# FIFA LABORATORY TEST REPORT

TM Football Turf I 2015
01.01.2015

| | |
|---|---|
| Product | XWR |
| FIFA Licensee | Nurteks Hali San.ve Tic. A.S. |
| Test Institute | Labosport Italia S.r.l. |

| | |
|---|---|
| Test Number | 103187 |
| External Test Number | 21-0030IT |
| Date of Test | 26.02.2021 |
| Test Result | Passed |
| Quality Level | FIFA Quality PRO |
| Test Type | Initial |

## Licensee

Main Address

| | |
|---|---|
| Name | Nurteks Hali San.ve Tic. A.S. |
| Address | Nurteks Hali San.ve Tic. A.S.<br>Yesilköy Mah. Atatürk Cad. EGS<br>Bloklari No:12 B2 Blok Kat:4 |
| ZIP / City | 34149 / ISTANBUL |
| Website | |
| Contact Email | sales@nurteks.com.tr |
| Contact Phone | |

## Test institute

Main Address

| | |
|---|---|
| Name | Labosport Italia S.r.l. |
| Address | Labosport Italia S.r.l.<br>Via Monza, 80 |
| ZIP / City | 23870 / CERNUSCO LOMBARDONE |
| Website | www.labosport.com |
| Contact Email | labosport@labosport.it |
| Contact Phone | +39/ 039 896 26 84 |

# Approval

| Test Institute Director | Roberto Armeni |
|---|---|
| Signature |  |
| Date | 25.03.2021 |

| Test Institute Engineer | Matteo Giorgini |
|---|---|
| Signature |  |
| Date | 25.03.2021 |

# 1 – Test Results

| Name | Comment | Result |
|---|---|---|
| **1 - Summary** | | |
| Vertical ball rebound FIFA Quality Pro | | Passed |
| Angle ball rebound FIFA Quality Pro | | Passed |
| Reduced ball roll FIFA Quality Pro | | Passed |
| Shock absorption FIFA Quality Pro | | Passed |
| Deformation FIFA Quality Pro | | Passed |
| Rotational resistance FIFA Quality Pro | | Passed |
| Skin / surface friction | | Passed |
| Skin abrasion | | Passed |
| **1 - Test Details \| Object** | | |
| Product Name | | XWR |
| Product ID | | - |
| Synthetic Turf System | | - |
| Performance infill | | SBR |
| Stabilising infill | | SILICA |
| Shock-pad or elastic layer | | FOAM |
| Sub-base composition | | CONCRETE |
| **2 - Test Details \| Test Institute** | | |
| Date(s) of test | | 26.02.2021 |
| Report created by | | Matteo Giorgini |
| Laboratory Test report number | | 21-0030IT |
| Test Institute Project number | | 21-0030IT |
| **3 – Product Declaration (Manufacturer)** | | |
| Manufacturer | | Nurteks Halı San. Tic. As. |
| Tuft pattern | | Straight |
| Yarn manufacturer \| yarn 1 | | TenCate Thiolon B.V. |
| Product name, code \| yarn 1 | | MS D2 132/6 XWR FIELD GREEN, S17 |
| Pile yarn profile \| yarn 1 | | Elipse |
| Pile thickness (µ m) \| yarn 1 | | 360.0 |
| Pile colour (RAL) \| value 1 \| yarn 1 | | RAL 120 40 30 |

| Name | Comment | Result |
|---|---|---|
| Pile colour (RAL) \| value 2 \| yarn 1 | | - |
| Pile colour (RAL) \| value 3 \| yarn 1 | | - |
| Pile width (mm) \| yarn 1 | | 1.10 |
| Number of tufts/m2 \| yarn 1 | ISO1773 | 8260.00 |
| Pile length (mm) \| yarn 1 | ISO 2549 | 42.00 |
| Pile weight (g/m2) \| yarn 1 | ISO 8543 | 555.00 |
| Pile yarn characterization \| yarn 1 | | PE |
| Pile yarn dtex \| yarn 1 | | 7000 |
| Yarn manufacturer \| yarn 2 | | TenCate Thiolon B.V |
| Product name, code \| yarn 2 | | MS D2 132/6 XWR LIME GREEN, S18 |
| Pile yarn profile \| yarn 2 | | Elipse |
| Pile thickness (µm) \| yarn 2 | | 360.0 |
| Pile colour (RAL) \| value 1 \| yarn 2 | | RAL 110 40 40 |
| Pile colour (RAL) \| value 2 \| yarn 2 | | - |
| Pile colour (RAL) \| value 3 \| yarn 2 | | - |
| Pile width (mm) \| yarn 2 | | 1.10 |
| Number of tufts/m2 \| yarn 2 | ISO1773 | 8260.00 |
| Pile length (mm) \| yarn 2 | ISO 2549 | 42.00 |
| Pile weight (g/m2) \| yarn 2 | ISO 8543 | 555.00 |
| Pile yarn characterization \| yarn 2 | | PE |
| Pile yarn dtex \| yarn 2 | | 7000.0 |
| Yarn manufacturer \| yarn 3 | | - |
| Product name, code \| yarn 3 | | - |
| Pile yarn profile \| yarn 3 | | - |

