

DLG Test Report 6353

Animat Inc.

Cow Mattress Animattress I

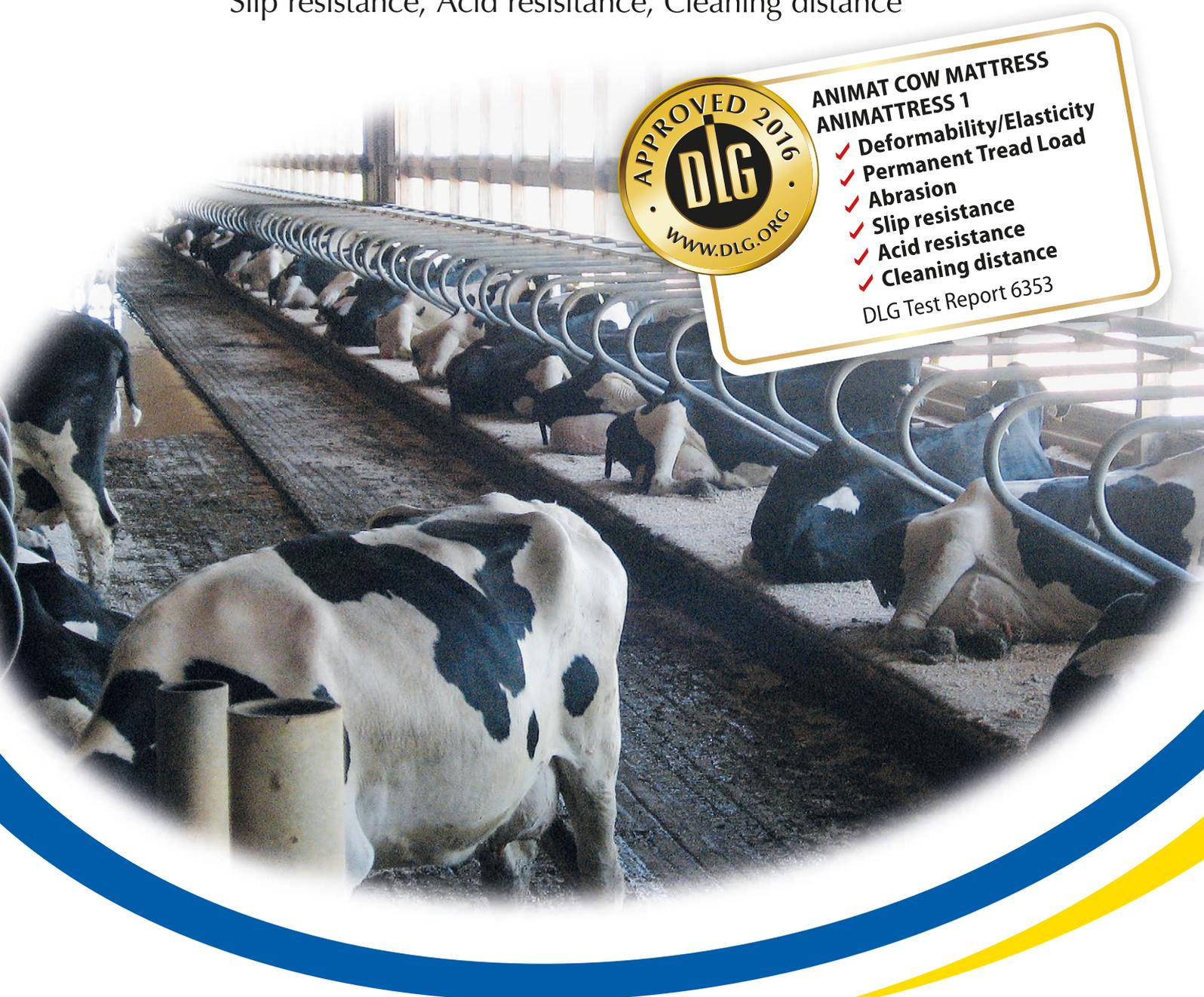
Deformability/Elasticity, Permanent Tread Load, Abrasion, Slip resistance, Acid resistance, Cleaning distance



**ANIMAT COW MATTRESS
ANIMATTRESS 1**

- ✓ Deformability/Elasticity
- ✓ Permanent Tread Load
- ✓ Abrasion
- ✓ Slip resistance
- ✓ Acid resistance
- ✓ Cleaning distance

