



Report of Impact Drop Testing

on behalf of

**Groundshield Limited
on 20 October 2016**

**Product:
Bark**

**Tester:
Toby Knight**



RoSPA drop test are an independent safety assessment of the playground surfacing and are produced for RoSPA by

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TESTING PROCEDURE

Introduction

The following text is taken as a précis from the foreword to British Standard BS 7188:1998+A2:2009 Impact absorbing playground surfacing – Performance requirements and test methods. It also refers to British Standard BS EN 1177:2008 Impact attenuating playground surfacing – Determination of critical fall height.

This standard was first published in 1989 as a series of test methods for impact absorbing playground surfacing, at which time it introduced the term “critical height” as a means of describing the effectiveness of surfaces in absorbing the impact of a headfirst fall. “Critical height” was the distance through which a standard headform could be dropped on to the surface before it experienced a severity index of 1 000 (a parameter originating from head injury studies available at that time).

The European Committee for Standardization (CEN) accepted the general principle of measuring the effectiveness of playground surfacing in this way and adapted the procedure to take account of more recent research into means of measuring the potential for head injury and other anthropometric data on children’s head size and mass. The result of these discussions was the approval in August 1997 of EN 1177, Impact absorbing playground surfacing — Safety requirements and test methods.

The test method described in BS EN 1177 uses the term “critical fall height”, the distance through which a standard headform could be dropped on to the surface before it experiences a head injury criterion (HIC) value of 1 000 (HIC being a refinement of the original severity index concept, which measures maximum severity experienced over any period during the impact event).

Specifiers and purchasers of impact absorbing playground surfacing may continue, therefore, to express their requirements in the familiar terms of the critical height needed for any given situation by using BS EN 1177. However, because the headform used to create the impact and the mathematical basis by which the severity of the event is assessed are both different from the original British Standard method, there is no simple relationship between values obtained for critical height by these two methods. Specifiers should be careful to ensure, therefore, that test reports and certificates describing surfacing products now refer, as appropriate, to BS EN 1177 or BS 7188:1998+A2:2009.

The test method for critical height is intended to be universally applicable to all types of impact absorbing surfacing, from loose-fill particulate materials to prefabricated rubber tiles.

The test method described in BS EN 1177:2008 is applicable to measurements made in the laboratory and on site. However, only measurements made under controlled laboratory conditions are acceptable for the purposes of certification of conformity.



Testing was undertaken at the depot of Groundshield Ltd under simulated conditions. A 1000 mm x 1000 mm sample was tested on a concrete base at a variety of depths

The following procedure is followed for the testing of surfacing, in accordance with BS EN 1177:2008 and BS EN 1176-1:2008.

- Principles – a test specimen is struck by an instrumented headform in a series of defined tests. The signals from an accelerometer are processed to yield a Head Injury Criterion (HIC) for each drop that is an indication of the severity of the impact.
- Equipment – the test rig is a Triax 2010 Surface Impact Tester.
- Testing was carried out at a temperature of approximately 11°C, being the ambient on-site temperature at the time of testing.
- Testing is carried out on the surface as found.
- Testing procedure – at least three test drops are conducted for each item of play equipment. In the case of loose-fill surfaces the drops are undertaken at the same spot without redistribution of the material. For other surfaces a different drop location is selected each time.
- The Critical Fall Height (CFH) is the lowest drop height that yields a Head Injury Criterion (HIC) reading of 1000 or less. In the case of on-site testing, the test drops were conducted from the maximum free height of fall of the equipment.
- HIC readings of 1000 or less are considered as being a PASS. Readings in excess of 1000 are considered as being a FAIL.

TEST RESULTS – Groundshield Limited

Data for all test drops:

- Tested in accordance with EN 1177:2008 and BS 7188:1998+A2:2009
- The surface is pine bark
- The test was carried out at Groundshield Ltd premises on a sample.
- The sample was a 1000 mm x 1000 mm section on a concrete base
- A variety of depths were tested, the results recorded below
- Three drops were carried out at each height on to the same spot without redistributing the material to simulate displacement of the surface.

Specific Results

Surface Type: Bark			
Drop Number	Height (mm)	HIC	Result
1	2000	152	PASS
2	2000	281	PASS
3	2000	383	PASS
Depth (mm): 150			
Extent: Compliant			

Surface Type: Bark			
Drop Number	Height (mm)	HIC	Result
1	3000	494	PASS
2	3000	690	PASS
3	3000	657	PASS
Depth (mm): 200			
Extent: Compliant			

Surface Type: Bark			
Drop Number	Height (mm)	HIC	Result
1	3000	198	PASS
2	3000	263	PASS
3	3000	279	PASS
Depth (mm):300			
Extent: Compliant			