| Name | Comment | Result |
|---|---|---|
| Pile thickness (µm) \| yarn 3 | | 0.0 |
| 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 | | 0.00 |
| Number of tufts/m2 \| yarn 3 | ISO1773 | 0.00 |
| Pile length (mm) \| yarn 3 | ISO 2549 | 0.00 |
| Pile weight (g/m2) \| yarn 3 | ISO 8543 | 0.00 |
| Pile yarn characterization \| yarn 3 | | 0 |
| Pile yarn dtex \| yarn 3 | | 0.0 |
| Primary backing \| Product name, code | | H18 |
| Primary backing \| Manufacturer | | Tencate |
| Re-enforcement scrim \| Product name, code | | - |
| Re-enforcement scrim \| Manufacturer | | - |
| Secondary backing \| Product name, code | | SBR Latex |
| Secondary backing \| Manufacturer | | Styron |
| Secondary backing \| Dry application rate (g/m2) | | 1100.0 |
| Carpet \| Minimum tuft withdrawal force (N) | | 40 |
| Carpet \| Carpet mass per unit area [g/m2] | | 2570.0 |
| Method of jointing | | Bonded |
| Bonded joints \| Adhesive brand name | | Ayka Floor |

| Name | Comment | Result |
|---|---|---|
| Bonded joints \| Adhesive manufacturer | | Ayka Floor |
| Bonded joints \| Application rate (g/m) | | 200 |
| Bonded joints \| Jointing film brand name | | Helmetin |
| Bonded joints \| Jointing film manufacturer | | Serta Tekstil |
| Stitched seams \| Tread brand name/product code | | - |
| Stitched seams \| Tread manufacturer | | - |
| Stitched seams \| Stitch rate (stitch per lm) | | 0.000 |
| Performance Infill \| Product name, code | | NRT SBR RUBBER |
| Performance Infill \| Manufacturer | | NURTEKS HALI SAN. TİC.AS. |
| Performance Infill \| Material type | | BLACK SBR |
| Performance Infill \| Material grading | | 1,0-3,15 |
| Performance Infill \| Particle shape | prEN 14955 | A2-B3 |
| Performance Infill \| Particle size range | EN 933-Part 1 | 1,0-3,15 |
| Performance Infill \| Bulk density (g/cm3) | EN 1097-3 | 0.450 |
| Performance Infill \| Application rate (kg/m2) | | 10.5 |
| Stabilising Infill \| Product name, code | | Silica Sand |
| Stabilising Infill \| Manufacturer | | Emek, Fares Kum |
| Stabilising Infill \| Material type | | Silica |
| Stabilising Infill \| Material grading | | 0,315-0,8 |
| Stabilising Infill \| Particle shape | prEN 14955 | Round high sphericity-C1 |

| Name | Comment | Result |
|---|---|---|
| Stabilising Infill \| Particle size range | EN 933-Part 1 | 0,315-0,8 |
| Stabilising Infill \| Bulk density (g/cm3) | EN 1097-3 | 1.50 |
| Stabilising Infill \| Application rate (kg/m2) | | 10.0 |
| Shockpad, E-layer \| Product name, code | | Foamex Shock Pad |
| Shockpad, E-layer \| Manufacturer | | Berkosan |
| Shockpad, E-layer \| Type | | Foam |
| Shockpad, E-layer \| Composition | | - |
| Shockpad, E-layer \| Bulk density (g/cm3) | | 40.00 |
| Shockpad, E-layer\| Thickness | EN 1969 | 8.8 |
| Shockpad, E-layer \| Shock absorption (%) | FIFA 4a | 24.8 |
| Shockpad, E-layer \| Deformation | FIFA 5a | 5.8 |
| Shockpad, E-layer \| Tensile strength (MPa) | | 0.17 |
| Shockpad, E-layer \| Mass per unit area (kg/m2) | | 0.0 |
| Other, detail | | - |
| **3 – Test Results \| Player / Surface Interaction** | | |
| Rotational Resistance \| Initial \| Dry (Pro) | 32 - 43 Nm | 41 |
| Rotational Resistance \| Initial \| Wet (Pro) | 32 - 43 Nm | 38 |
| Rotational Resistance \| after simulated wear \| 3'000 cycles (5*) | 32 - 43 Nm | 43 |
| Rotational Resistance \| after simulated wear \| 3'000 cycles (20*) | 32 - 43 Nm | 0 |
| **3 – Test Results \| Product identification field product** | | |
| Performance infill \| Theremographic analysis \| Elastomer [%] - | | 58.7 |

| Name | Comment | Result |
|---|---|---|
| Product Declaration | | |
| Performance infill \| Theremographic analysis \| Inorganic [%] - Product Declaration | | 35.2 |
| Performance infill \| Theremographic analysis \| Organic [%] - Product Declaration | | 64.8 |
| **4 – Product Identification** | | |
| Artificial Turf \| Carpet mass per unit area [g/m2] | | 2567 |
| Artificial Turf \| Tufts per unit area [m2] | | 9072 |
| Artificial Turf \| Pile lenght above backing [mm] | | 42.0 |
| Artificial Turf \| Pile weight [g/m2] | | 1125 |
| Detailed tuft decitex (Dtex) [g/10000m] | | 13694 |
| Artificial Turf \| Water permeability of carpet [mm/h] | | 5625 |
| Artificial Turf \| Free pile height | | 11 |
| Performance infill \| Particle size range [mm] | | 0,8 - 3,15 |
| Performance infill \| Particle shape | | A2 - B3 |
| Performance infill \| Bulk density [g/cm3] | | 0.470 |
| Performance infill \| Infill depth [mm] | | 29 |
| Performance infill \| Thermographic analysis \| organic [%] | | 62 |
| Performance infill \| Theremographic analysis \| inorganic [%] | | 38 |

