DLG Test Report 6356

Animat Inc.

Alley Mat Max Grip

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

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, Cleaning distance" includes technical measurements on test stands of the DLG Test Center. The deformability and elasticity,the abrasion resistance, the slip 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 2015.

Other criteria were not investigated.

Assessment – Brief Summary

The Animat alley mat Max Grip tested here, an elastic floor for walking ways in cubicle houses, was investigated with regard to durability and comfort properties on test stands in the DLG Approved Test.

The deformability and elasticity, the abrasion resistance, the slip 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 better than standard.

Table 1:
Overview of results

Test characteristic	Test result	Evaluation
Deformability and elasticity*		
in new condition	2.3 mm, good	+
following endurance test	2.3 mm, good	+
Permanent tread load*		
	no lasting deformation	+ +
	no noticeable wear	+
Abrasion test*		
	satisfactory resistance	○
Slip resistance**		
	good slip resistance on dry and wet mat surface	+
Cleaning distance*		
with flat jet nozzle	20 cm	○
with a coarse dirt remover	40 cm	○

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

** Evaluation range: + / –

The Product

Manufacturer and Applicant

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Alley Mat Max Grip

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Description and Technical Data

The Animat alley mat Max Grip tested here, an elastic floor for walking ways in cubicle houses.

Black rubber mat

- thickness approx. 21 mm
- upper side: with rhomb structure (rhomb: high: 4.5mm, length: 28 mm, width: 19 mm)
- under side: no structure
- Shore A hardness: approx. 75
- laid as single mat

The Method

Deformability and elasticity

The deformability is measured in new condition and following permanent tread load with a round steel foot (diameter of 105 mm and therefore a contact area of 75 cm²) 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 250,000 alternating loads at 5,000 N (corresponding to approx. 500 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.

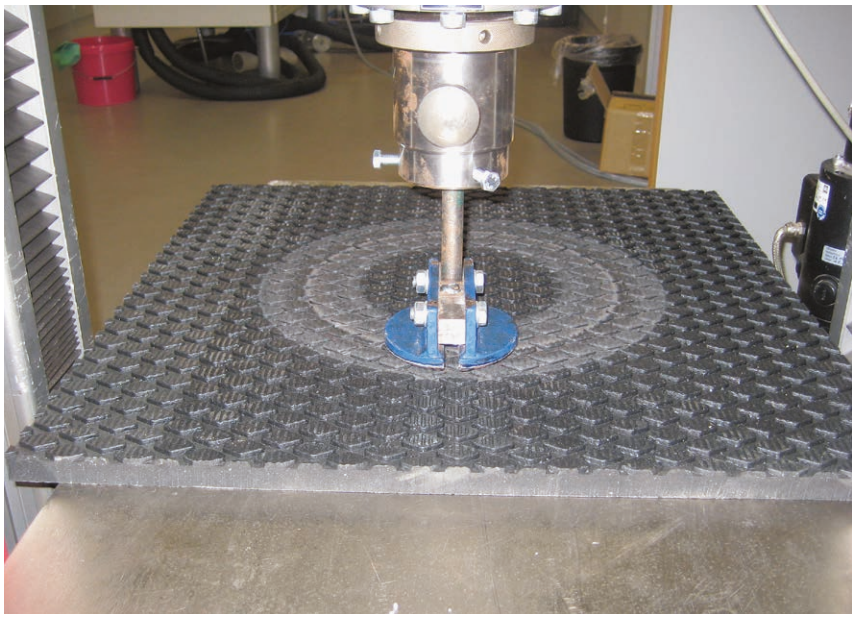

Figure 2:
Deformation measurement

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 75 cm², 3 mm wide ring at the periphery of the ground) was pulled with a velocity of 20 mm/s across the mat.

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.

Deformability and elasticity

In the penetration test in new condition with a round steel foot (artificial cow´s foot) having a diameter of 105 mm (contact area 75 cm², with a 5 mm wide ring at the periphery of the sole, which projects 1 mm over the rest of the surface (carrying edge of the claw)) and a penetration force of 2.000 N (corresponding to ca. 200 kg), penetration depth was 2.3 mm. This results in a calculated surface pressure of 26.7 N/cm².

Elasticity was measured after the Max Grip mat had been exposed to a permanent tread load exerted by the steel foot (250.000 alternating loads of 5.000 N). After the endurance test, the penetration depth of the mat stays at 2.3 mm (see Fig. 2).

Evaluation	
Deformability and elasticity	
– in new condition	+
– following permanent tread load	+

Permanent tread load

After the Max Grip mat had been exposed to a permanent tread load exerted with 250.000 alternating loads of 5.000 N (corresponding to ca. 500 kg), the mat showed no noticeable wear. Lasting deformation could not be observed.

Evaluation	
no lasting deformation	++
no noticeable wear	+

Abrasion test

The abrasion depth after 10,000 cycles amounted to 5.5 mm, this corresponds to approximately 26 % of the mat thickness. Of the ground surface 26.1 grams were rubbed off.

