPORT XL. MAY INDICATE YARNS PRONE TO GENERATING MICROPLASTICS PARTICLES

TESTING PERFORMED ON A NEW TURF SAMPLE

SMALL FRAGMENTS OF YARN

Maintenance to mitigate environmental concerns

Field observations

- Sampling and testing fields – example; Community use with heavy use of between 40 and 80 hours per week.

Maintenance to mitigate environmental concerns

	Dtex Result	Difference
Initial Test (No use)	5671	+1%
4 Years later (High Use)	5809	

	Dtex Result	Difference
Initial Test (No use)	5671	+3%
4 Years later (Low Use)	5850	

	Thickness Result	Difference
Initial Test (No use)	0.389mm	-4%
4 Years later (High Use)	0.372mm	

	Thickness Result	Difference
Initial Test (No use)	0.389mm	-7%
4 Years later (Low Use)	0.361mm	

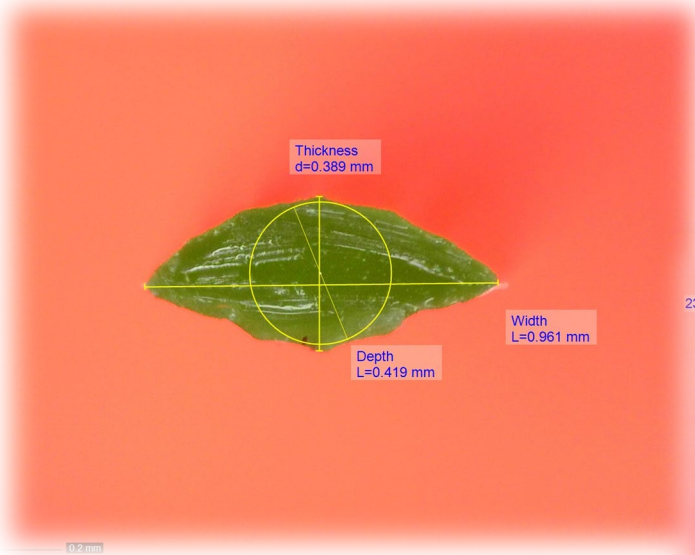
	Depth Result	Difference
Initial Test (No use)	0.419mm	-7%
4 Years later (High Use)	0.390mm	

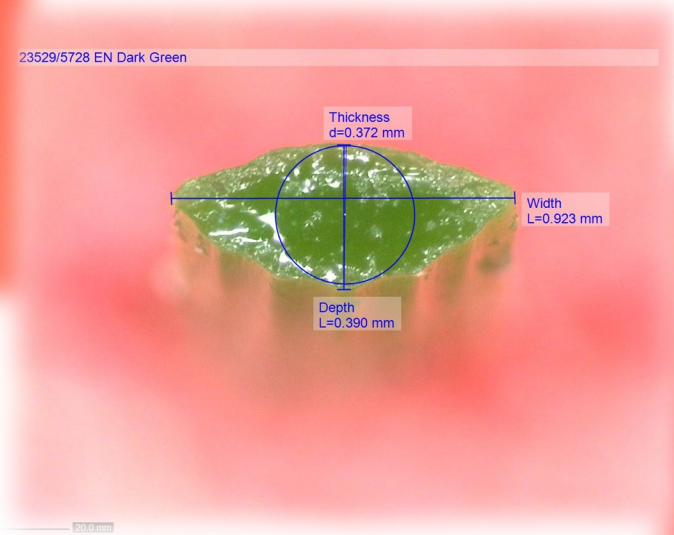
	Depth Result	Difference
Initial Test (No use)	0.419mm	-8%

