

DLG-Test Report 7429

Animat Inc.

Alley Mat Transition Mat

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



**ANIMAT ALLEY MAT
TRANSITION MAT**

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

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Overview

A test mark “DLG-APPROVED for individual criteria“ is awarded for agricultural products which have successfully fulfilled a scope-reduced usability testing conducted by DLG according to independent and recognised evaluation criteria. The test is intended to highlight particular innovations and key criteria of the test object. The test may contain criteria from the DLG test scope for overall tests, or focus on other value-determining characteristics and properties of the test subject. The minimum requirements, test conditions and procedures as well as the evaluation bases of the test results will be specified in consultation with an expert group of DLG. They correspond to the recognised rules of technology, as well as scientific and agricultural knowledge and requirements. The successful testing is concluded with the publication of a test report, as well as the awarding of the test mark which is valid for five years from the date of awarding.



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 Frameworks for elastic stable flooring, as of December 2018 and DIN 3763:2022-08 (Elastic floorings for cattle and dairy cows walking and rest surfaces – Requirements and testing). Other criteria were not investigated.

Assessment in brief

The Animat alley mat Transition Mat tested here, an elastic floor for walking ways in cubicle houses, was investigated with regard to durability and comfort properties on test benches 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 the standard.

Requirements DIN 3763 are fulfilled for the tested criteria. Deformation and Elasticity corresponds to class 1 DIN 3763 for single pens for calves.

Table 1:
Overview of results

DLG QUALITY PROFILE	Evaluation
Lying measurement deformability and elasticity in new condition	■ ■ ■ ■ *
Lying measurement deformability and elasticity following endurance test	■ ■ ■ ■ *
Walking measurement deformability and elasticity in new condition	■ ■ ■ ■ *
Walking measurement deformability and elasticity following endurance test	■ ■ ■ ■ *
Lasting deformation following 250.000 endurance test	■ ■ ■ ■ *
No noticeable wear and no damage following 250.000 endurance test	■ ■ ■ ■ *
Slip resistance	■ ■ **
Abrasion/Wear resistance	■ ■ ■ ■ *
Cleaning distance with flat jet nozzle	■ ■ ■ ■ *
Cleaning distance with a coarse dirt remover	■ ■ ■ ■ *

DLG Evaluation range:

* ■ ■ ■ or better = meets, exceeds or significantly exceeds the established DLG standards,

■ ■ = meets the legal requirements for marketability, ■ = failed

** Single criteria slip resistance: ■ ■ = passed, ■ = failed

The product

Manufacturer and Applicant

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Product:
Alley mat Transition Mat

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Description and Technical Data

The Animat alley mat Transition Mat tested here is an elastic floor for walking ways in cubicle houses.

- Black rubber mat
- thickness: approx. 19.7 mm
 - upper side with T-structure
 - lower side with bars and grooves
 - height of the bars: approx. 6 mm
 - width of the bars: approx. 5 mm
 - width of the grooves: approx. 6 mm
 - Shore A hardness: approx. 70
 - laid as single mat

The method

Deformability and elasticity

Lying measurement

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).

Walking measurement

The deformability is determined in new condition and after the continuous tread load with a cow's foot modeled steel base and a penetration force of 2,000 N (approx. 200 kg). Where: the "artificial cow's foot" in its dimensions is the one used in the continuous tread load.

Permanent tread load

The measurement of the continuous tread load is carried out with 250,000 alternating loads at 5,000 N (corresponds to approx. 500 kg) on a test bench with a round steel foot.

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 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.

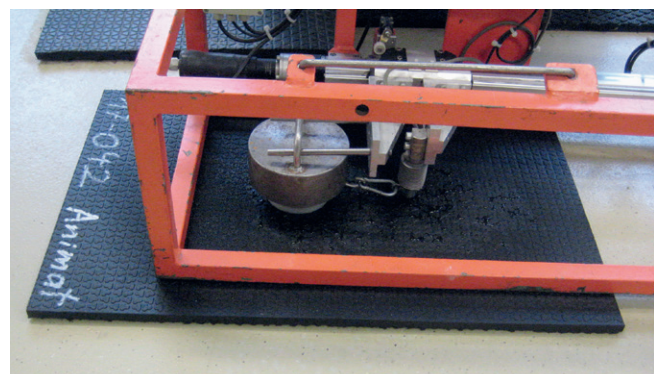


Figure 2:
Slip resistance measurement

Detailed account of the test results

Deformability and elasticity

Lying measurement

In the ball penetration tests in new condition with a calotte ($r = 120$ mm), penetration depth was 3.2 mm. The resulting calculated bearing pressure of 82.9 N/cm² indicates a 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 cm²) with 250,000 alternating loads at 5,000 N.