Evaluation	
The abrasion depth and the slight grit implicate a satisfactory wear resistance of the mat	○

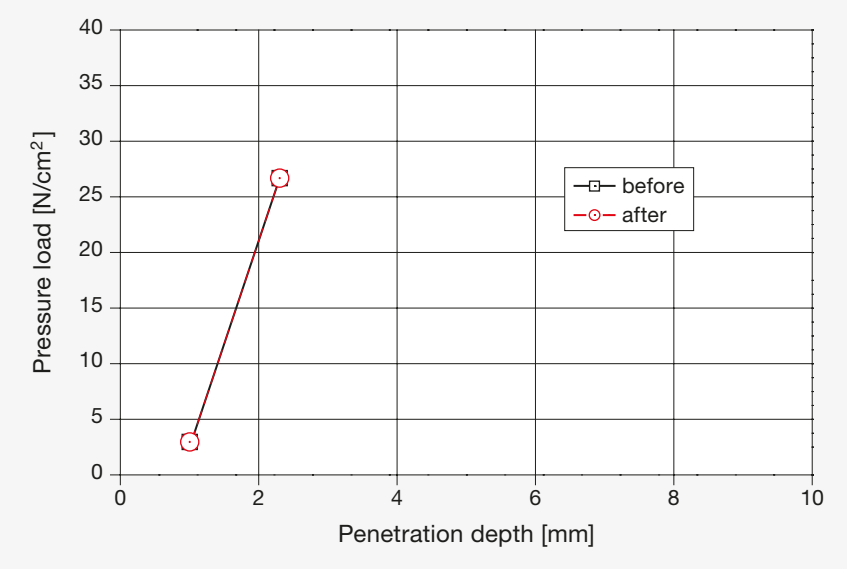

Figure 3:
Deformability as a function of bearing pressure

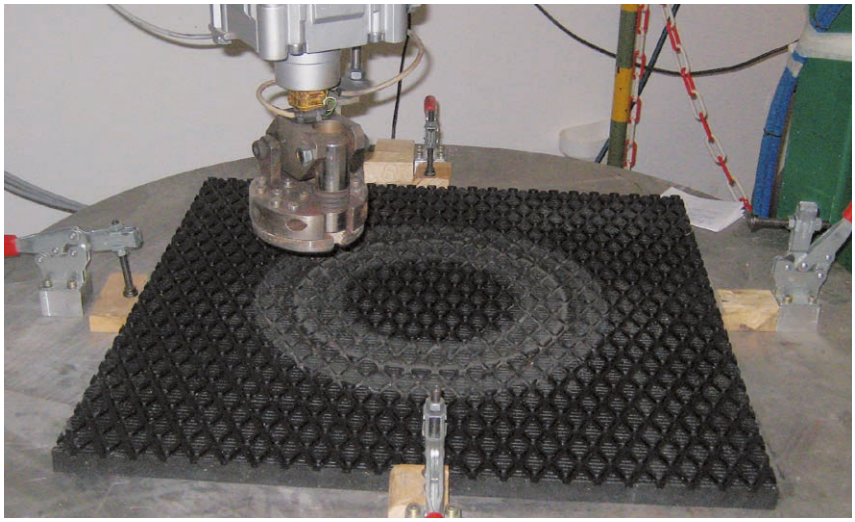

Figure 4:
Permanent tread load

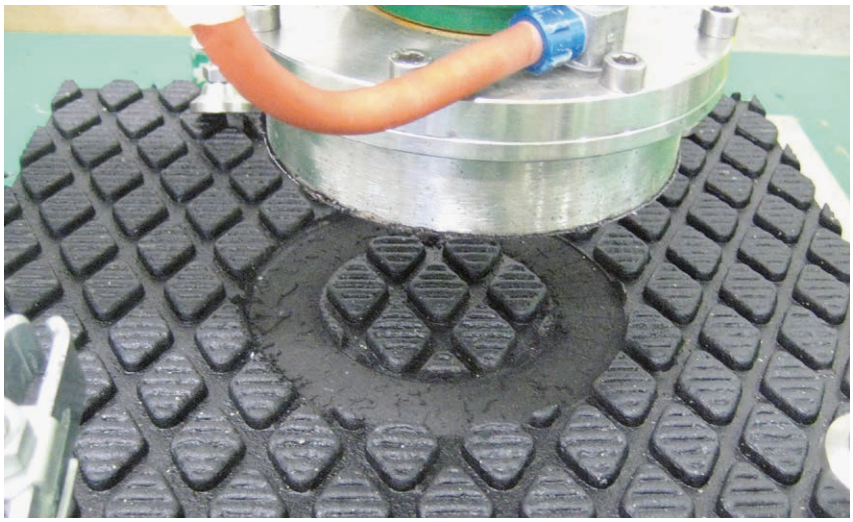

Figure 5:
Test sample after abrasion test

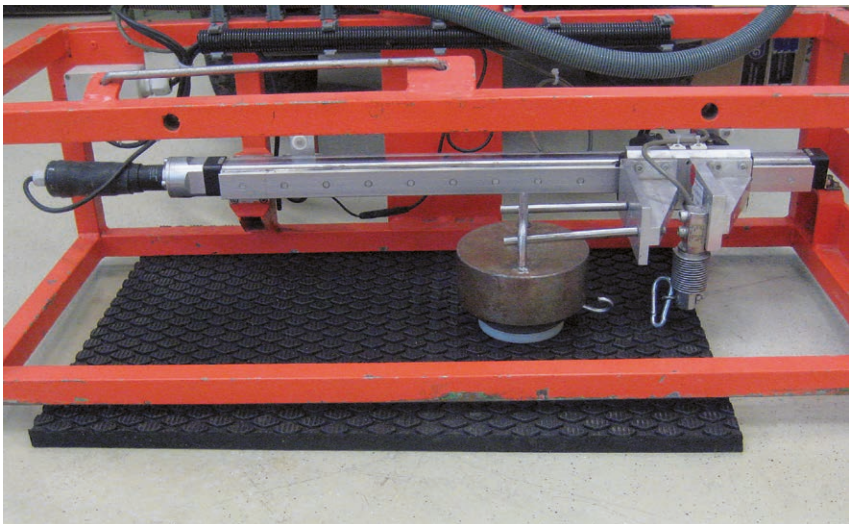

Figure 6:
Slip resistance measurement

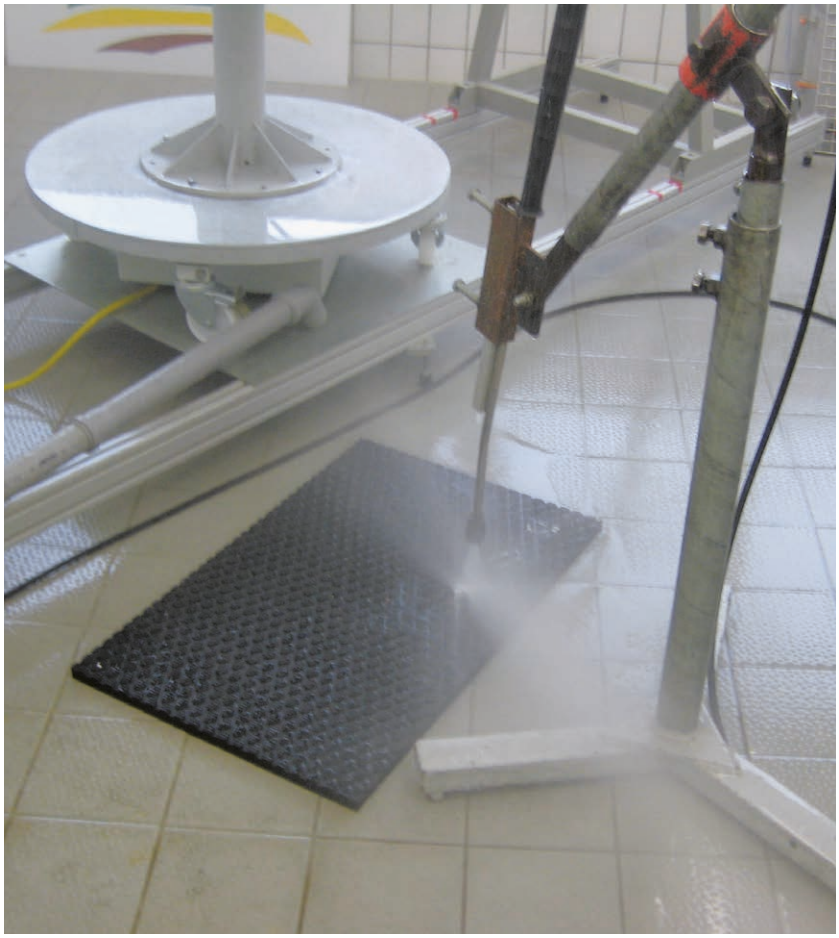

Figure 7:
Measurement cleaning distance

Slip resistance

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

Evaluation	
Good slip resistance on dry and wet rubber mat surface	+

Cleaning distance

In test stand trials with a high pressure cleaner damage to the mat only occurred when a minimum distance of 40 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	
Minimum distance	
– 20 cm with a flat jet nozzle	○
– 40 cm with a coarse dirt remover	○

Summary

Based on test-stand investigations, the criteria tested in this DLG Approved Test evaluate the comfort and durability properties of the Animat Max Grip alley mat for use in the walking ways in cubicle houses. The tested Animat Max Grip alley mat 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 04/2015)

Field

Indoor operations

Project manager

Dipl.-Ing. agr. Susanne Gäckler

Test engineer(s)

Dr Harald Reubold*

* Reporting engineer

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.

Obtain access to knowledge advancement and other advantages, and collaborate on expert knowledge in the agricultural industry! Please visit http://www.dlg.org/membership_agriculture.html for further information.

The DLG Test Center for 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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