

DLG Test Report 6253 F

Animat

Cow Mattress Animattress III

Deformability/Elasticity, Permanent Tread Load, Abrasion, Acid resistance, Cleaning distance



DLG FOKUS
TEST

03/15

Deformability/Elasticity,
Permanent Tread Load,
Abrasion, Acid resistance,
Cleaning distance



Test Center
Technology and Farm Inputs

www.DLG-Test.de

Overview

The Focus Test is a DLG usability test intended to allow product differentiation and special highlighting of innovations in machinery and technical products used primarily in agriculture, forestry, horticulture, fruit cultivation and viticulture, as well as in landscape and municipal management.

This test focuses on testing a product's individual qualitative criteria, e.g. fatigue strength, performance, or quality of work.

The scope of testing can include criteria from the testing framework of a DLG Signum Test, the DLG's extensive usability test for technical products, and concludes with the publishing of a test report and the awarding of a test mark.

The DLG Focus Test "Deformability/Elasticity, Permanent Tread Load, Abrasion, Acid resistance, Cleaning distance" includes technical measurements on test stands of the DLG Test Center.



The deformability and elasticity, the abrasion resistance, the acid resistance, the cleaning distance were measured and a permanent tread load was applied. The test was based on the DLG Testing Framework for elastic stable flooring, as of April 2010.

Other criteria were not investigated.

Assessment – Brief Summary

The Animatress III tested here, an elastic floor covering for the resting area in cubicle houses, was investigated with regard to durability and comfort properties on test stands in the DLG Focus Test.

The deformability and elasticity of the rubber mat, the abrasion resistance, the acid resistance, the cleaning distance were measured and a permanent tread load was applied.

Table 1:
Overview of results

Test characteristic	Test result	Evaluation
Deformability and elasticity*		
in new condition	8.7 mm (satisfactory)	○
following endurance test	8.9 mm (satisfactory)	○
Permanent tread load*		
	no lasting deformation	++
	No noticeable wear	+
Abrasion test*		
	good wear resistance	+
Acid resistance**		
Feed acid mixture	resistant	+
Uric acid	limited resistant	○
Sulfurous acid	resistant	+
Ammonia solution	resistant	+
Disinfection liquid	resistant	+
Peracetic acid	resistant	+
Cleaning distance*		
with flat jet nozzle	20 cm	○
with a coarse dirt remover	45 cm	○

* Evaluation range: ++ / + / ○ / - / -- (○ = standard)

** Evaluation range: + = resistant / ○ = limited resistant / - = not resistant

The Product

Manufacturer and Applicant

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Product:
Animatress III cubicle mattress

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Description and Technical Data

The Animatress III cubicle mattress tested here is an elastic floor covering for use in the resting area of high cubicles in cubicle houses; it has a thickness of approx. 32 mm.

Black rubber mat

- upper side with pebble surface
- under side with conical knobs in two sizes
 - big knobs 20 mm high and 29 mm at the bottom and 21 mm at the top
 - small knobs 13 mm high and 29 mm at the bottom and 25 mm at the top
- Shore A hardness: approx. 70
- laid as single mat

The Method

Deformability and elasticity

The deformability is measured in new condition and following permanent tread load using ball indentation tests with a calotte ($r = 120$ mm) and a indentation force of 2,000 N (corresponding to approx. 200 kg).

Permanent tread load

The permanent tread load is measured on a test stand with a round steel foot and run in the standard test programme with 100,000 alternating loads at 10,000 N (corresponding to approx. 1,000 kg). The steel foot is adapted to the natural conditions as an "artificial cow foot". The foot has a diameter of 105 mm and therefore a contact area of 75 cm²; the bearing edge of the claw is simulated by a 5 mm wide ring on the periphery of the sole that overhangs the rest of the surface by 1 mm.

Abrasion test

In a standardised abrasion test with 10,000 cycles the top cover was grinded with an emery cloth (granulation 280) and a grinding pressure of 500 N (= 8.1 N/cm² surface pressure). The friction element was cooled continuously with water to prevent an influence of the generated heat during the abrasion test. The size of the abraded area in the test was 61,5 cm².

