



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 + Playgrass 24 + Sand**

Report Number **71620**

Report Status **Final**

Issue Date **18/11/2019**

Client **GrassSupport V.O.F.
Backlaan 1
5343 EC Oss
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FOREWORD

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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".



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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

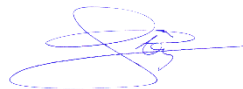
We refer to the sample of playground surfacing installed in our laboratory in Zeist on 11/11/2019. The client requested testing to be carried out in accordance with the requirements of EN 1177:2018 - Determination of Critical Fall Height.

The sample consists of a 18 mm Grass Support shockpad covered with 24 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

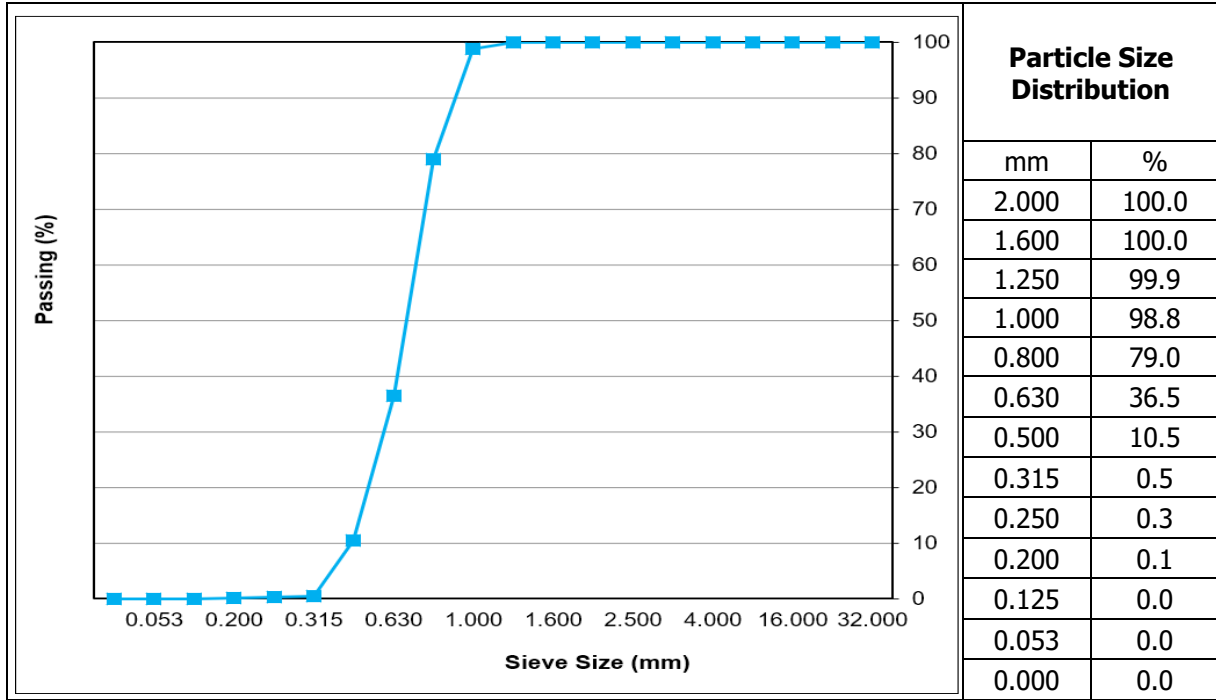
A handwritten signature in blue ink, appearing to read "Yannick Peij".

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 + Playgrass 24 + Sand
Top layer name	Playgrass 24 mm
Top layer material	Artificial grass
Top layer size (m)	1 x 1
Top layer weight (Kg/m ²)	2.25
Top layer thickness (mm)	24
Loose particulate name	Stabilisation sand
Loose particulate material	Sand
Loose particulate particle size (mm)	0.315 - 1.000
Loose particulate weight (Kg/m ²)	25
Loose particulate density (Kg/m ³)	1488
Loose particulate depth (mm)	18
#1 Shockpad name	GRS 18
#1 Shockpad material	EPP Foam
#1 Shockpad size (m)	1 x 1
#1 Shockpad weight (Kg/m ²)	0.51
#1 Shockpad density(Kg/m ³)	28.37
#1 Shockpad thickness (mm)	18
Substrate	Concrete