| Name | Comment | Result |
|---|---|---|
| Stabilising infill \| Particle size range [mm] | | 0,5 - 1,0 |
| Stabilising infill \| Particle shape | | C2 |
| Stabilising infill \| Bulk density [g/cm3] | | 1.36 |
| Shock pad / E-layer \| Shock absorption [%] | if part of supplied system | 24.8 |
| Shock pad / E-layer \| Deformation | if part of supplied system | 5.8 |
| Shock pad / E-layer \| Thickness | if part of supplied system | 8.8 |
| Other, detail | | - |
| **5 – Test Results \| Ball / Surface interaction** | | |
| Vertical Ball Rebound \| Initial \| Dry (Pro) | 0.6 - 0.85m | 0.79 |
| Vertical Ball Rebound \| Initial \| Wet (Pro) | 0.6 - 0.85m | 0.75 |
| Vertical Ball Rebound \| after simulated wear \| 3'000 cycles (5*) | 0.6 - 0.85m | 0.85 |
| Vertical Ball Rebound \| after simulated wear \| 3'000 cycles (20*) | 0.6 - 0.85m | 0.00 |
| Angle Ball Rebound \| Dry | 45 - 60 % | 55 |
| Angle Ball Rebound \| Wet | 45 - 80 % | 65 |
| Reduced Ball Roll \| Initial \| Dry (Pro) | 4 - 8 m | 7.1 |
| Reduced Ball Roll \| after simulated wear \| 3'000 cycles (5*) \| Dry | 4 - 8 m | 7.5 |
| Reduced Ball Roll \| after simulated wear \| 3'000 cycles (5*) \| Wet | 4 - 8 m | 7.7 |
| Reduced Ball Roll \| after simulated wear \| 3'000 cycles (20*) \| Dry | 4 - 8 m | 0.0 |
| Reduced Ball Roll \| after simulated | 4 - 8 m | 0.0 |

| Name | Comment | Result |
|---|---|---|
| wear \| 3'000 cycles (20*) \| Wet | | |
| Shock absorption \| Initial \| Dry (Pro) | 62 - 68 % | 64.9 |
| Shock absorption \| Initial \| Wet (Pro) | 62 - 68 % | 64.5 |
| Shock absorption \| after simulated wear \| 3'000 cycles (5*) | 62 - 68 % | 62.6 |
| Shock absorption \| after simulated wear \| 3'000 cycles (20*) | 62 - 68 % | 0.0 |
| Shock absorption \| 50°C | 57 - 68 % | 66.20 |
| Shock absorption \| -5°C | 57 - 68 % | 66.90 |
| Other, detail | | - |
| **5 – Test Results \| Player / Surface interaction** | | |
| Deformation \| Initial \| Dry (Pro) | 4 - 10 mm | 10.0 |
| Deformation \| Initial \| Wet (Pro) | 4 - 10 mm | 10.0 |
| Deformation \| after simulated wear \| 3'000 cycles (5*) | 4 - 10 mm | 9.5 |
| Deformation \| after simulated wear \| 3'000 cycles (20*) | 4 - 10 mm | 0.0 |
| Skin / surface friction \| Dry | 0.35 - 0.75 µ | 0.60 |
| Skin / surface friction \| Dry \| 3'000 cycles | 0.35 - 0.75 µ | 0.68 |
| Skin / surface friction \| Dry \| 6'000 cycles | 0.35 - 0.75 µ | 0.00 |
| Skin abrasion \| Dry | ± 30 % | 17 |
| Skin abrasion \| Dry \| 3'000 cycles | ± 30 % | 26 |
| Skin abrasion \| Dry \| 6'000 cycles | ± 30 % | 0 |
| **6 – Environmental impact (arficial, light, water)** | | |
| Pile yarn 1 \| Colour change \| after artificial weathering | ≥ Grey scale 3 | 5 |
| Pile yarn 2 \| Colour change \| | ≥ Grey scale 3 | 5 |

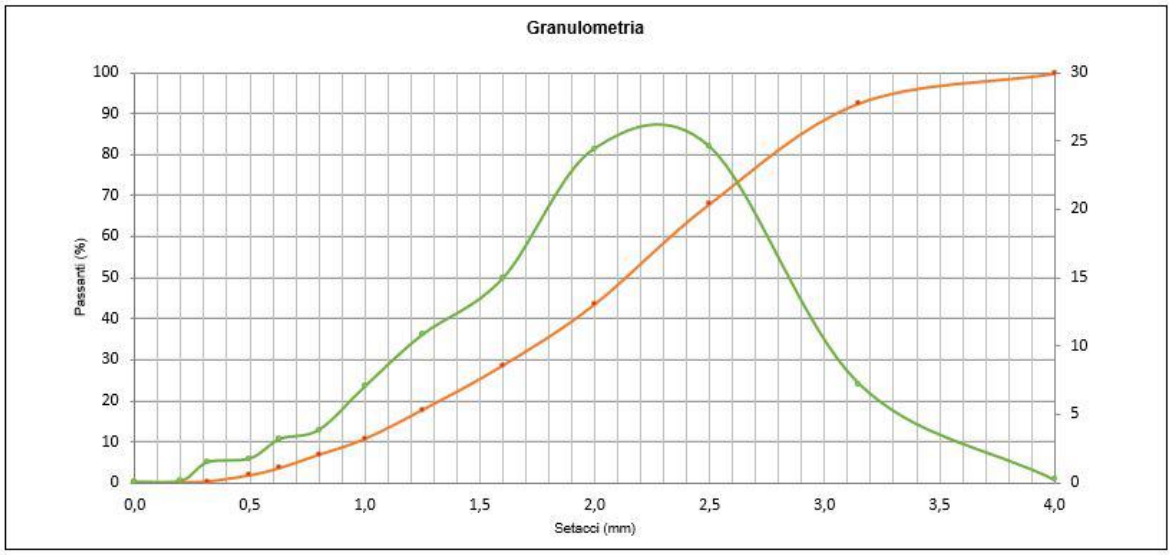
| Name | Comment | Result |
|---|---|---|
| after artificial weathering | | |
| Pile yarn 3 \| Colour change \| after artificial weathering | ≥ Grey scale 3 | 0 |
| Pile yarn 1 \| Peak Breakage Force \| before artificial weathering | | 15.20 |
| Pile yarn 1 \| Peak Breakage Force \| after artificial weathering | | 15,1 |
| Pile yarn 1 \| Peak Breakage Force \| Green Reference value before artificial weathering | | 15.20 |
| Pile yarn 1 \| Peak Breakage Force \| Variation after weathering from Green Reference value | Change ≤ 25 % | 0.70 |
| Pile yarn 2 \| Peak Breakage Force \| before artificial weathering | | 13.60 |
| Pile yarn 2 \| Peak Breakage Force \| after artificial weathering | | 14,3 |
| Pile yarn 2\| Peak Breakage Force \| Green Reference value before artificial weathering | | 13.60 |
| Pile yarn 2 \| Peak Breakage Force \| Variation after weathering from Green Reference value | Change ≤ 25 % | 5.10 |
| Pile yarn 3 \| Peak Breakage Force \| before artificial weathering | | 0.00 |
| Pile yarn 3 \| Peak Breakage Force \| after artificial weathering | | - |

