



Building Research Institute
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DEPARTMENT OF CONSTRUCTION MATERIAL ENGINEERING
 LABORATORY OF BUILDING MATERIALS

RESEARCH REPORT No. LZM00-03465/18/Z00NZM

This report has been published in three copies, two of which were received by the Client and one remained with ITB.

Client: *FLEX MOTION Sp. z o. o.*
Address: *Ul. Zgorzelecka 48, 59-700 Bolesławiec*

Product information

Product name: *Polyurethane sports surface*

Information on the product and the declared scope of use: *Synthetic surface based on EPDM granulate. According to the Client's declaration, the surface was made in the BSS 2000 FULL POUR system.*

Information on the test object

Research object: name, description, state and identification *Synthetic outdoor sports surface
 Detailed information about the research object can be found on p. 2 of this report "Materials for research"*

Date of acceptance of the test object: *21.11.2018 and 22.11.2018*

Protocol of acceptance of the test object: *LZM00-03465/18/Z00NZM/1 and LZM00-03465/18/Z00NZM/2*
Collection procedure of the test object: *Management Procedure No. 18*

Information on studies

Date of commencement of tests: *22/11/2018*

Date of completion of tests: *03/12/2018*

Other test information: *Executive team:
 MSc Cezary Strąk*

METHOD / RESEARCH PROCEDURE

PB LT-055/1/03-2001 *Freezing resistance test of sports surfaces.*

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Fig. 1. General view of the samples of the tested sports surface

1. The scope of research

The scope of testing of the sports surface included checking its resistance to freezing and thawing.

2. Test materials

For the tests covered by this report, the Client provided 8 samples measuring 100x100mm (Figure 1).

3. Test methods and results

The uncertainty was determined on the basis of available data including the accuracy of the measurement system used. The uncertainty estimated in this way does not contain a component related to the heterogeneity of the tested sample. The result and its uncertainty apply only to the test samples. The value of uncertainty can not be assigned directly to the level of properties of a given product, because the laboratory has no knowledge about the variability of its population, but only about the tested sample.

3.1. Freezing and thawing resistance

The test of resistance to freezing and thawing of synthetic surface was carried out in the laboratory according to PB LT-055/1/03-2001 on 5 samples with dimensions of approx. 100x100mm. Before testing, the samples were visually inspected and weighed dry, then immersed in water for 24 hours, after which they were subjected to 20 cycles of freezing and thawing in the following system:

- I cycle - 16 hours freezing at -20°C and 2 hours thawing in water at 20°C,
- II XX - 4 hours freezing at -20°C and 2 hours thawing in water at 20°C.

The result of the test is a visual assessment of the change in appearance and the change in weight of the samples after the cycles. After removal from the climatic chamber, the sample was conditioned for 72 hours at 23°C and 62% humidity on a grid in a horizontal position. The change in mass was determined using the following formula:

where:

M_m - weight change [%],

m_z - mass of the sample before freezing and thawing cycles,

m_r - mass of the sample after freezing and thawing cycles.

$$M = \frac{m_z - m_r}{m_z} \cdot 100$$

The test results are shown in Table 1.



Fig. 2. Samples when drying on a grid in a horizontal position.

Table 1. Results of weight change test after cycles of freezing and thawing of sports surface BSS 2000 FULL POUR

No.	Initial weight [g]	Weight after freezing and thawing cycles [g].	Change in weight [%]	Visual evaluation after freezing and thawing cycles
1	150,97	151,45	0,32	No signs of damage or change in appearance
2	162,75	163,48	0,45	No signs of damage or change in appearance
3	157,78	158,18	0,25	No signs of damage or change in appearance
4	172,62	173,15	0,31	No signs of damage or change in appearance
5	144,57	144,90	0,23	No signs of damage or change in appearance
AVERAGE:			0,31	-

Extended uncertainty of measurement (related to the accuracy of the devices used), at a confidence level of 95% and with a coverage factor of $k=2$, $U_p=0.5g$.

4. Evaluation of test results - outside the scope of accreditation

The results obtained in the study are presented in Table 2 with the criteria specified in the Building Research Institute Technical Recommendations granted in 2015 for polyurethane sports surfaces.

Table 2. Summary of the results of freezing and thawing resistance tests on BSS 2000 FULL POUR sports surfaces with the adopted assessment criterion

Characteristic	Test result	Criterion
Frost resistance determined by: - a change in the appearance, - change of weight, [%]	no changes 0,31	no changes <0,5

Analyzing the results presented in Table 2, it is stated that the surface of BSS 2000 FULL POUR shows resistance to freezing and thawing.

The Parties have agreed that a simple acceptance rule is applied when assessing the compliance of the results with the criteria set out in Table 2, i.e. a product is considered as conforming with regard to the result if the result, without taking into account the variability resulting from measurement uncertainty, meets the requirement. This is related to the risk of incorrect assessment resulting from the failure to consider uncertainty in the assessment. The risk is also due to the fact that the laboratory does not know about the variability of the product population, but only about the tested sample.

Person responsible for the test
MSc Cezary Strąk

Signature

Person authorizing the
report
MSc Iwona Komosa

Signature

Head of the LZM laboratory
PhD Ewa Sudoł
Signature

Warsaw, 03/12/2018

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