3. LABORATORY PARTICLE SIZE TEST RESULTS



4. HIC (CRITICAL FALL HEIGHT) TEST RESULTS

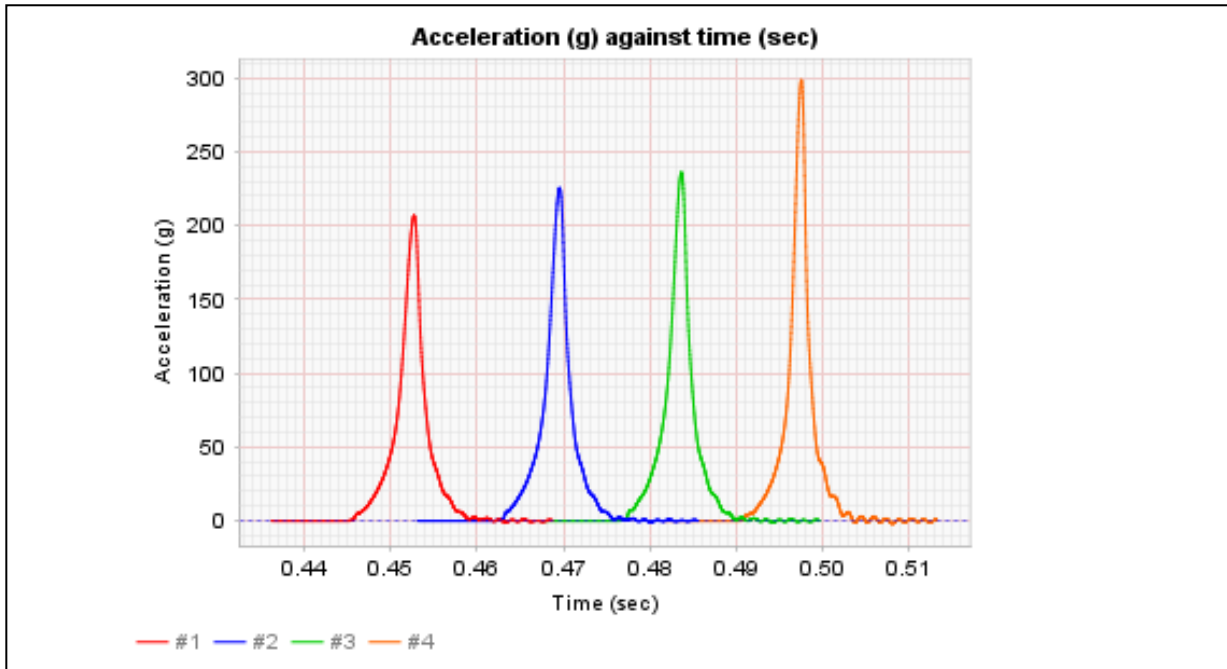
Drop Test P1			Drop Test P2			Drop Test P3		
Drop Height (m)	g _{max}	HIC	Drop Height (m)	g _{max}	HIC	Drop Height (m)	g _{max}	HIC
0.93	180	671	0.94	207	805	0.96	167	616
1.01	203	835	1.01	225	947	1.02	216	902
1.09	242	1113	1.07	236	1038	1.08	235	1053
1.19	269	1330	1.14	298	1491	1.14	273	1327
Critical Fall Height P1 (m)		0.99	Critical Fall Height P2 (m)		0.94	Critical Fall Height P3 (m)		1.01
Drop Test P4			Drop Test P5			Drop Test P6		
Drop Height (m)	g _{max}	HIC	Drop Height (m)	g _{max}	HIC	Drop Height (m)	g _{max}	HIC
0.96	166	596	0.96	165	600	0.95	163	581
1.03	238	1043	1.03	227	981	1.06	213	906
0.97	228	958	1.09	241	1106	1.10	244	1128
1.04	247	1116	1.15	266	1307	1.16	268	1333
Critical Fall Height P4 (m)		0.97	Critical Fall Height P5 (m)		1.01	Critical Fall Height P6 (m)		1.03
Drop Test P7			Drop Test P8			Drop Test P9		
Drop Height (m)	g _{max}	HIC	Drop Height (m)	g _{max}	HIC	Drop Height (m)	g _{max}	HIC
0.97	171	619	0.96	149	541	0.98	156	574
1.05	225	978	1.07	222	969	1.02	206	860
1.11	267	1290	1.11	250	1163	1.11	238	1102
1.16	257	1259	1.15	275	1359	1.17	275	1379
Critical Fall Height P7 (m)		1.01	Critical Fall Height P8 (m)		1.04	Critical Fall Height P9 (m)		1.04

- 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

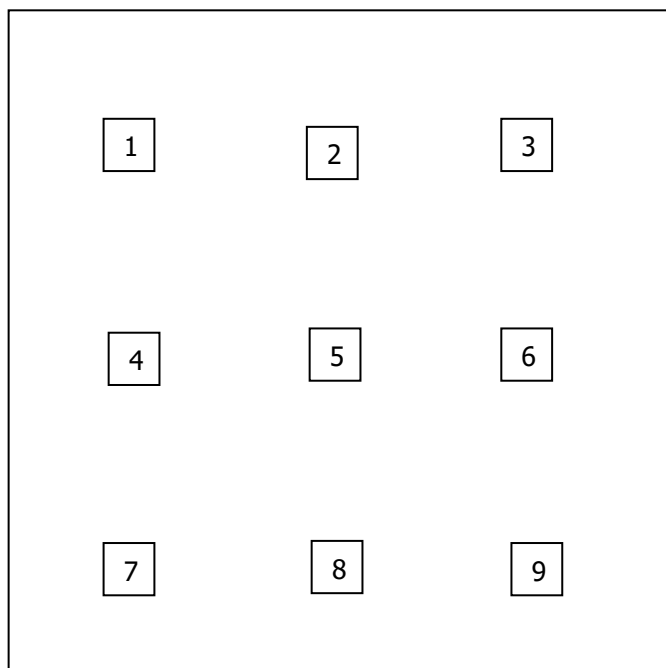
Drop Test P1	Drop Test P2	Drop Test P3
Critical Fall Height P1 0.99 m	Critical Fall Height P2 0.94 m	Critical Fall Height P3 1.01 m
Drop Test P4	Drop Test P5	Drop Test P6
Critical Fall Height P4 0.97 m	Critical Fall Height P5 1.01 m	Critical Fall Height P6 1.03 m
Drop Test P7	Drop Test P8	Drop Test P9
Critical Fall Height P7 1.01 m	Critical Fall Height P8 1.04 m	Critical Fall Height P9 1.04 m

6. TIME/ACCELERATION CURVE



Calculated Critical Fall Height Value (m)	0.9
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7. TEST LOCATIONS



8. LAYER PHOTOGRAPHS

Overview



Side view of the whole system



Close up



Infill height sand

