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# FIFA LABORATORY TEST REPORT

Test manual 2015  
01.01.2015

Product	Stemgrass 50-13
FIFA Licensee	CoCreation Grass Co., Ltd.
Test Institute	Labosport SAS

Test Number	55536
External Test Number	R180936-A1
Date of Test	26.07.2018
Test Result	Passed
Quality Level	FIFA Quality
Test Type	Initial



## Licensee

### Main Address

<b>Name</b>	CoCreation Grass Co., Ltd.
<b>Address</b>	CoCreation Grass Corporation, Ltd. Floor 18th Dadi Building, No. 56, Huaqiao Road
<b>ZIP / City</b>	210029 / NANJING
<b>Website</b>	www.ccgrass.com
<b>Contact Email</b>	
<b>Contact Phone</b>	

## Test institute

### Main Address

<b>Name</b>	Labosport SAS
<b>Address</b>	Technoparc du Circuit des 24 heures
<b>ZIP / City</b>	72100 / LE MANS
<b>Website</b>	
<b>Contact Email</b>	
<b>Contact Phone</b>	

## Approval

Test Institute Director	Aurélien LE BLAN
Signature	
Date	28.06.2018
Test Institute Engineer	Steve BAZEILLE
Signature	
Date	28.06.2018



## 1 – Test Results

Name	Comment	Result
<b>1 - Summary</b>		
Vertical ball rebound FIFA Quality		Passed
Angeled ball rebound FIFA Quality		Passed
Reduced ball roll FIFA Quality		Passed
Shock absorption FIFA Quality		Passed
Deformation FIFA Quality		Passed
Rotational resistance FIFA Quality		Passed
Skin / surface friction		Passed
Skin abrasion		Passed
<b>1 - Test Details   Object</b>		
Product Name		Stemgrass 50-13
Product ID		Stemgrass 50-13
Synthetic Turf System		Stemgrass 50-13
Performance infill		SBR
Stabilising infill		Silica Sand
Shock-pad or elastic layer		
Sub-base composition		Concrete
<b>2 - Test Details   Test Institute</b>		
Date(s) of test		26.07.2018
Report created by		Steve BAZEILLE
Other Test Engineer on site		
Laboratory Test report number		R180936-A1
Test Institute Project number		18-0936
<b>3 – Product Declaration (Manufacturer)</b>		
Manufacturer		CCGrass
Tuft pattern		Straight
Yarn manufacturer   yarn 1		CCGrass
Product name, code   yarn 1		Stemgrass Emerald Green
Pile yarn profile   yarn 1		Spined
Pile thickness (µ m)   yarn 1		340.0
Pile colour (RAL)   value 1   yarn 1		Emerald Green
Pile colour (RAL)   value 2   yarn 1		
Pile colour (RAL)   value 3   yarn 1		
Pile width (mm)   yarn 1		1.60
Number of tufts/m2   yarn 1	ISO1773	8190.00
Pile length (mm)   yarn 1	ISO 2549	50.00
Pile weight (g/m2)   yarn 1	ISO 8543	550.00
Pile yarn characterization   yarn 1		PE
Pile yarn dtex   yarn 1		6000



Name	Comment	Result
Yarn manufacturer   yarn 2		CCGrass
Product name, code   yarn 2		Stemgrass Emerald Light
Pile yarn profile   yarn 2		Spined
Pile thickness (µ m)   yarn 2		340.0
Pile colour (RAL)   value 1   yarn 2		Olive Green
Pile colour (RAL)   value 2   yarn 2		
Pile colour (RAL)   value 3   yarn 2		
Pile width (mm)   yarn 2		1.60
Number of tufts/m2   yarn 2	ISO1773	8190.00
Pile length (mm)   yarn 2	ISO 2549	50.00
Pile weight (g/m2)   yarn 2	ISO 8543	550.00
Pile yarn characterization   yarn 2		PE
Pile yarn dtex   yarn 2		6000.0
Yarn manufacturer   yarn 3		
Product name, code   yarn 3		
Pile yarn profile   yarn 3		
Pile thickness (µ m)   yarn 3		
Pile colour (RAL)   value 1   yarn 3		
Pile colour (RAL)   value 2   yarn 3		
Pile colour (RAL)   value 3   yarn 3		
Pile width (mm)   yarn 3		
Number of tufts/m2   yarn 3	ISO1773	
Pile length (mm)   yarn 3	ISO 2549	
Pile weight (g/m2)   yarn 3	ISO 8543	
Pile yarn characterization   yarn 3		
Pile yarn dtex   yarn 3		
Primary backing   Product name, code		Yangzhou Shengxin
Primary backing   Manufacturer		Yangzhou Shengxin
Re-enforcement scrim   Product name, code		
Re-enforcement scrim   Manufacturer		Yangzhou Shengxin
Secondary backing   Product name, code		Latex
Secondary backing   Manufacturer		Yangzhou Shengxin
Secondary backing   Dry application rate (g/m2)		1150.0
Carpet   Minimum tuft withdrawel force (N)		30
Carpet   Carpet mass per unit area (g/m2)		2500.0