Acid resistance

An immersion test according to DIN EN ISO 175:2000 (performance of synthetic material against liquid chemicals) was carried out. Test samples (size 30 mm x 30 mm) were completely immersed in different test liquids for 24 hours and 28 days at room temperature of 20° Celsius. During the the 28 days test the liquids were changed weekly.

After the 28 days the samples were washed with distilled water and dried for 24 hours. Before and after immersion the weight, the dimensions and the Shore hardness (Shore A) of the test samples were measured. Additionally material surface changes like loss of gloss, color changing, swelling, destruction or crystallisation were evaluated. All samples were assessed against water as standard.

Cleaning distance

In test stand trials with a high pressure cleaner (approximately 145 bar, exposure period 1 minute with a 25° flat jet nozzle and a coarse dirt remover) the spraying distance was measured where no damage occurs.

The Test Results in Detail

Deformability and elasticity

In the ball indentation tests in new condition with a calotte ($r = 120 \text{ mm}$), indentation depth was 8.7 mm . The resulting calculated bearing pressure of 30.5 N/cm^2 indicates a still relative-

ly small load on the carpal joints when lying down and getting up.

Elasticity was measured following a permanent tread load exerted by a steel foot (contact area: 75 cm^2) with $100,000$ alternating loads at $10,000 \text{ N}$.

Following the endurance test, the indentation depth of the calotte increased from 8.7 mm to 8.9 mm . The bearing pressure decreased from 30.5 N/cm^2 to 29.8 N/cm^2 (see Fig. 2). This means that deformability and elasticity slightly increase.

Evaluation see table 1.

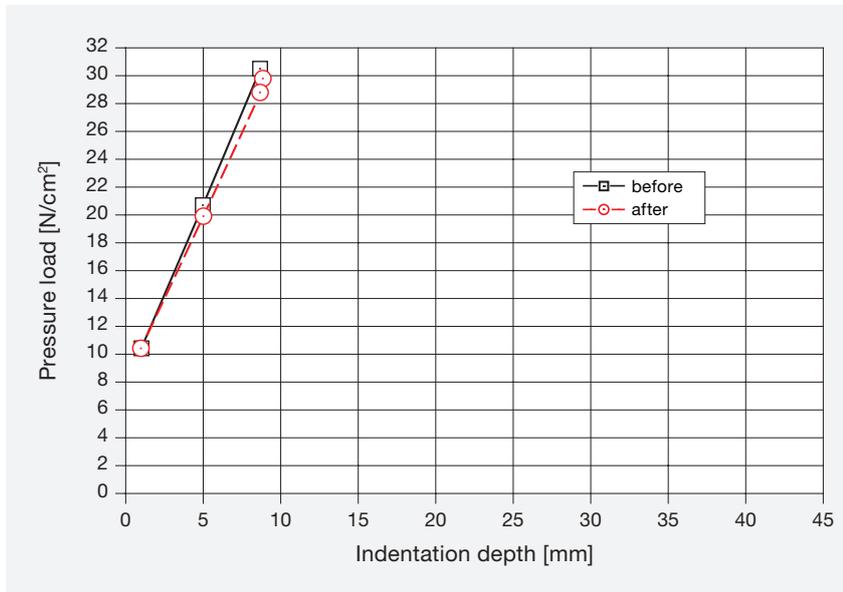


Figure 2:
Deformability as a function of bearing pressure

Permanent tread load

Slight wear was observed on the top cover following exposure to permanent tread load on a test stand with $100,000$ alternating loads at $10,000 \text{ N}$. No lasting deformation was observed.

Evaluation see table 1.

Abrasion test

The abrasion depth after $10,000$ cycles amounted to 1.0 mm , this corresponds to approximately 3% of the rubber thickness. Of the ground surface 4.0 grams were rubbed off.

