



TESTING TECHNOLOGY FOR SPORT

## PERFORMANCE REPORT

In accordance with

**EN 1177:2018 – Determination of Critical Fall Height**

**Tests carried out in our laboratory in accordance with Method 1**

**Sample Reference**    **GRS 18 + Finegrass 12 + Sand**

**Report Number**    **71614**

**Report Status**    **Final**

**Issue Date**    **20/11/2019**

**Client**    **GrassSupport V.O.F.  
Landweerstraat-Zuid 138 B  
5349 AK Oss  
Nederland**

### FOREWORD

1. This report has been prepared by Sports Labs limited with all reasonable skill, care and diligence within the terms of the contract with the Client and within the limitations of the resources devoted to it.
2. This report is confidential to the Client and Sports Labs Limited accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.
3. This report shall not be used for engineering or contractual purposes unless signed by the Author and the Checker and unless the report status is "Final".



#### HEADQUARTERS

Sports Labs Ltd  
1 Adam Square,  
Brucefield Industry Park  
Livingston EH54 9DE  
Scotland, United Kingdom

Tel: +44(0)1506 444 755  
Email: info@sportslabs.co.uk  
Web: www.sportslabs.co.uk

#### LOCATIONS

- United States
- Morocco
- Turkey
- South Africa
- Holland
- Belgium
- Norway
- South America
- Israel



43 Timber Lane  
Woburn, Bedfordshire MK17 9PL  
England, United Kingdom  
Tel: +44 (0)845 603 5019

Email: Nick.smith@propitch.online  
Web: www.propitchsystem.co.uk



## Content

|  |   |
|--|---|
| 1. INTRODUCTION .....                            | 3 |
| 2. TEST DETAILS .....                            | 3 |
| 3. LABORATORY PARTICLE SIZE TEST RESULTS .....   | 5 |
| 4. HIC (CRITICAL FALL HEIGHT) TEST RESULTS ..... | 6 |
| 5. HIC CURVES FOR EACH TEST LOCATION .....       | 7 |
| 6. TIME/ACCELERATION CURVE .....                 | 8 |
| 7. TEST LOCATIONS .....                          | 8 |
| 8. LAYER PHOTOGRAPHS.....                        | 9 |

## 1. INTRODUCTION

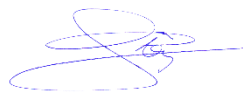
We refer to the sample of playground surfacing installed in our laboratory in Zeist on 11/11/2019. The client requested testing to be carried out in accordance with the requirements of EN 1177:2018 - Determination of Critical Fall Height.

The sample consists of a 18 mm Grass Support shockpad covered with 12 mm sandfilled artificial grass.

**Prepared By** Nick Hubers  
Field and lab technician

A handwritten signature in black ink, appearing to read "Nick Hubers".

**Checked By** Yannick Peij  
Business manager EU

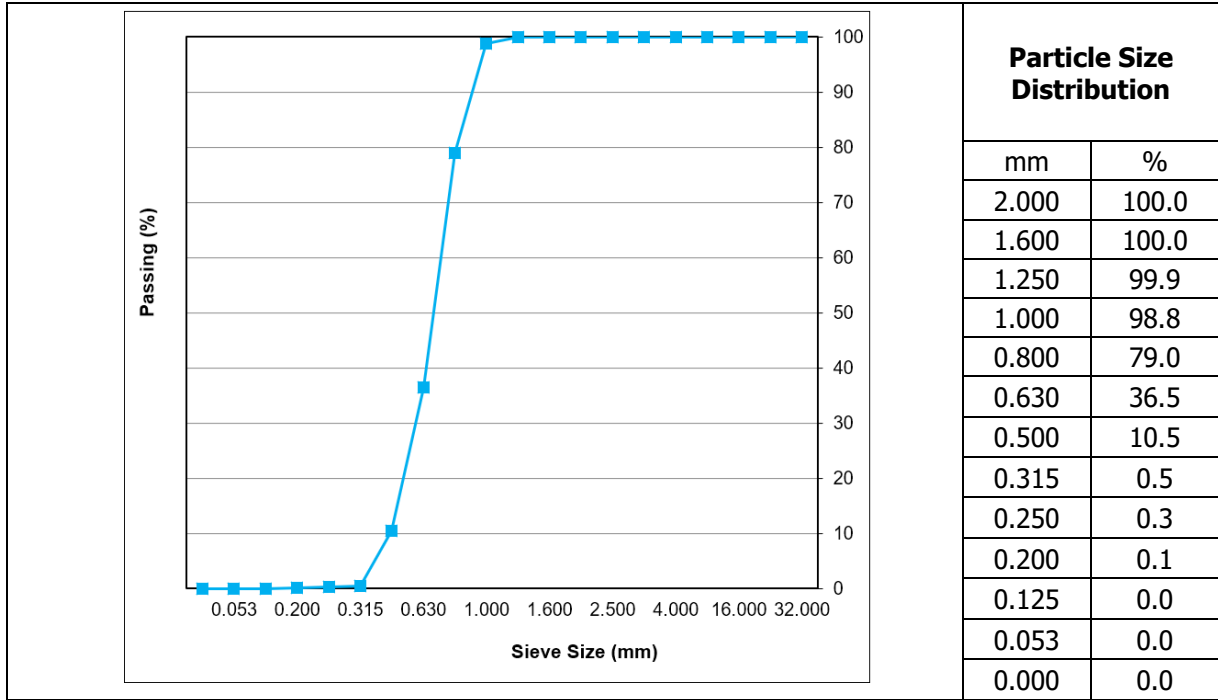
A handwritten signature in blue ink, appearing to read "Yannick Peij".