Name	Comment	Result
Method of jointing		Bonded
Bonded joints   Adhesive brand name		Beijingshanfeng
Bonded joints   Adhesive manufacturer		Beijingshanfeng
Bonded joints   Application rate (g/m)		
Bonded joints   Jointing film brand name		Yihua Bonar
Bonded joints   Jointing film manufacturer		
Stitched seams   Tread brand name/product code		
Stitched seams   Tread manufacturer		
Stitched seams   Stitch rate (stitch per 1m)		
Performance Infill   Product name, code		SBR
Performance Infill   Manufacturer		Various
Performance Infill   Material type		SBR
Performance Infill   Material grading		0.8 - 2.5 mm
Performance Infill   Particle shape	prEN 14955	Angular A2
Performance Infill   Particle size range	EN 933-Part 1	0.8 - 2.5 mm
Performance Infill   Bulk density (g/cm <sup>3</sup> )	EN 1097-3	0.400
Performance Infill   Application rate (kg/m <sup>2</sup> )		17.0
Stabilising Infill   Product name, code		Silica Sand
Stabilising Infill   Manufacturer		Various
Stabilising Infill   Material type		Silica Sand
Stabilising Infill   Material grading		0.5 - 1.0 mm
Stabilising Infill   Particle shape	prEN 14955	Rounded
Stabilising Infill   Particle size range	EN 933-Part 1	0.5 - 1.0 mm
Stabilising Infill   Bulk density (g/cm <sup>3</sup> )	EN 1097-3	1.46
Stabilising Infill   Application rate (kg/m <sup>2</sup> )		5.0
Shockpad, E-layer   Product name, code		
Shockpad, E-layer   Manufacturer		



Name	Comment	Result
Shockpad, E-layer   Type		
Shockpad, E-layer   Composition		
Shockpad, E-layer   Bulk density (g/cm <sup>3</sup> )		
Shockpad, E-layer   Thickness	EN 1979	
Shockpad, E-layer   Shock absorption (%)	FIFA 4a	
Shockpad, E-layer   Deformation	FIFA 5a	
Shockpad, E-layer   Tensile strength (N)		
Shockpad, E-layer   Mass per unit area (kg/m <sup>2</sup> )		
Other, detail		
<b>4 – Product Identification</b>		
Artificial Turf   Carpet mass per unit area [g/m <sup>2</sup> ]		2719
Artificial Turf   Tufts per unit area [m <sup>2</sup> ]		8440
Artificial Turf   Pile length above backing [mm]		52.0
Artificial Turf   Pile weight [g/m <sup>2</sup> ]		1099
Artificial Turf   Water permeability of carpet [mm/h]		2068
Artificial Turf   Free pile height		14
Performance infill   Particle size range [mm]		0.8 - 2.0 mm
Performance infill   Particle shape		Angular A2
Performance infill   Bulk density [g/cm <sup>3</sup> ]		0.410
Performance infill   Infill depth [mm]		36
Performance infill   Thermographic analysis   organic [%]		64
Performance infill   Thermographic analysis   inorganic [%]		36
Stabilising infill   Particle size range [mm]		0.5 - 1.0 mm
Stabilising infill   Particle shape		Rounded C1
Stabilising infill   Bulk density [g/cm <sup>3</sup> ]		1.46
Shock pad / E-layer   Shock absorption [%]	if part of supplied system	