Following the endurance test, the penetration depth of the calotte decreased from 3.2 mm to 3.1 mm. The bearing pressure increased from 82.9 N/cm² to 85.6 N/cm² (see Fig. 3a). This means that deformability and elasticity slightly decrease.

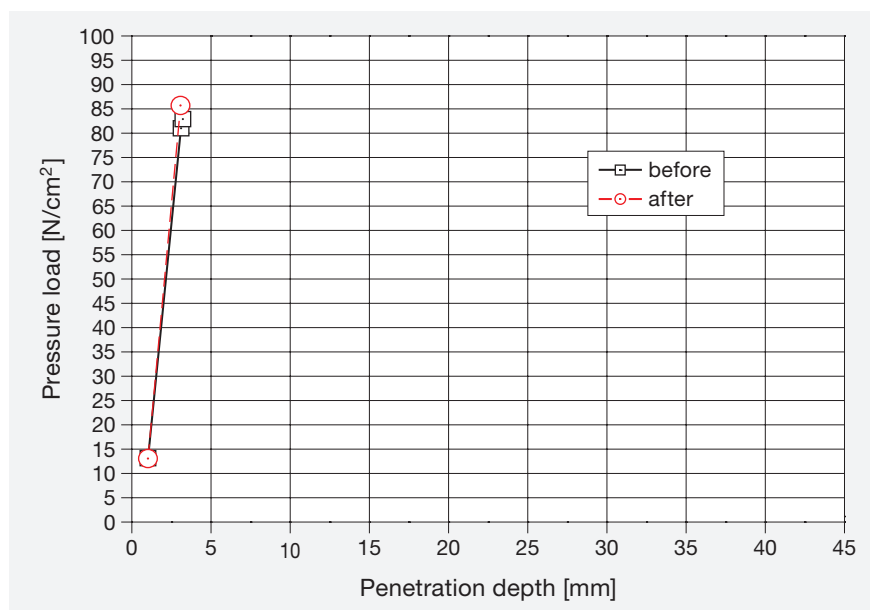


Figure 3a:
Lying measurement –
deformability as function of bearing pressure

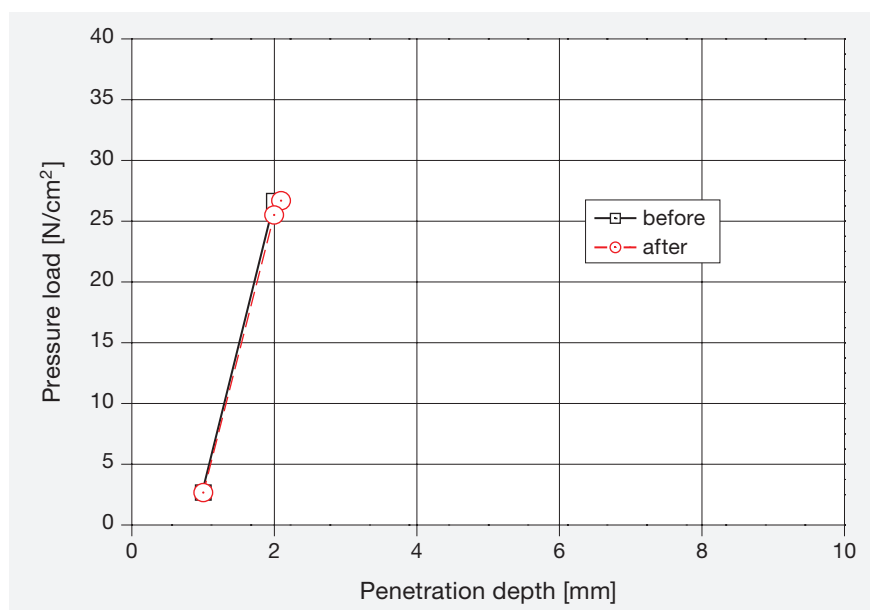


Figure 3b:
Walking measurement –
deformability as function of bearing pressure

Walking measurement

In the penetration test in new condition with a round steel foot (artificial cow 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 approx. 200 kg), the penetration depth was 2.0 mm. This results in a calculated surface pressure of 26.67 N/cm². Elasticity was measured after the Transition 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 increased to 2.1 mm (see Fig. 3b). This means that deformability and elasticity increase slightly).

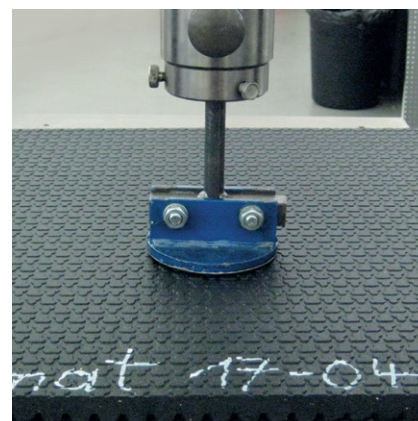


Figure 4:
Deformation measurement

Permanent tread load

After the Transition Mat had been exposed to a permanent tread load exerted with 250,000 alternating loads of 5,000 N (corresponding to approx. 500 kg), the mat showed no noticeable wear.

Lasting deformation could not be observed.

Abrasion test

The abrasion depth after 10,000 cycles amounted to 2.4 mm, this corresponds to approximately 12 % of the mat thickness.

From the ground surface 13.5 grams were rubbed off.

Slip Resistance

The slide pulling tests showed a good slip resistance on the dry or wet rubber mat surface in new condition. The measured friction coefficients (μ) surpassed the minimal value of $\mu = 0,40$ (DIN 3763) and $\mu = 0.45$ (DLG test program).

Cleaning distance

In test bench trials with a high pressure cleaner damage to the mat only occurred when a minimum distance of 45 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.