| Name | Comment | Result |
|---|---|---|
| Pile yarn 3\| Peak Breakage Force \| Green Reference value before artificial weathering | | 0.00 |
| Pile yarn 3 \| Peak Breakage Force \| Variation after weathering from Green Reference value | Change ≤ 25 % | 0.00 |
| Polymeric infill \| Colour change \| after artificial weathering | ≥ Grey scale 3 | 5 |
| Polymeric infill \| Visual change in composition \| after artificial weathering | No change | No change |
| Complete system \| Water permeability | > 180 mm/h | 3843 |
| Stitched joints \| Strength \| un-aged | ≥ 1000N/100mm | 0 |
| Stitched joints \| Strength \| water aged | ≥ 1000N/100mm | 0 |
| Bonded joints \| Strength \| un-aged | ≥ 75/100mm | 100 |
| Bonded joints \| Strength \| water aged | ≥ 75/100mm | 93 |
| Carpet tuft \| Withdrawal force \| un-aged | ≥ 40N | 63 |
| Carpet tuft \| Withdrawal force \| water aged | ≥ 40N | 52 |
| Heat \| Category | for information | Category 3 |
| Splash \| Characteristics | for information | > 1,5% |
| **7 - Miscellaneous (shock pad, sub-base - if part of the system)** | | |
| Shock Pad / E-layer \| tensile strength \| un-aged | ≥ 0.15 MPa | 0.17 |
| Sub-base \| Composition | | - |

| Name | Comment | Result |
|---|---|---|
| Sub-base \| Particle size range | | - |
| Sub-base \| Particle shape | | - |
| Sub-base \| Thickness | | - |
| Sub-base \| Compaction & test method | | - |
| Other, detail | | Due to different DSC devices and potential difference in the test method used, the shape and peak temperatures of the DSC analysis may differ from the FIFA requirement.<br>MS D2 132/6 XWR FIELD GREEN, S17 UVA report SPORTSLABS number 16744/1375 issued on 07/07/2016.<br>MS D2 132/6 XWR LIME GREEN, S18 UVA report SPORTSLABS number 16744/1798 issued on 07/07/2016. |