Name	Comment	Result
Shock pad / E-layer   Deformation	if part of supplied system	
Shock pad / E-layer   Thickness	if part of supplied system	
Other, detail		Infill depth = 2mm (Sand) + 36mm (SBR)
<b>5 – Test Results   Ball / Surface interaction</b>		
Vertical Ball Rebound   Initial   Dry (Quality)	0.6 - 1m	0.83
Vertical Ball Rebound   Initial   Wet (Quality)	0.6 - 1m	0.79
Vertical Ball Rebound   after simulated wear   6'000 cycles (5*)	0.6 - 1m	0.99
Vertical Ball Rebound   after simulated wear   6'000 cycles (20*)	0.6 - 1m	
Angeled Ball Rebound   Dry	45 - 80 %	55
Angeled Ball Rebound   Wet	45 - 80 %	73
Reduced Ball Roll   Initial   Dry (Quality)	4 - 10 m	8.2
Reduced Ball Roll   after simulated wear   6'000 cycles (5*)   Dry	4 - 12 m	11.5
Reduced Ball Roll   after simulated wear   6'000 cycles (5*)   Wet	4 - 12 m	11.6
Reduced Ball Roll   after simulated wear   6'000 cycles (20*)   Dry	4 - 12 m	
Reduced Ball Roll   after simulated wear   6'000 cycles (20*)   Wet	4 - 12 m	
Shock absorption   Initial   Dry (Quality)	57 - 68 %	63.4
Shock absorption   Initial   Wet (Quality)	57 - 68 %	65.8
Shock absorption   after simulated wear   6'000 cycles (5*)	57 - 68 %	61.4
Shock absorption   after simulated wear   6'000 cycles (20*)	57 - 68 %	
Shock absorption   50°C	57 - 68 %	63.20
Shock absorption   -5°C	57 - 68 %	61.70
Deformation   Initial   Dry (Quality)	6 - 11 m	9.5
Deformation   Initial   Wet (Quality)	6 - 11 m	10.0





Name	Comment	Result
Deformation   after simulated wear   6'000 cycles (5*)	6 - 11 m	8.5
Deformation   after simulated wear   6'000 cycles (20*)	6 - 11 m	
Rotational Resistance   Initial   Dry (Quality)	27 - 48 Nm	35
Rotational Resistance   Initial   Wet (Quality)	27 - 48 Nm	33
Rotational Resistance   after simulated wear   6'000 cycles (5*)	27 - 48 Nm	34
Rotational Resistance   after simulated wear   6'000 cycles (20*)	27 - 48 Nm	
Other, detail		
<b>5 – Test Results   Player / Surface interaction</b>		
Skin / surface friction   Dry	0.35 - 0.75 $\mu$	0.73
Skin / surface friction   Dry   3'000 cycles	0.35 - 0.75 $\mu$	
Skin / surface friction   Dry   6'000 cycles	0.35 - 0.75 $\mu$	
Skin abrasion   Dry	$\pm$ 30 %	3
Skin abrasion   Dry   3'000 cycles	$\pm$ 30 %	
Skin abrasion   Dry   6'000 cycles	$\pm$ 30 %	
<b>6 – Environmental impact (artificial, light, water)</b>		
Pile yarn 1   Colour change   after artificial weathering	$\geq$ Grey scale 3	4-5
Pile yarn 2   Colour change   after artificial weathering	$\geq$ Grey scale 3	4-5
Pile yarn 3   Colour change   after artificial weathering	$\geq$ Grey scale 3	
Pile yarn 1   Yarn tensile strength   after artificial weathering	Change $\leq$ 50 %	20
Pile yarn 2   Yarn tensile strength   after artificial weathering	Change $\leq$ 50 %	34
Pile yarn 3   Yarn tensile strength   after artificial weathering	Change $\leq$ 50 %	
Polymeric infill   Colour change   after artificial weathering	$\geq$ Grey scale 3	4
Polymeric infill   Visual change in composition   after artificial weathering	No change	No change
Complete system   Water permeability	> 180 mm/h	1490