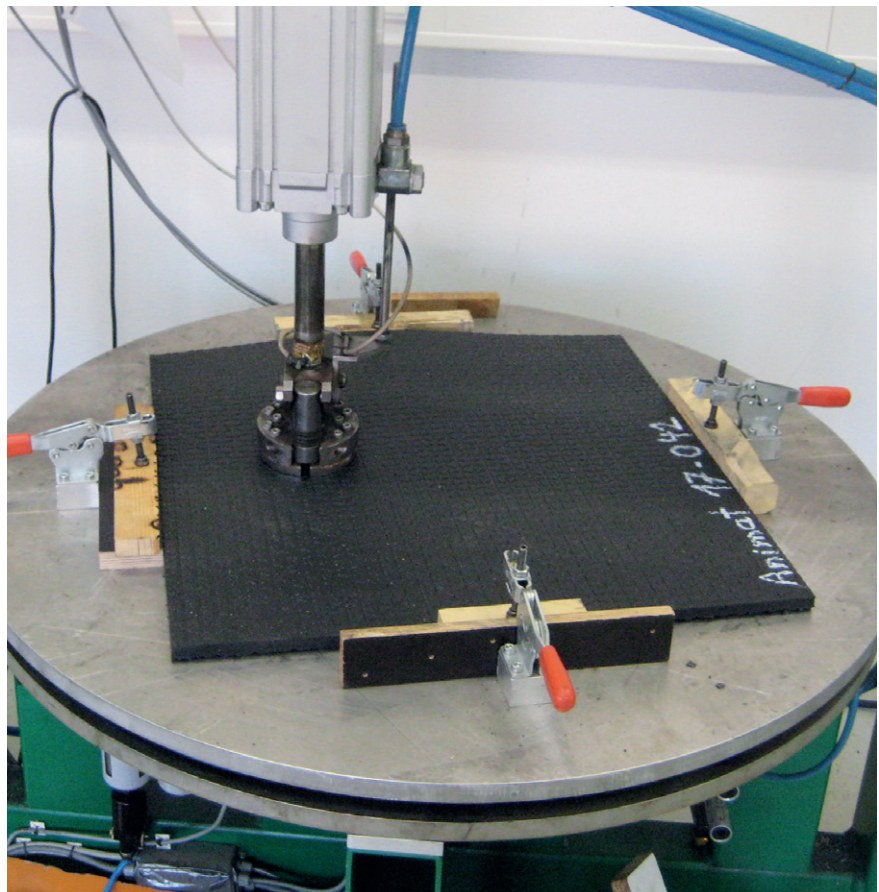


Figure 5:
Permanent tread load test

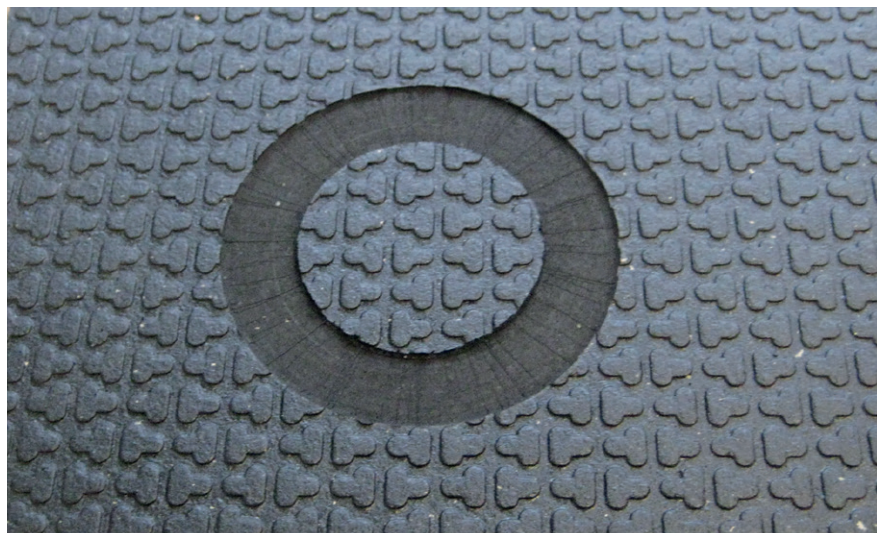


Figure 6:
Test sample after abrasion test

Summary

Based on test bench investigations, the criteria tested in this DLG-APPROVED Test evaluate the comfort and durability properties of the Animat alley mat Transition Mat for use in the walking ways in cubicle houses.

The tested Transition Mat met the requirements of DIN 3763 and the DLG Testing Framework with respect to the investigated criteria.

Further information

Testing agency

DLG TestService GmbH,
Gross-Umstadt location, Germany

The tests are conducted on behalf of DLG e.V.

DLG test framework

DLG Testing Frameworks for elastic stable flooring,
as of December 2018

DIN 3763:2022-08 (Elastic floorings for cattle and
dairy cows walking and rest surfaces – Requirements
and testing)

Department

Agriculture

Division head

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DLG – the open network and professional voice

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As one of the leading organisations in the agricultural and food market, DLG organises international trade fairs and events in the specialist areas of crop production, animal husbandry, machinery and equipment for farming and forestry work as well as energy supply and food technology. DLG's quality tests for food, agricultural equipment and farm inputs are highly acclaimed around the world.

For more than 130 years, our mission has also been to promote dialogue between academia, farmers and

the general public across disciplines and national borders. As an open and independent organisation, our network of experts collaborate with farmers, academics, consultants, policymakers and specialists in administration in the development of future-proof solutions for the challenges facing the agriculture and the food industry.

Leaders in the testing of agricultural equipment and input products

The DLG Test Center Technology and Farm Inputs and its test methods, test profiles and quality seals hold a leading position in testing and certifying equipment and inputs for the agricultural industry. Our test methods and test profiles are developed by an independent and impartial commission to simulate in-field applications of the products. All tests are carried out using state-of-the-art measuring and test methods applying also international standards.

The walking way cover Transition Mat has already received the DLG-approved test mark in 2017. The information presented in the report are based on the DLG test report no. 6765. According to the manufacturer, the walking way cover manufactured unchanged in the tested version.

Internal test code DLG: 2302-0037

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