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Test Center
Technology and Farm Inputs

www.DLG-Test.de

Overview

DLG-APPROVED Single value-determining criteria

A quality mark “DLG-APPROVED for single value-determining criteria” is awarded to agricultural products which successfully passed a smaller-scope DLG usability test according to independent and recognized evaluation criteria. The test intends to highlight special innovations and key criteria of the test item. The test can focus on criteria from the DLG testing framework for full tests or on other individual features or qualitative criteria. The minimum requirements, the test conditions and procedures as well as the evaluation guidelines of the test results are determined in consultation with a DLG expert

group. They comply with the generally recognized technology rules as well as with scientific and agricultural knowledge and requirements. The successful test concludes with the publishing of a test report and the awarding of a quality mark which is valid for five years following the award date.

The DLG Approved Test “Deformability/Elasticity, Permanent Tread Load, Abrasion, Slip resistance, Acid resistance, Cleaning distance” includes technical measurements on test stands of the DLG Test Center. The deformability and elasticity,



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the abrasion resistance, the slip 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 at April 2010.

Other criteria were not investigated.

Assessment – Brief Summary

The Animattress I 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 Approved Test.

The deformability and elasticity of the cubicle mattress, the abrasion resistance, the slip resistance, the acid resistance, the cleaning distance were measured and a permanent tread load was applied. The deformability and elasticity in new condition and following permanent tread load were significantly better than standard.

Table 1:
Overview of results

Test characteristic	Test result	Bewertung*
Deformability and elasticity		
in new condition	25.7 mm, very good	++
following endurance test	27.7 mm, very good	++
Permanent tread load		
	no lasting deformation	++
	slight wear	○
Abrasion test		
	good wear resistance	+
Slip resistance**		
	good slip resistance on dry and wet mattress surface	+
Acid resistance***		
Feed acid mixture	limited resistant	○
Uric acid	resistant	+
Sulfurous acid	resistant	+
Ammonia solution	limited resistant	○
Disinfection liquid	limited resistant	○
Peracetic acid	resistant	+
Cleaning distance		
with flat jet nozzle	20 cm	○
with a coarse dirt remover	35 cm	+

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

** Evaluation range: + / -

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

The Product

Manufacturer and Applicant

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Product:

Animatress I cubicle mattress

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Description and Technical Data

The Animatress I 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. 53 mm.

- Top cover: black rubber mat, upper side with silkscreen structure, under side with white woven textile, thickness approx. 4.5 mm.
- Shore A hardness: approx. 75.
- Mattress underlay made of approx. 48 mm thick PU foam sheet which is covered with a ca. 1 mm thick colourless film.
- Laid as sheeting.

The Method

Deformability and elasticity

The deformability is measured in new condition and following permanent tread load using ball penetration tests with a calotte ($r = 120$ mm) and a penetration 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 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 carrying edge of the hoof is simulated by a 5 mm wide ring on the periphery of the sole that projects 1 mm above the rest of the surface.

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 continuous with water to prevent an influence of the generated heat during the abrasion test. The size of the grinded area was 61,5 cm².

Slip resistance

The measurements were carried out with the ComfortControl test rig of the DLG test centre.

A loaded (10 kg) round plastic foot (105 mm diameter, with a contact area of 70 cm², 3 mm wide ring at the periphery of the ground) was pulled with a velocity of 20 mm/s across the mat.

Acid resistance

A permanent dipping test in accordance 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 complete dipped in different test liquids for 24 hours and 28 days (room temperature 20° Celsius). In the 28 days test the

liquids were changed weekly.

After the 28 days the samples were washed with distillate water and dried for 24 hours. Before and after the dipping the weight, the dimensions and the shore hardness (shore A) of the test samples was measured. Additional a visual evaluation was done for alterations like colour changing, swelling, destruction or crystallisation. All samples were evaluated in comparison to the standard water.

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 distance was measured where no damage occurs.