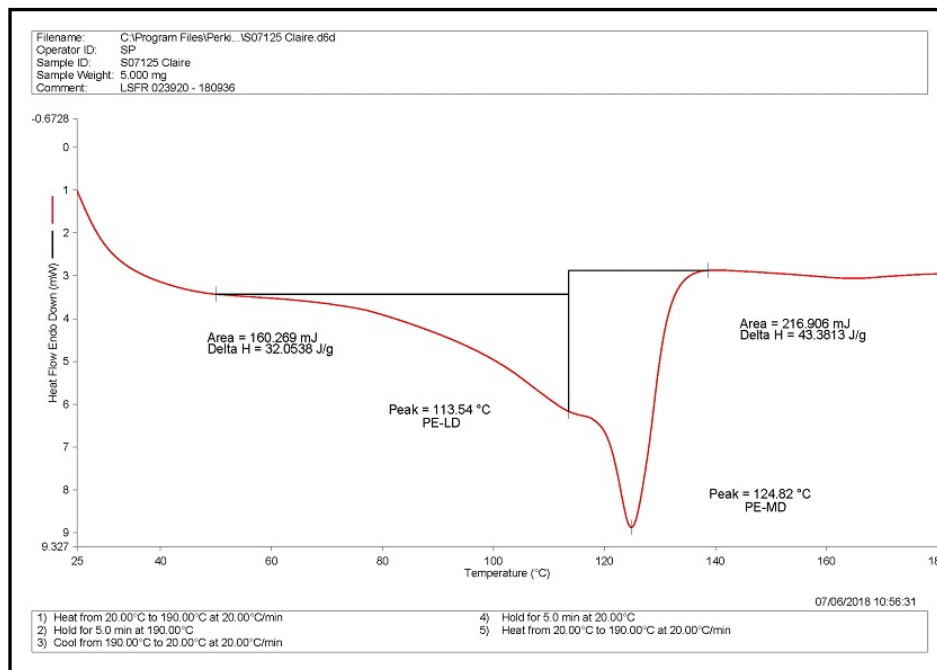


Name	Comment	Result
Stitched joints   Strength   un-aged	$\geq 1000\text{N}/100\text{mm}$	
Stitched joints   Strength   water aged	$\geq 1000\text{N}/100\text{mm}$	
Bonded joints   Strength   un-aged	$\geq 75/100\text{mm}$	204
Bonded joints   Strength   water aged	$\geq 75/100\text{mm}$	128
Carpet tuft   Withdrawal force   un-aged	$\geq 30\text{N}$	60
Carpet tuft   Withdrawal force   water aged	$\geq 30\text{N}$	30
Heat   Category	for information	
Splash   Characteristics	for information	
<b>7 - Miscellaneous (shock pad, sub-base - if part of the system)</b>		
Shock Pad / E-layer   tensile strength   un-aged	$\geq 0.15 \text{ MPa}$	
Sub-base   Composition		
Sub-base   Particle size range		
Sub-base   Particle shape		
Sub-base   Thickness		
Sub-base   Compaction & test method		
Other, detail		UVA test results from test reports n°17617/1710 & n°17617/1711 - SL