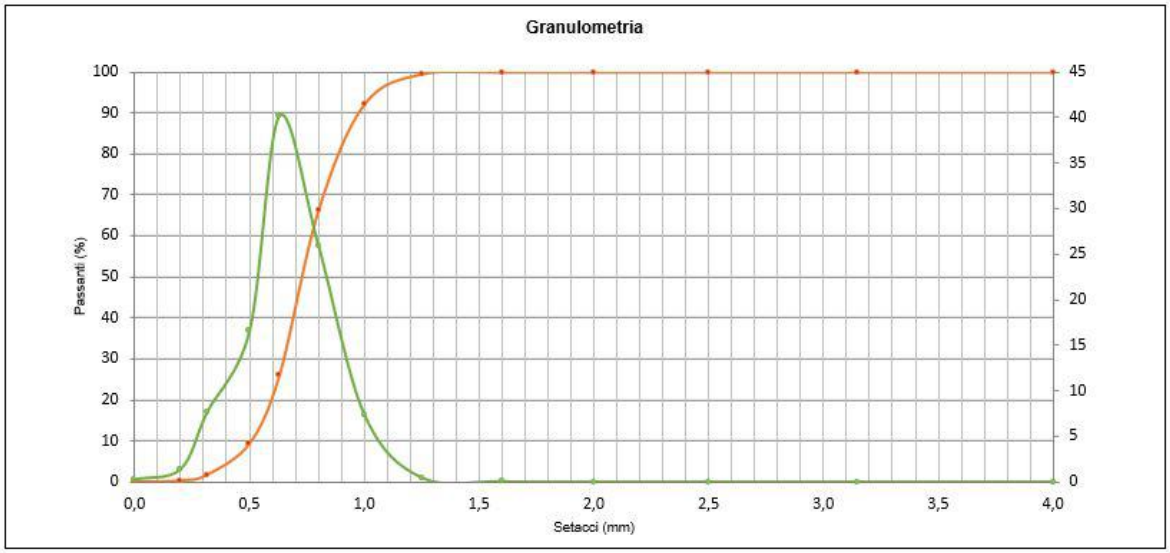
# 2 – Test Images

Performance infill particle grading curve



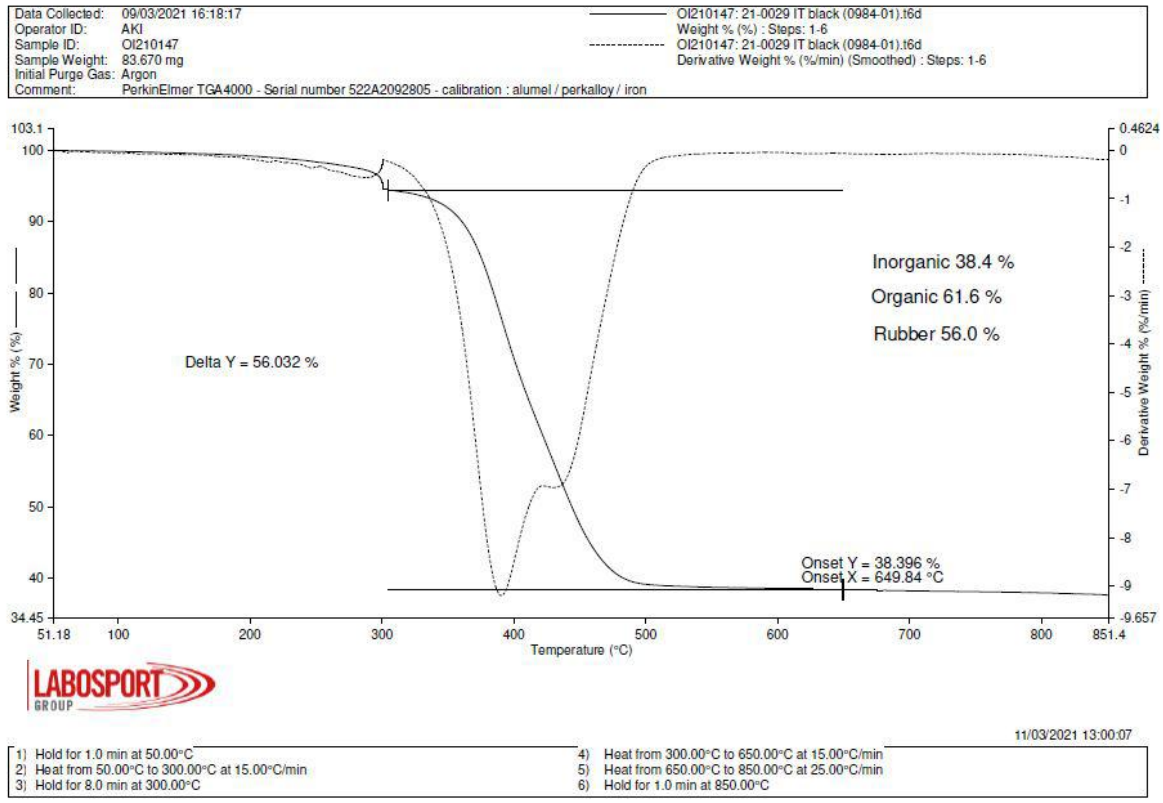

| Setacci (mm) | 0 | 0,2 | 0,315 | 0,5 | 0,63 | 0,8 | 1,0 | 1,25 | 1,6 | 2,0 | 2,5 | 3,15 | 4,0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rifiutati (%) | 0 | 0 | 2 | 2 | 3 | 4 | 7 | 11 | 15 | 24 | 25 | 7 | 0 |
| Passanti (%) | 0 | 0 | 0 | 2 | 4 | 7 | 11 | 18 | 29 | 44 | 68 | 93 | 100 |