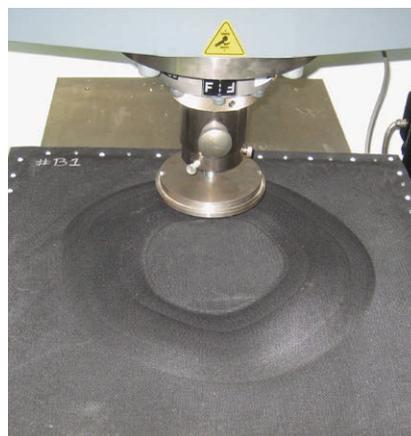


Figure 2:
Measuring the deformability



Figure 3:
Slip resistance measurement

The Test Results in Detail

Deformability and elasticity

In the ball penetration tests in new condition with a calotte ($r = 120 \text{ mm}$), penetration depth was 25.7 mm . The resulting calculated bearing pressure of 10.3 N/cm^2 indicates a relatively 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 N. Following the endurance test, the penetration depth of the calotte increased from 25.7 mm to 27.7 mm . The bearing pressure decreased from 10.3 N/cm^2 to 9.6 N/cm^2 (see Fig. 4). This means that deformability and elasticity slightly increase.

Evaluation see Table 1.

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 N. No lasting deformation was observed.

Evaluation see Table 1.

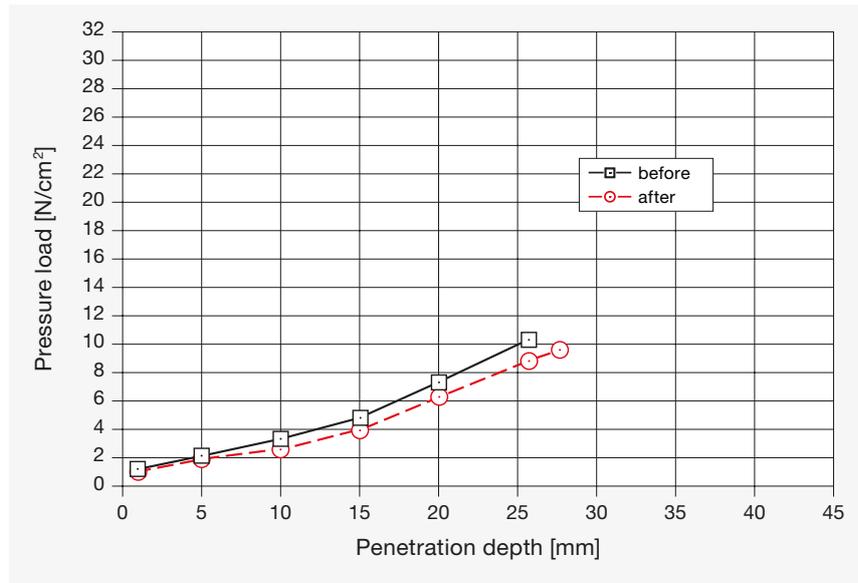


Figure 4:
Deformability as a function of bearing pressure

Abrasion test

The abrasion depth after 10,000 cycles amounted to 1.0 mm , this corresponds to approximately 17% of the rubber thickness.

Of the ground surface 3.4 grams were rubbed off.

Evaluation see Table 1.

Slip resistance

The slide pulling tests showed a good slip resistance on the dry or wet mattress surface in new condition. The measured friction coefficients (μ) all surpassed the minimal value of $\mu = 0.45$ which speaks for a good foothold.

Evaluation see Table 1.