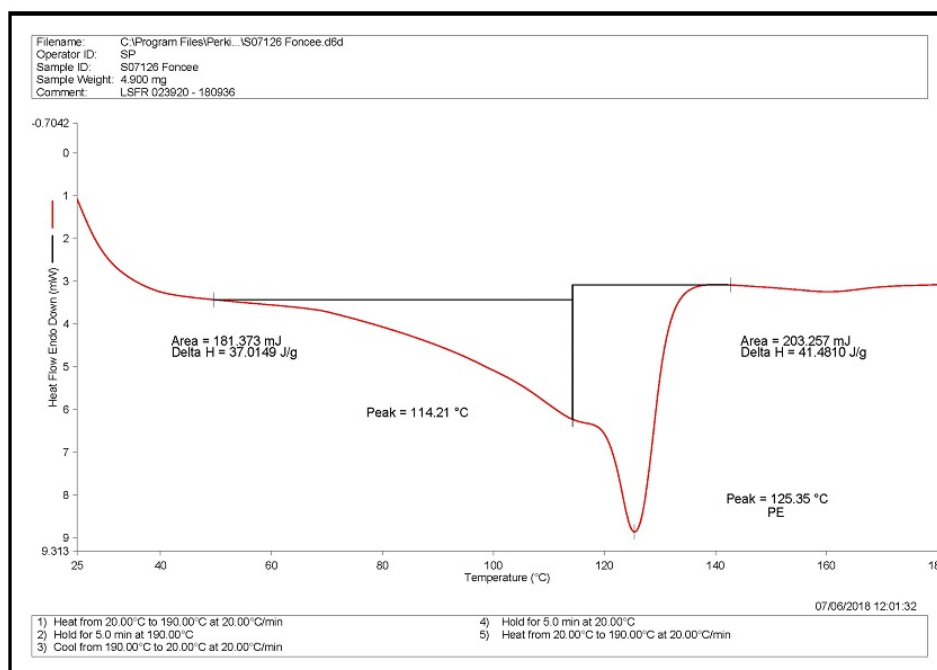
## 2 – Test Images

DSC Diff. Scan. Colorimetry scans of pile yarn

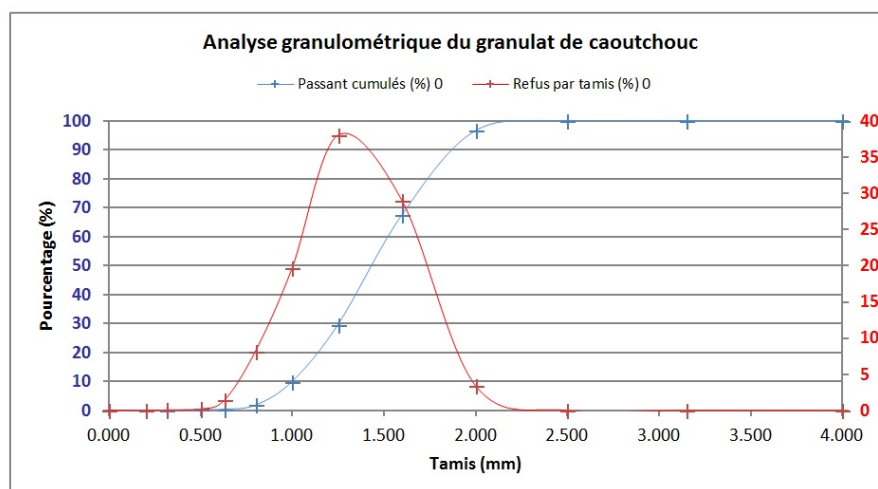
**Light  
yarn**



**Dark  
yarn**

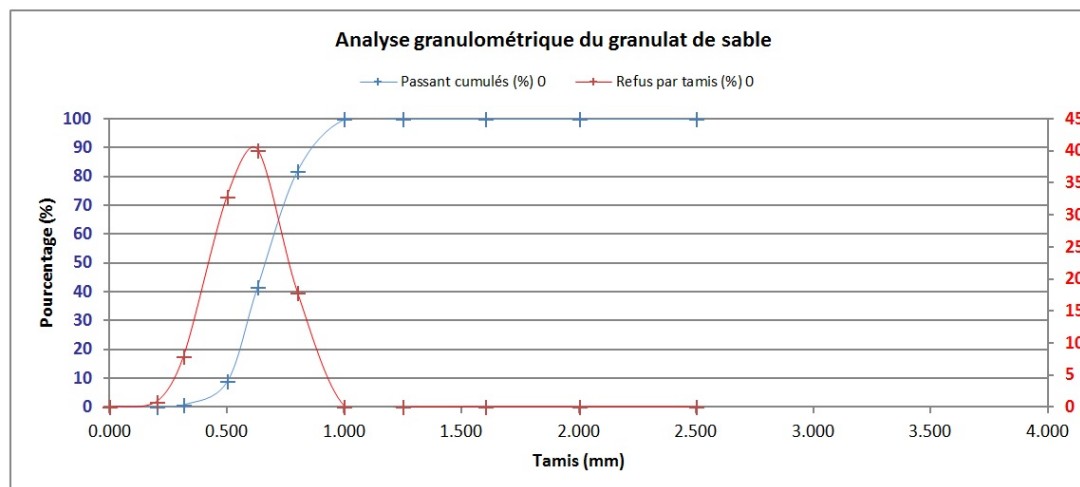


## Performance infill particle grading curve



Ouverture des tamis (mm)	0.000	0.200	0.315	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500	3.150	4.000
Refus par tamis (%)	0	0	0	0	1	8	20	38	29	3	0	0	0
Passant cumulés (%)	0	0	0	0	0	2	10	30	68	97	100	100	100