Stabilising infill particle grading curve

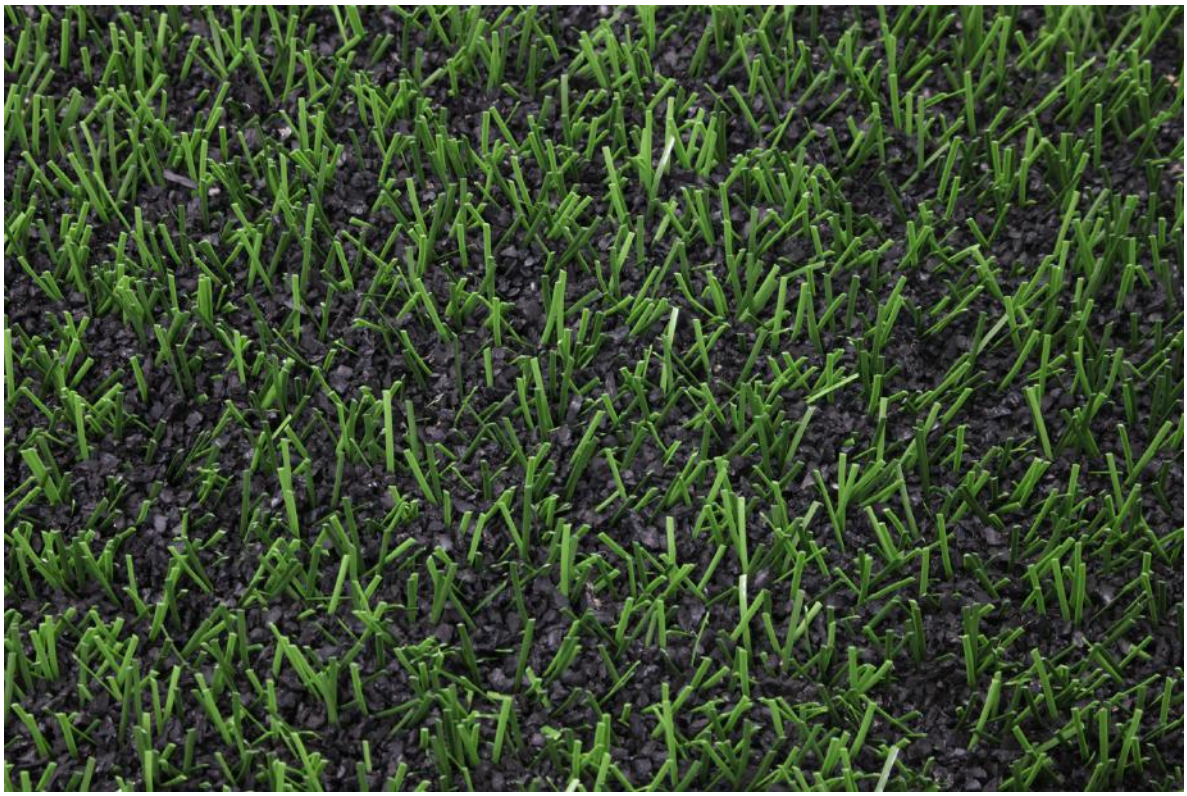



| Setacci (mm) | 0 | 0,2 | 0,315 | 0,5 | 0,63 | 0,8 | 1,0 | 1,25 | 1,6 | 2,0 | 2,5 | 3,15 | 4,0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rifiutati (%) | 0 | 1 | 8 | 17 | 40 | 26 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Passanti (%) | 0 | 0 | 2 | 9 | 26 | 66 | 92 | 100 | 100 | 100 | 100 | 100 | 100 |