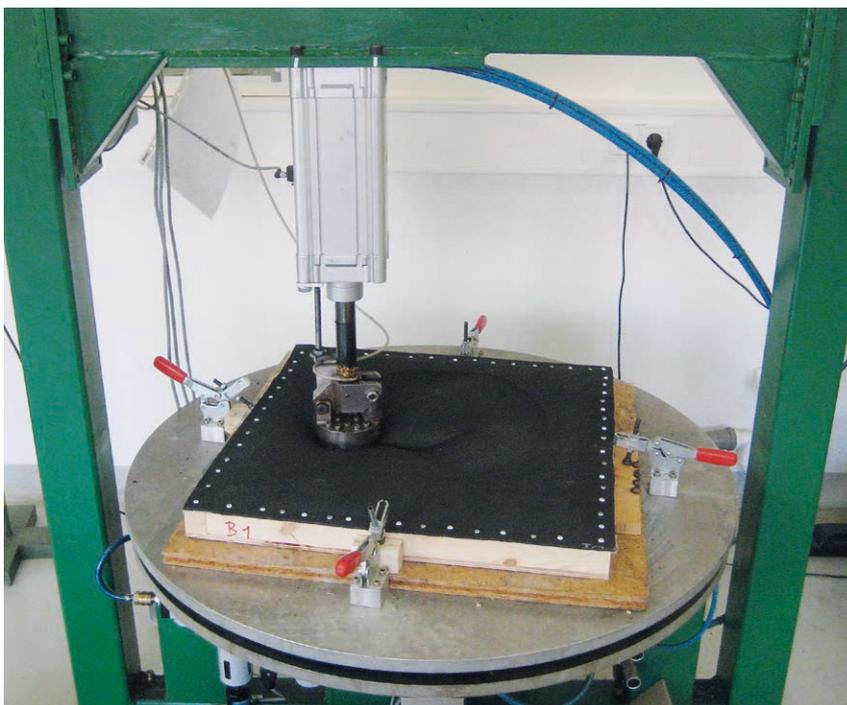


Figure 5:
Permanent tread load



Figure 6:
Measurement cleaning distance

Acid resistance

The cover mat of the mattress was limited resistant against the feed acid mixture, ammonia solution and barn disinfection liquid and resistant against the other used test liquids.

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 cover mat seems to be satisfactory 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 cover, only the cleaning agents permitted by the manufacturer should be used.

Evaluation see Table 1.

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	fleece on the back little color changing	fleece on the back color changing	limited resistant
Excrement acids				
Uric acid	saturated urea solution (0,4%)	no changing	no changing	resistant
Sulfurous acid	5-6% SO ₂	no changing	no changing	resistant
Ammonia solution	32% solution	no changing	fleece on the back in solution	limited resistant
Disinfection liquid				
Barn Disinfection liquid	2%-solution of a product with formic acid and glyoxyl acid	no changing	fleece on the back color changing	limited resistant
Peracetic acid	3000 ppm	no changing	no changing	resistant

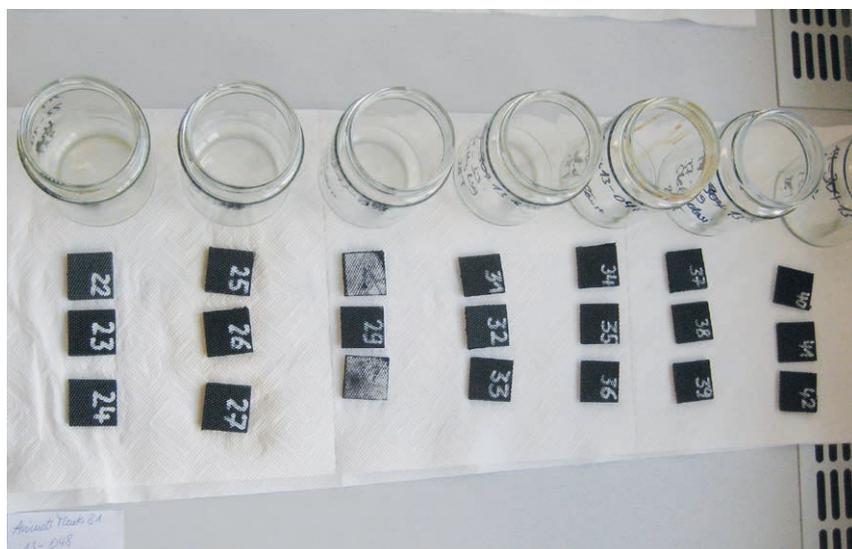


Figure 7:
Samples after acid resistance test

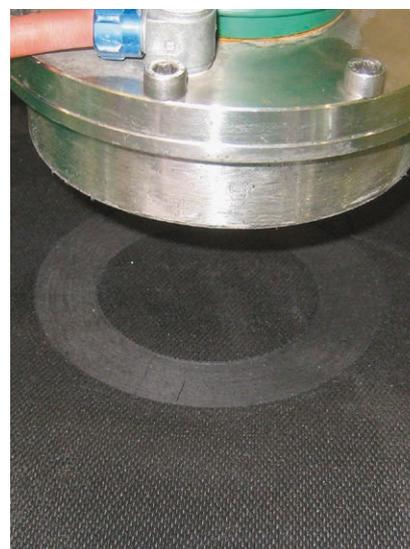


Figure 8:
Test sample after abrasion test

Summary

Based on test-stand investigations, the criteria tested in this DLG Approved Test evaluate the comfort and durability properties of the

animatress I for use in the resting area of high cubicles in cubicle houses. The tested animatress I 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

DLG Approved Test
"Elastic Stable Flooring"
(as at 04/2010)

Field

Indoor operations

Project manager

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Test engineer(s)

Dr Harald Reubold*

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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.

The DLG organises the world's leading trade exhibitions for the agriculture and food industry. In doing so, it helps to discover modern products, processes and services and to make these transparent to the public.

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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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