## Stabilising infill particle grading curve



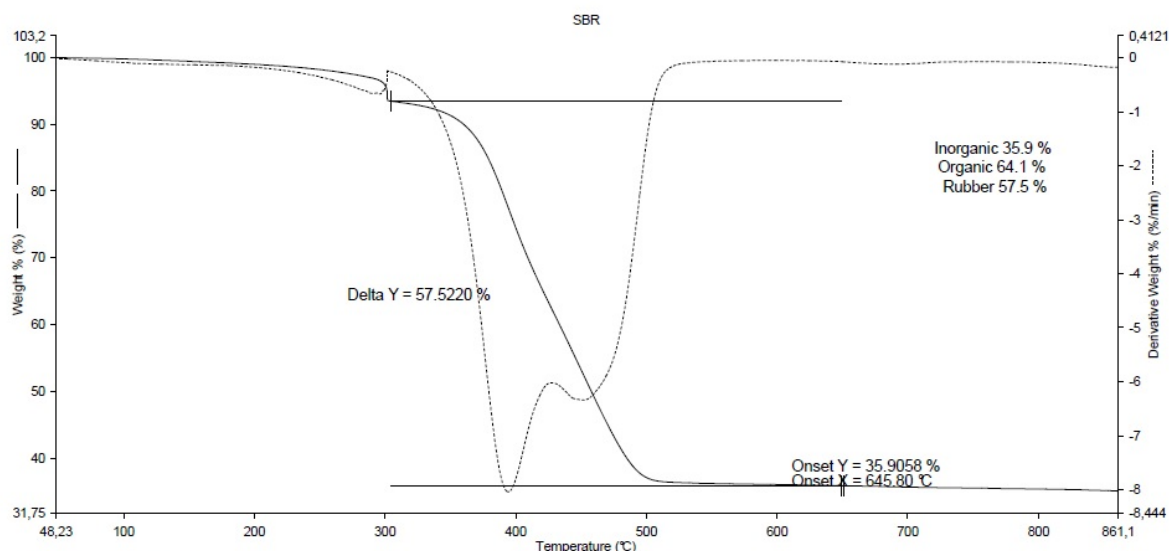
Ouverture des tamis (mm)	0.000	0.200	0.315	0.500	0.630	0.800	1.000	1.250	1.600	2.000	2.500
Refus par tamis (%)	0.00	0.86	7.94	32.90	40.16	17.91	0.12	0.00	0.00	0.00	0.00
Passant cumulés (%)	0	0	1	9	42	82	100	100	100	100	100



## TGA of performance infill

Data Collected: 28/05/2018 15:06:08  
 Operator ID: AKI  
 Sample ID: 18-0561  
 Sample Weight: 59.753 mg  
 Initial Purge Gas: Nitrogen  
 Comment: PerkinElmer TGA4000 - Serial number 522A2092805 - calibration : alumel / perkallloy / iron

18-0561: 023858 (2503-01)  
 Unsubtracted Weight % (%) : Steps: 1-6  
 18-0561: 023858 (2503-01)  
 Derivative Unsubtracted Weight % (%/min) (Smoothed) : Steps: 1-6



01/06/2018 11:36:31

1) Hold for 1.0 min at 50.00°C  
 2) Heat from 50.00°C to 300.00°C at 15.00°C/min  
 3) Hold for 8.0 min at 300.00°C  
 4) Heat from 300.00°C to 650.00°C at 15.00°C/min  
 5) Heat from 650.00°C to 850.00°C at 25.00°C/min  
 6) Hold for 1.0 min at 850.00°C