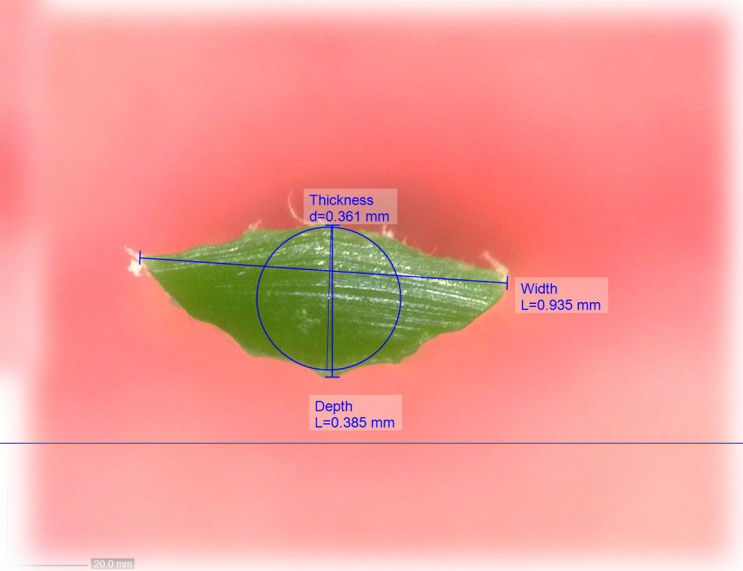
Results of mass loss are below:	High use area	Low use area
Manufacturer's Declared Values	945 g/m2 (mono) 626 g/m2 (fib) 6824 tufts /m2	945 g/m2 (mono) 626 g/m2 (fib) 6824 tufts /m2
Initial Field Test Results	869 g/m2 (mono) 579 g/m2 (fib) 6696 tufts /m2	869 g/m2 (mono) 579 g/m2 (fib) 6696 tufts /m2
Pile weight /m2	771 g/m2 (mono) 506 g/m2 (fib)	779 g/m2 (mono) 559 g/m2 (fib)
% loss from initial field sample result	- 11.3 % (mono) - 12.6 % (fib)	- 10.4 % (mono) - 3.8 % (fib)

SYNTHETIC TURF COUNCIL EMEA

Maintenance to mitigate environmental concerns







SYNTHETIC TURF COUNCIL
EMEA

Maintenance to mitigate environmental concerns

Equipment requirements

- A rotating brush
- A means of push/pulling extracted materials through a filter
- Potentially a filtration system which will collect microparticles as small as 1.6 microns
- This equipment is potentially available

Maintenance to mitigate environmental concerns

Maintenance is the key

- Trial of maintenance equipment at an indoor artificial pitch 6 years old in Edinburgh, Scotland.

Maintenance to mitigate environmental concerns

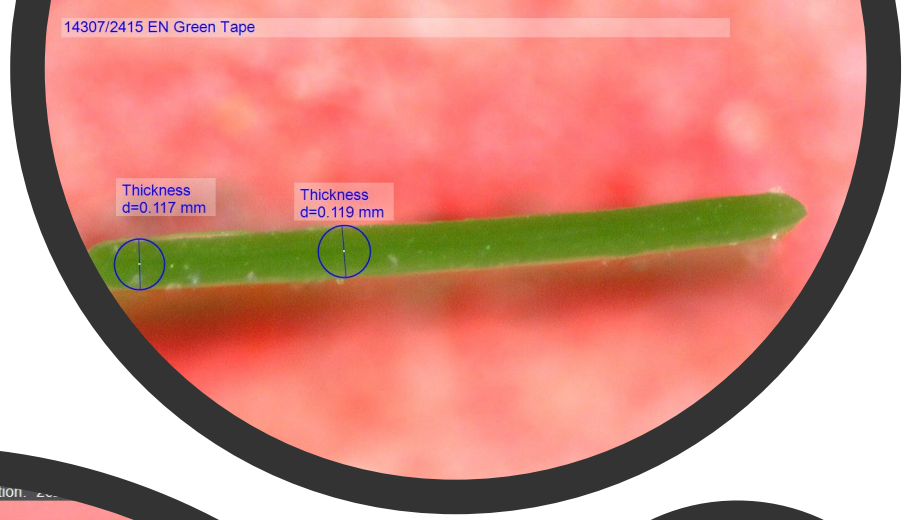
Maintenance to mitigate environmental concerns