## 2. TEST DETAILS

- 2.1 Determination of Critical Fall Height – EN 1177: 2018.
- 2.2 The test specimen was prepared in accordance with the manufacturer's instructions.
- 2.3 The specimens were tested in the conditions and temperatures described in EN 1177: 2018 to the testing in our laboratory method 1.
- 2.4 As the performance of some products can be greatly influenced by the prevailing conditions, the results in this report cannot be used to indicate the performance of the same product under other conditions or in other locations.
- 2.5 Detailed test results are given overleaf in tabular format.

| TEST DETAILS                                   |  |
|--|--|
| Test environment                               | Laboratory   |
| Test method                                    | Testing products consisting of more than one component |
| Framed testing                                 | Yes  |
| Test condition                                 | Dry  |
| Surface temperature (°C)                       | 20   |
| Air temperature (°C)                           | 21   |
| Relative humidity (%)                          | 55   |
| PRODUCT DETAILS                                |  |
| System name                                    | GRS 18 + Finegrass 12 + Sand                           |
| Top layer name                                 | Finegrass  |
| Top layer material                             | Artificial grass                                       |
| Top layer size (m)                             | 1 x 1  |
| Top layer weight (Kg/m <sup>2</sup> )          | 2.50   |
| Top layer thickness (mm)                       | 12   |
| Loose particulate name                         | Stabilisation sand                                     |
| Loose particulate material                     | Sand   |
| Loose particulate particle size (mm)           | 0.315 - 1.000  |
| Loose particulate weight (Kg/m <sup>2</sup> )  | 10   |
| Loose particulate density (Kg/m <sup>3</sup> ) | 1488   |
| Loose particulate depth (mm)                   | 10   |
| Loose particulate moisture content at test (%) | NA   |
| #1 Shockpad name                               | GRS 18   |
| #1 Shockpad material                           | EPP Foam   |
| #1 Shockpad size (m)                           | 1 x 1  |
| #1 Shockpad weight (Kg/m <sup>2</sup> )        | 0.51   |
| #1 Shockpad density(Kg/m <sup>3</sup> )        | 28.40  |
| #1 Shockpad thickness (mm)                     | 18   |
| Substrate                                      | Concrete   |

3. LABORATORY PARTICLE SIZE TEST RESULTS



| Particle Size Distribution |       |
|----------------------------|-------|
| mm                         | %     |
| 2.000                      | 100.0 |
| 1.600                      | 100.0 |
| 1.250                      | 99.9  |
| 1.000                      | 98.8  |
| 0.800                      | 79.0  |
| 0.630                      | 36.5  |
| 0.500                      | 10.5  |
| 0.315                      | 0.5   |
| 0.250                      | 0.3   |
| 0.200                      | 0.1   |
| 0.125                      | 0.0   |
| 0.053                      | 0.0   |
| 0.000                      | 0.0   |