Evaluation see table 1.

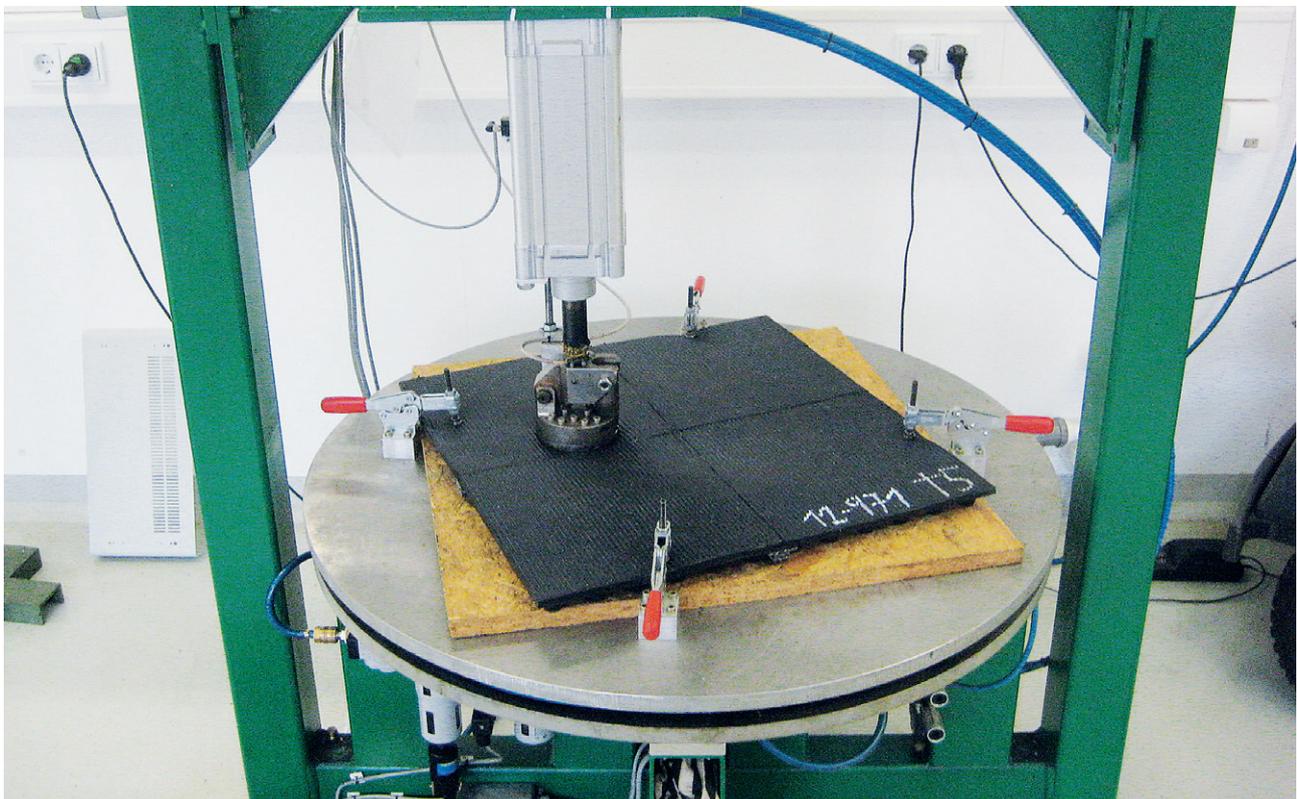


Figure 3:
Permanent tread load

Acid resistance

The rubber mat was limited resistant against Uric acid and resistant against the other test liquids used. The differences in weight, thickness and Shore A hardness between the acid treated and not acid treated samples were minor and lay in the range of water as standard.

Against the used liquids the rubber mat seems to be satisfactorily suited for the described use.

Evaluation see table 1.

Cleaning distance

In test stand trials with a high pressure cleaner damage to the cover of the mattress only occurred when a minimum distance of 35 cm (with a coarse dirt remover) and 20 cm (with a flat-jet nozzle) was not kept.