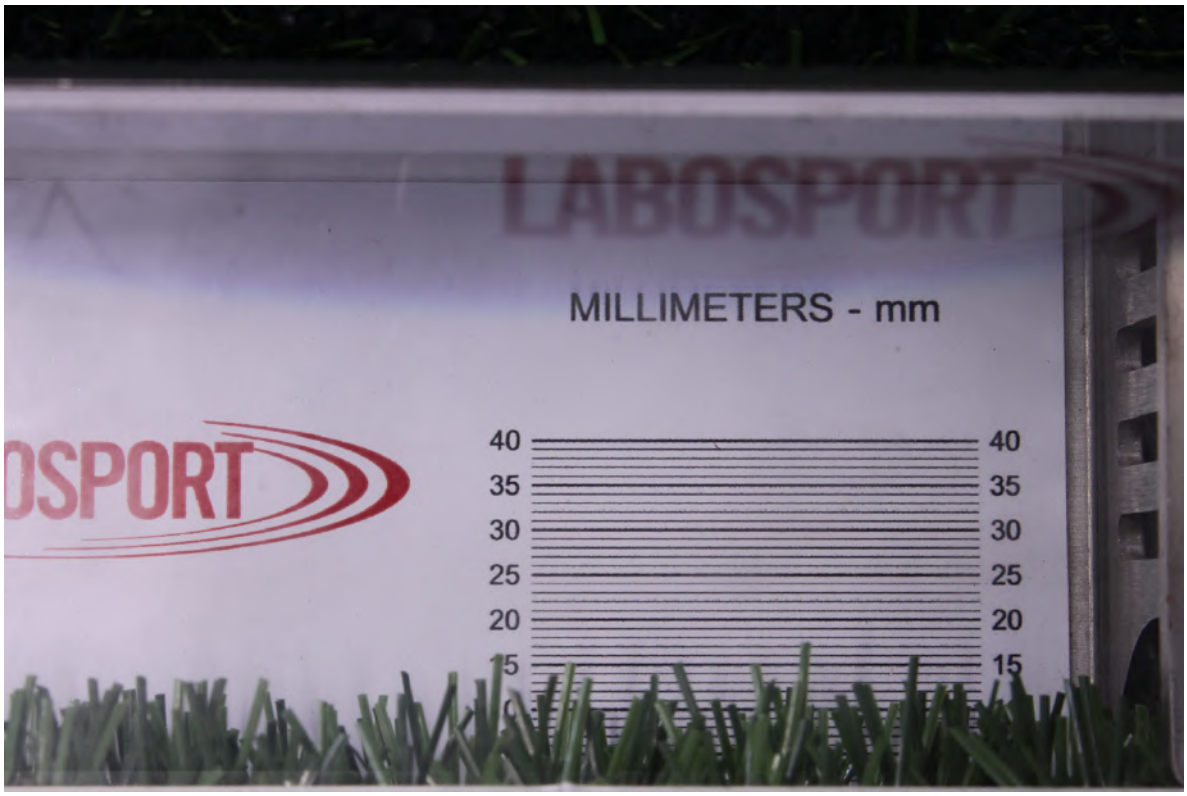
TGA of performance infill



Simulated wear - Before 1

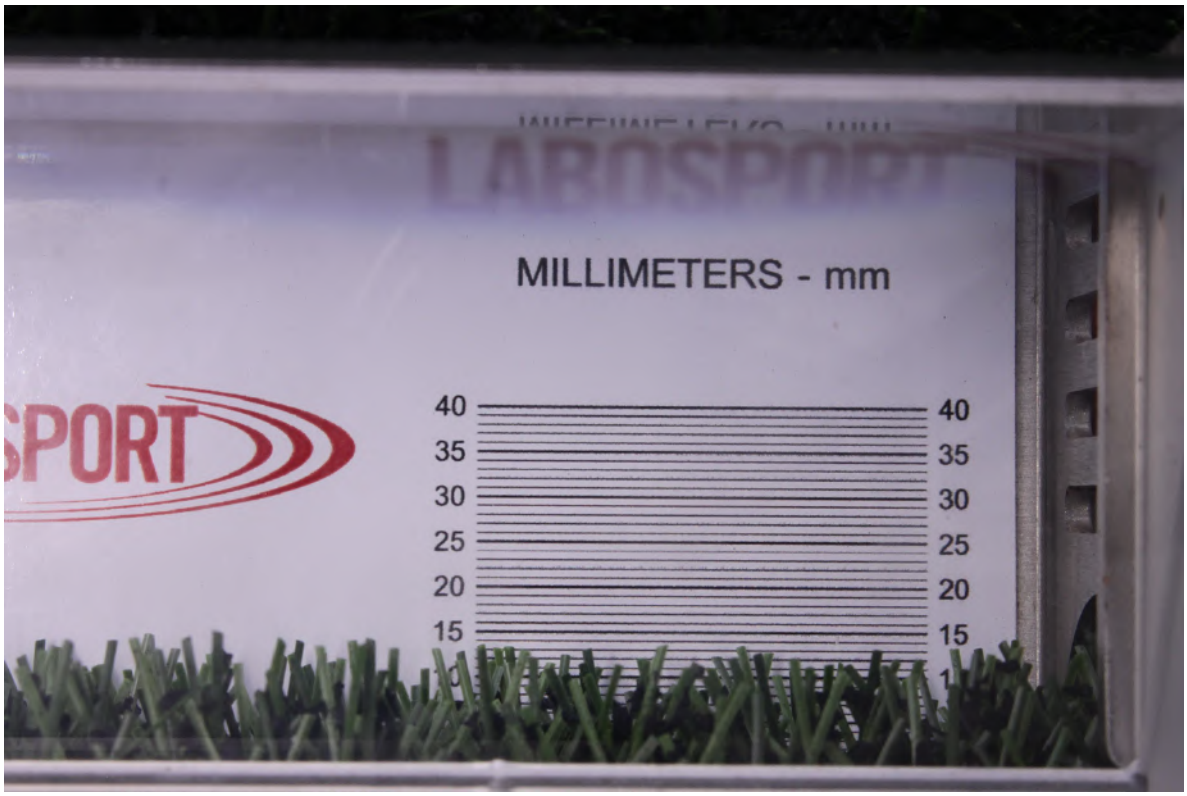


Simulated wear - Before 2

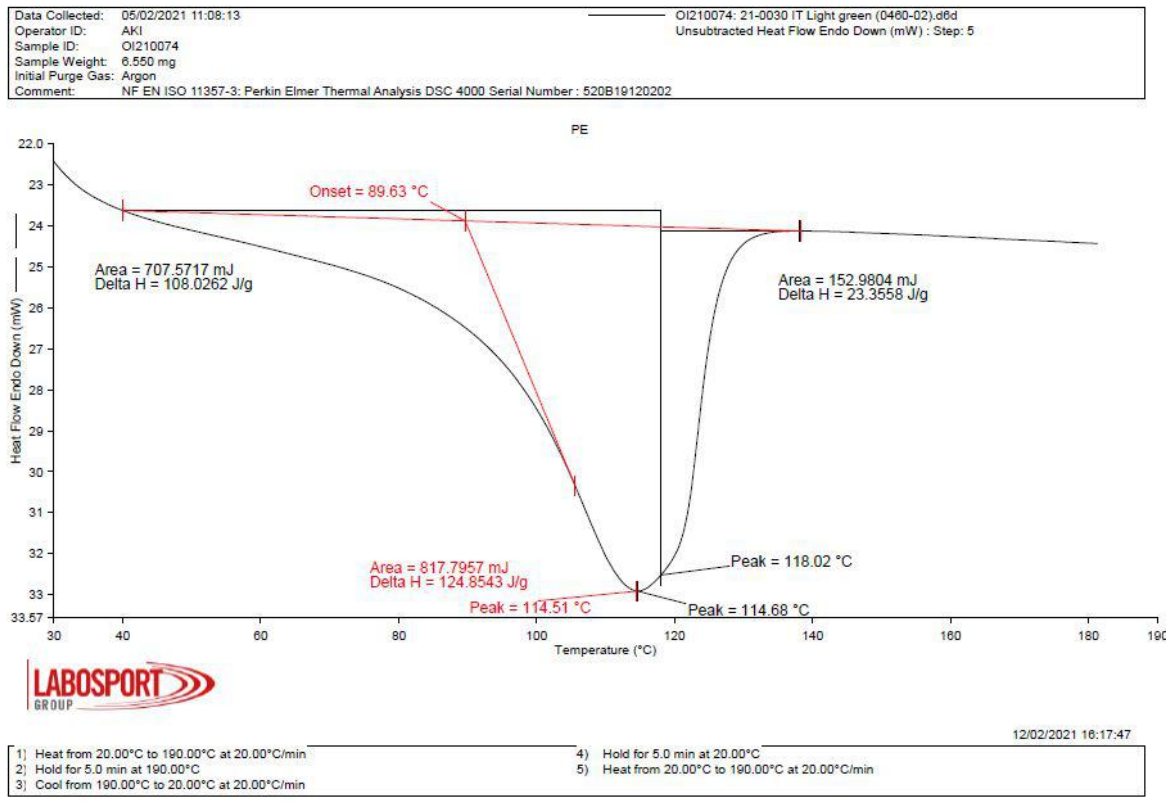


Simulated wear - After 1

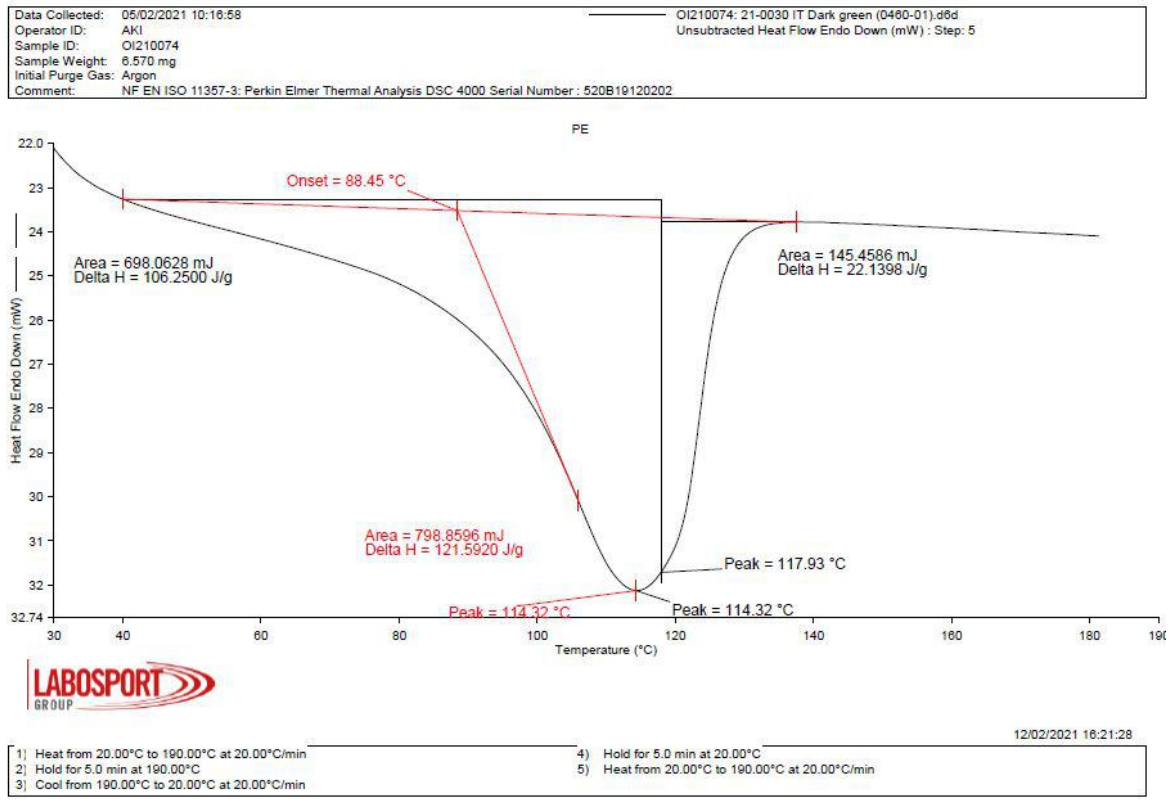