**4. HIC (CRITICAL FALL HEIGHT) TEST RESULTS**

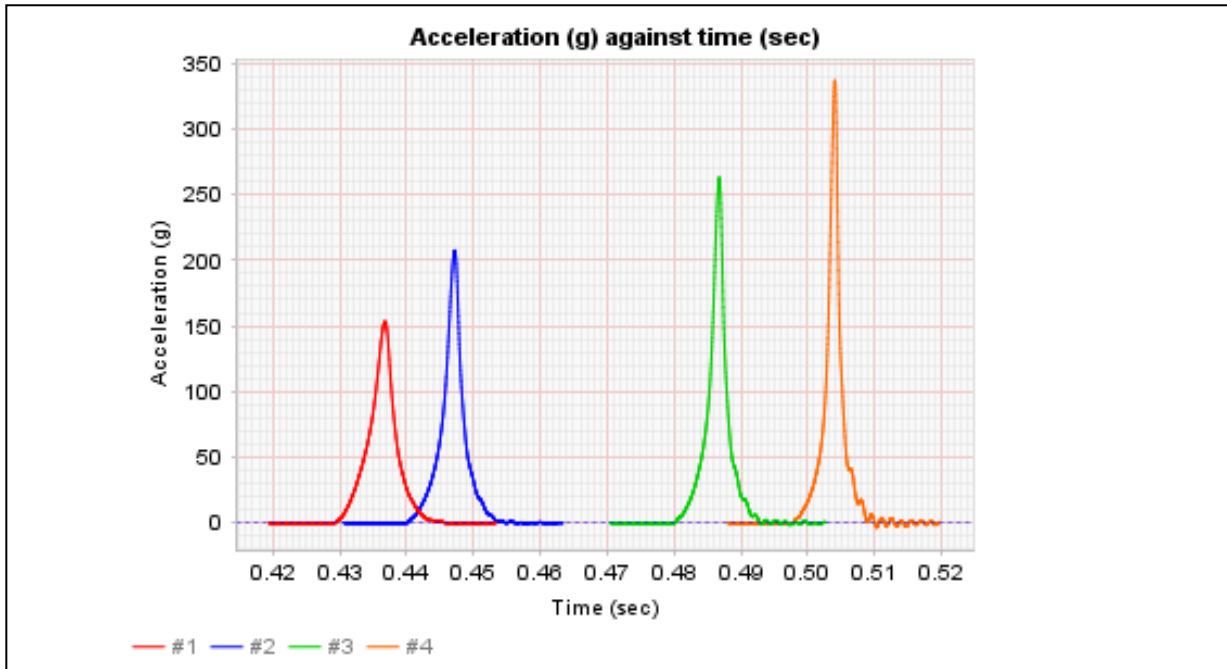
| Drop Test P1                |                  |      | Drop Test P2                |                  |      | Drop Test P3                |                  |      |
|-----------------------------|------------------|------|-----------------------------|------------------|------|-----------------------------|------------------|------|
| Drop Height (m)             | g <sub>max</sub> | HIC  | Drop Height (m)             | g <sub>max</sub> | HIC  | Drop Height (m)             | g <sub>max</sub> | HIC  |
| 0.85                        | 191              | 681  | 0.87                        | 153              | 521  | 0.91                        | 177              | 617  |
| 0.93                        | 234              | 939  | 0.92                        | 207              | 793  | 0.96                        | 209              | 821  |
| 1.00                        | 283              | 1276 | 1.09                        | 263              | 1180 | 1.05                        | 264              | 1175 |
| 1.05                        | 258              | 1109 | 1.18                        | 337              | 1761 | 1.12                        | 294              | 1400 |
| Critical Fall Height P1 (m) |                  | 0.84 | Critical Fall Height P2 (m) |                  | 0.94 | Critical Fall Height P3 (m) |                  | 0.94 |
| Drop Test P4                |                  |      | Drop Test P5                |                  |      | Drop Test P6                |                  |      |
| Drop Height (m)             | g <sub>max</sub> | HIC  | Drop Height (m)             | g <sub>max</sub> | HIC  | Drop Height (m)             | g <sub>max</sub> | HIC  |
| 0.90                        | 169              | 583  | 0.92                        | 174              | 613  | 0.89                        | 192              | 689  |
| 0.95                        | 232              | 929  | 0.95                        | 238              | 973  | 0.91                        | 242              | 993  |
| 0.98                        | 267              | 1154 | 1.00                        | 246              | 1038 | 0.98                        | 281              | 1266 |
| 1.02                        | 267              | 1186 | 1.04                        | 310              | 1507 | 1.02                        | 330              | 1623 |
| Critical Fall Height P4 (m) |                  | 0.92 | Critical Fall Height P5 (m) |                  | 0.93 | Critical Fall Height P6 (m) |                  | 0.88 |
| Drop Test P7                |                  |      | Drop Test P8                |                  |      | Drop Test P9                |                  |      |
| Drop Height (m)             | g <sub>max</sub> | HIC  | Drop Height (m)             | g <sub>max</sub> | HIC  | Drop Height (m)             | g <sub>max</sub> | HIC  |
| 0.89                        | 142              | 480  | 0.88                        | 187              | 656  | 0.82                        | 143              | 467  |
| 0.93                        | 208              | 791  | 0.91                        | 243              | 965  | 1.02                        | 253              | 1094 |
| 0.98                        | 241              | 1027 | 0.97                        | 294              | 1327 | 0.86                        | 210              | 779  |
| 1.06                        | 285              | 1311 | 0.99                        | 324              | 1552 | 1.07                        | 313              | 1550 |
| Critical Fall Height P7 (m) |                  | 0.94 | Critical Fall Height P8 (m) |                  | 0.88 | Critical Fall Height P9 (m) |                  | 0.90 |

- The uncertainty of these results under controlled laboratory conditions is ±7 %. Under site conditions the uncertainty may be greater."