Simulated wear - Before 1



Simulated wear - Before 2





Simulated wear - Before 3



Simulated wear - Before 4



Simulated wear - After 1



Simulated wear - After 2



Simulated wear - After 3





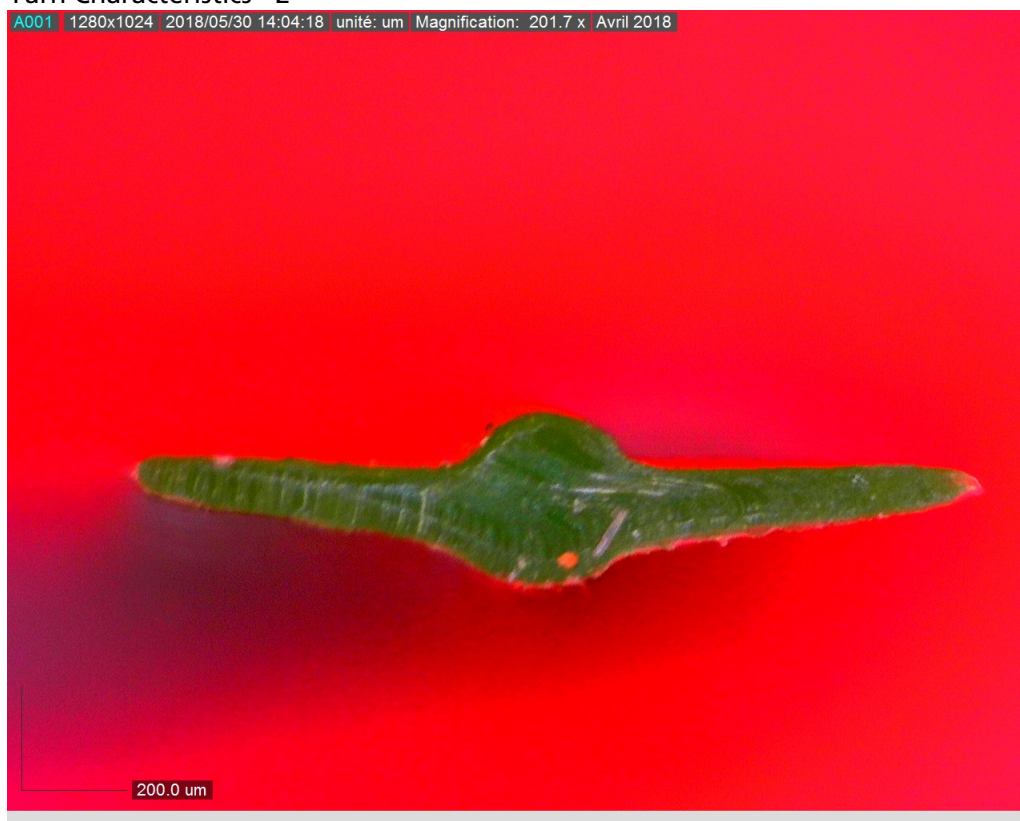
Simulated wear - After 4



## Yarn Characteristics - 1

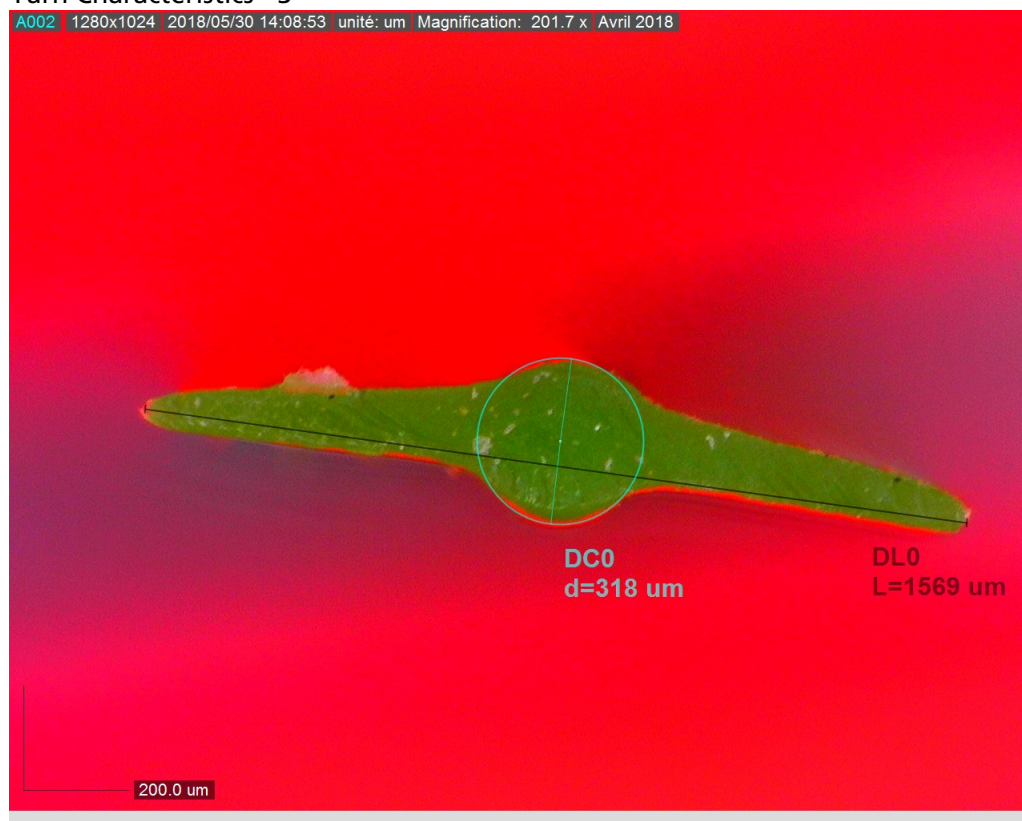


## Yarn Characteristics - 2





## Yarn Characteristics - 3



## Yarn Characteristics - 4

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