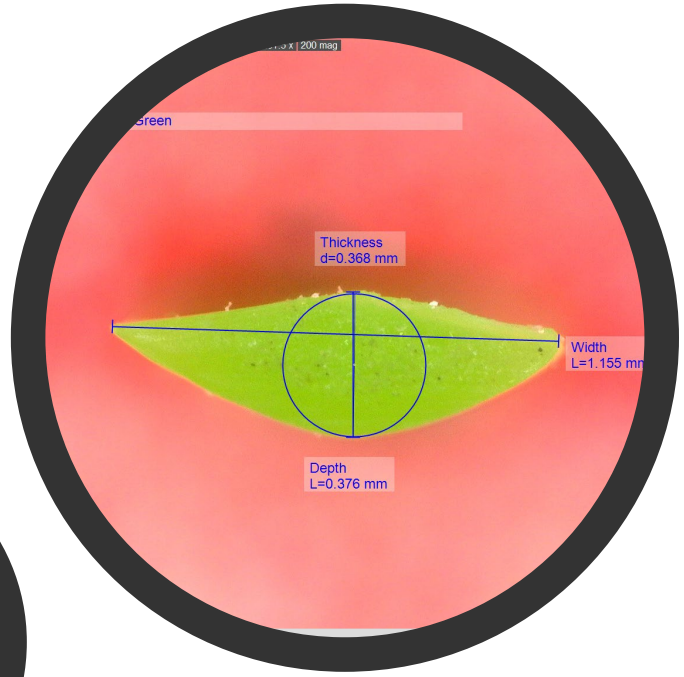
Maintenance to mitigate environmental concerns

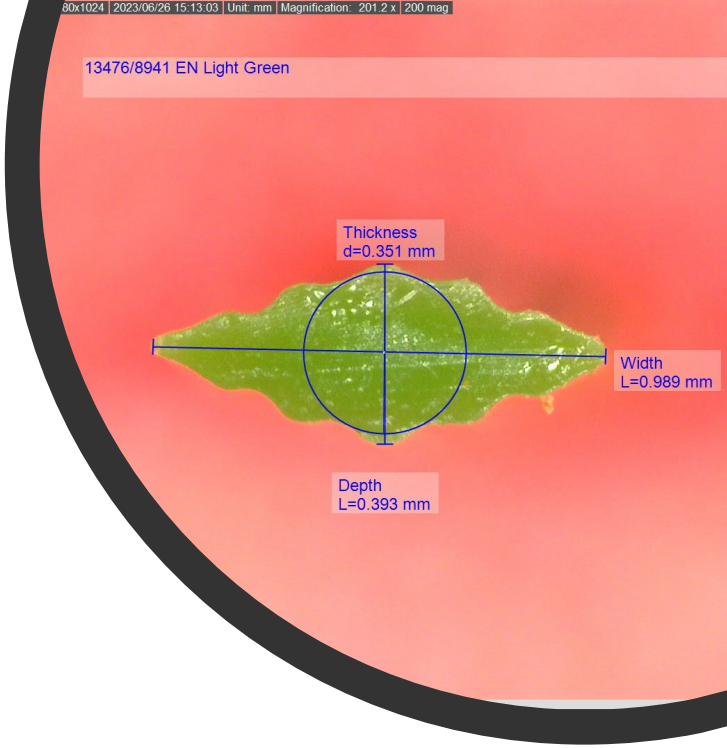
Maintenance to mitigate environmental concerns