5. HIC CURVES FOR EACH TEST LOCATION

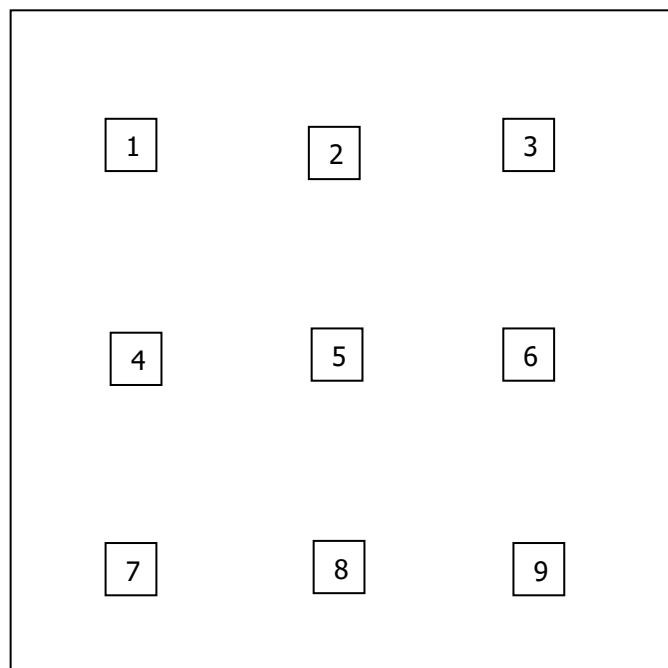
|                                       |                                       |                                       |
|---------------------------------------|---------------------------------------|---------------------------------------|
| <p>Drop Test P1</p>                   | <p>Drop Test P2</p>                   | <p>Drop Test P3</p>                   |
|                                       |                                       |                                       |
| <p>Critical Fall Height P1 0.84 m</p> | <p>Critical Fall Height P2 0.94 m</p> | <p>Critical Fall Height P3 0.94 m</p> |
| <p>Drop Test P4</p>                   | <p>Drop Test P5</p>                   | <p>Drop Test P6</p>                   |
|                                       |                                       |                                       |
| <p>Critical Fall Height P4 0.92 m</p> | <p>Critical Fall Height P5 0.93 m</p> | <p>Critical Fall Height P6 0.88 m</p> |
| <p>Drop Test P7</p>                   | <p>Drop Test P8</p>                   | <p>Drop Test P9</p>                   |
|                                       |                                       |                                       |
| <p>Critical Fall Height P7 0.94 m</p> | <p>Critical Fall Height P8 0.88 m</p> | <p>Critical Fall Height P9 0.90 m</p> |

**6. TIME/ACCELERATION CURVE**



|  |                   |
|--|-------------------|
| <b>Calculated Critical Fall Height Value (m)</b> | <b><i>0.8</i></b> |
|--|-------------------|

**7. TEST LOCATIONS**



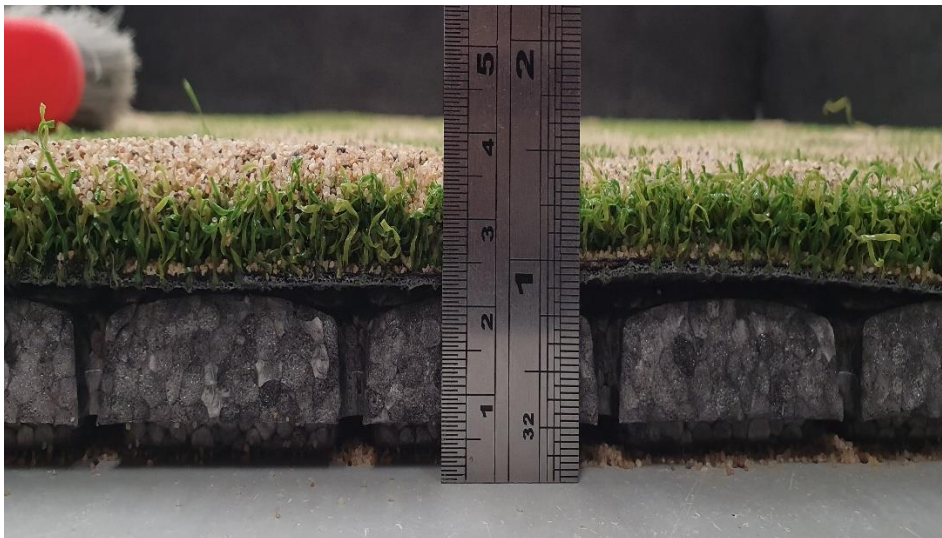


**8. LAYER PHOTOGRAPHS**

*Overview*



*Side view of the whole system*





*Close up*



*Infill height sand*