For cleaning and disinfection of the floor covering only the cleaning agents permitted by the manufacturer should be used.

Evaluation see table 1.



Figure 4:
Samples after acid resistance test

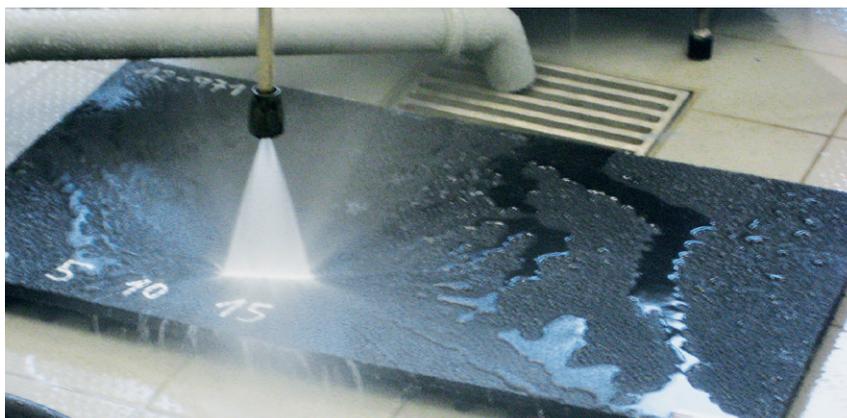


Figure 5:
Determination of the cleaning distance

Table 2:

Test liquids and results – acid resistance

Test liquid	Concentration	Result after 24 hours residence time	Result after 28 days residence time	Evaluation
Feed acid mixture				
	concentrate, pH 2	no changing	no changing	resistant
Excrement acids				
Uric acid	saturated urea solution (0,4%)	no changing	surface with color change	limited resistant
Sulfurous acid	5-6% SO ₂	no changing	no changing	resistant
Ammonia solution	32% solution	no changing	no changing	resistant
Disinfection liquid				
Stable disinfectant	2%-solution of a product with formic acid and glyoxyl acid	no changing	no changing	resistant
Peracetic acid	3000 ppm	no changing	no changing	resistant

Summary

Based on test-stand examinations, the criteria tested in this DLG FocusTest evaluate the comfort and durability properties of the Animatress III for use in the resting area of high cubicles in cubicle houses.

The tested Animatress III met the requirements of the testing framework with respect to the investigated criteria.

Further Information

Further test results for cubicle floorings are available for download at <http://www.dlg.org/stableequipment.html>. The relevant DLG committees have published various instruction leaflets on the topics of animal welfare and cattle farming. These are available free of charge in PDF format at www.dlg.org/merkblaetter.html.

Test execution

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DLG Testing Framework

Focus Test
"Elastic Stable Floorings"
(as of 04/2010)

Department

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The DLG

In addition to conducting its well-known tests of agricultural technology, farm inputs and foodstuffs, the DLG acts as a neutral, open forum for knowledge exchange and opinion-forming in the agricultural and food industry.

Around 180 full-time staff and more than 3,000 expert volunteers develop solutions to current problems. More than 80 committees, working groups and commissions form the basis for expertise and continuity in technical work. Work at the DLG includes the preparation of technical information for the agricultural sector in the form of instruction leaflets and working documents, as well as contributions to specialist magazines and books.

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The DLG Test Center Technology and Farm Inputs

The DLG Test Center Technology and Farm Inputs in Groß-Umstadt sets the benchmark for tested

agricultural technology and farm inputs and is the leading provider of testing and certification services for independent technology tests. With the latest measurement technology and practical testing methods, the DLG's test engineers carry out testing of both product developments and innovations.

As an EU-notified test laboratory with multiple accreditations, the DLG Test Center Technology and Farm Inputs provides farmers and practitioners with important information and decision-making aids, in the form of its recognised technology tests and DLG tests, to assist in the planning of investments in agricultural technologies and farm inputs.

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