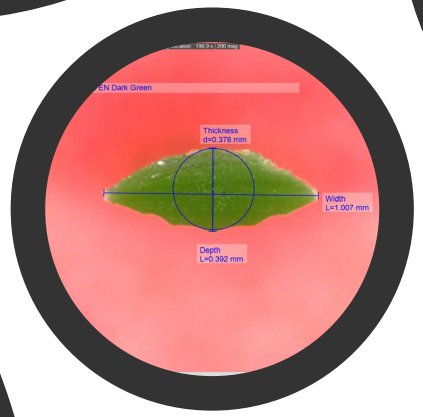
Keeping things in perspective

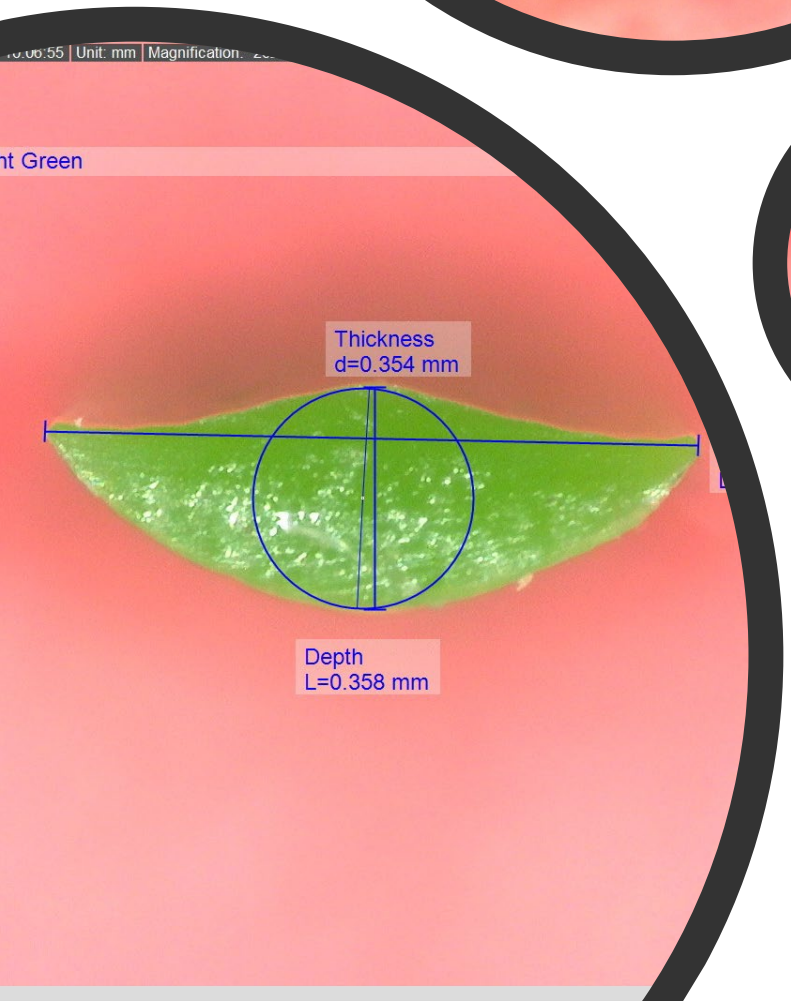
- Simplified shapes, thicker yarns
- More awareness and use of maintenance
- Better data about containment = better outcome
- Hockey surfaces may need more attention



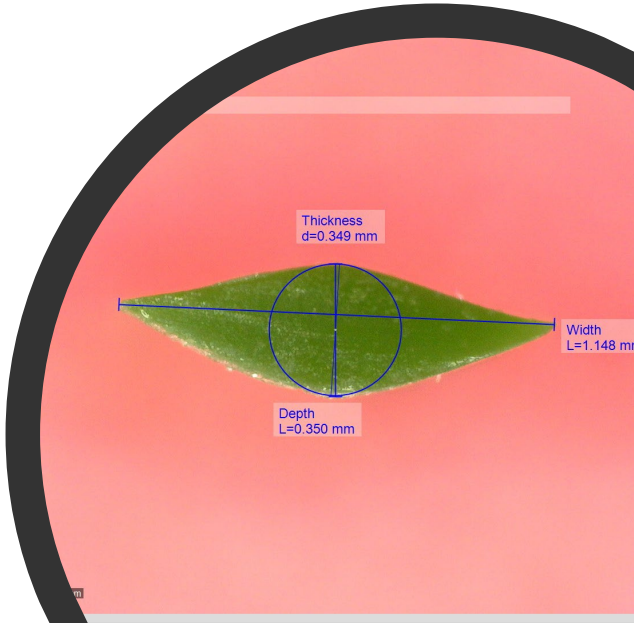








Maintenance to mitigate environmental concerns



Maintenance to mitigate environmental concerns

Likely outcome of studies

- The data will be carefully considered
- Indicative predicted low values from field study

Maintenance to mitigate environmental concerns

What will ECHA do about this?

- Whilst still on the radar it is a low priority at this time
- We strike first with data to be ahead of the curve
- We need to use the time we have effectively and be agile enough to redirect our focus if needed based on Turf moving up the list of priorities

Maintenance to mitigate environmental concerns

A few topics to be concerned about

- A large stock of aging pitches
- Identifying the pathways where microfibres actually end up? Potential research on this?
- Calibrating the effectiveness of maintenance equipment where clearly maintenance can be very effective in dealing with this issue
- Potentially further legislative manoeuvring from Europe

Maintenance to mitigate environmental concerns

Want further information?

[Sports turf final report]

[Landscape turf final report]

[Summary report]

[www.sportslabs.co.uk]