Simulated wear - After 2



## Yarn Characteristics DSC



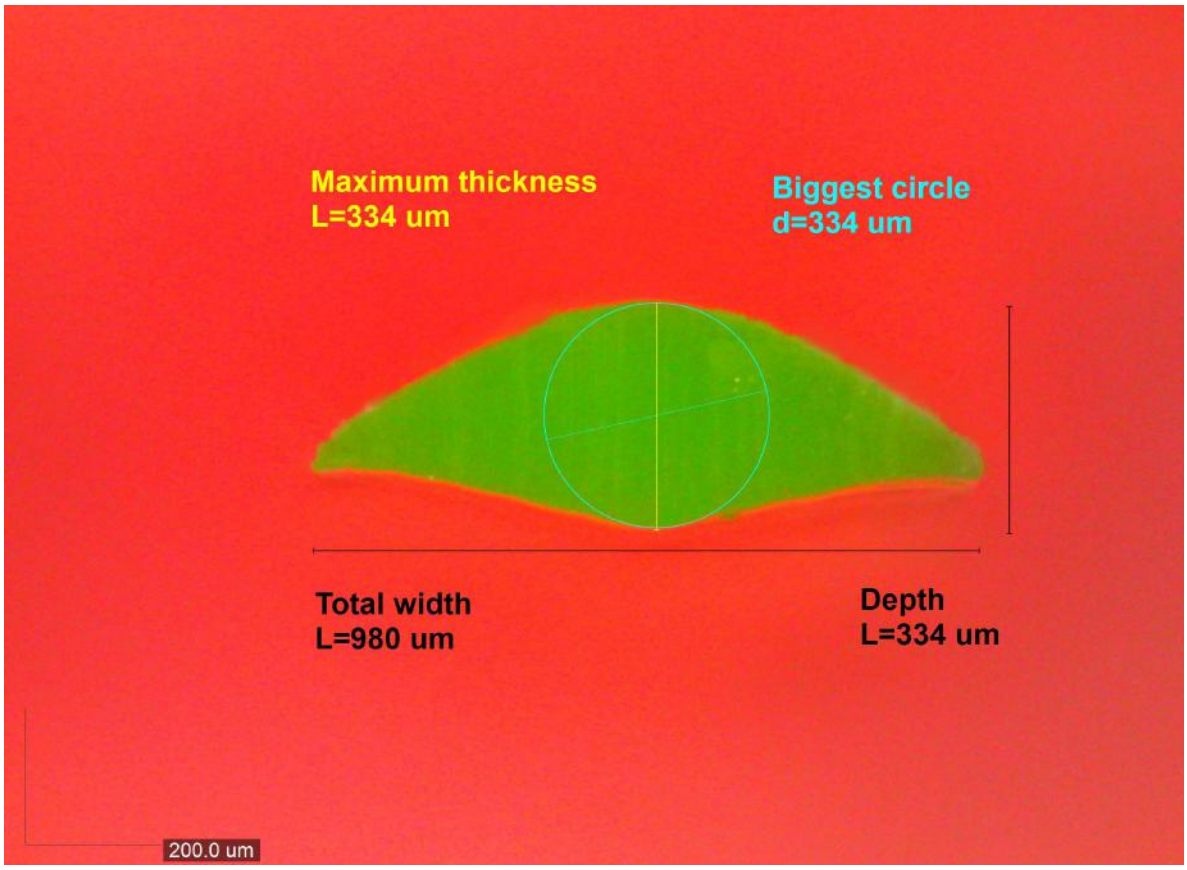
## Yarn Characteristics DSC - 2



Stabilising Infill - picture

Performance Infill - picture

Cross-section Yarn 1



Cross-section Yarn 2