DLG Test Report 6820





Overview

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 "BTS Cattle¹" included joint inspections and behavioural observations during standing up and lying down in three working farms, as well as measurement of deformability on test rigs at the DLG Test Center Technology and Farm Inputs. Data was acquired and analysed in accordance with the "Requirements of the BTS Programme Regarding Deformable Mattresses for Bovine Livestock" (Swiss Ethics Programme Ordinance of 25th June 2008, Annex 3). Other criteria were not investigated.

Assessment – Brief Summary

The DeLaval Sandbedmat Sand Stabilizer tested here was investigated with regard to comfort characteristics on test rigs in the DLG Appoved Test "BTS Cattle¹".

Joint inspections were carried out in three real-life farms, and behavioural observations were made during standing up and lying down. The requirements of the BTS programme regarding deformable mattresses for bovine livestock (Swiss Ethics Programme Ordinance of 25th June 2008, Annex 3) are met.

¹ Swiss support programme for especially animal-friendly housing systems ("Besonders tierfreundliche Stallhaltungssysteme", BTS)

The Product

Manufacturer and Applicant

DeLaval Service GmbH, Neu Galliner Ring 6, 19258 Gallin

Product: Sandbedmat Sand Stabilizer

Contact: Telephone +49 (0)4030 3344-308, matthias.reichert@delaval.com, www.delaval.com

Description and Technical Data

The Blister sandbedmat tested here, is a system for building a lying area in cubicle barns for cows and cattle.

- Black Rubber sandbedmat with 35 quadratic chambers ca. 20 cm x 20 cm, which are filled with sand.
 The surface of the sandbedmat should be interspersed with ca. 5 cm straw litter.
- Dimension of the mat: length 154 cm, width 114 cm, high 11 cm
- Weight: 50 kg each mat
- Shore A: 75
- The sanbedmat are fixed with 13 screws plus disks and dowel on the anchoring supports on the floor.



Figure 2: Drawing of the sandbedmat

The Method

Deformability and elasticity

The deformability is measured using ball-indentation tests in new condition and following permanent tread load 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 rig with a round steel foot 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.

Animal health

At a minimum of three farms, the tarsi (ankle joints) of all² cows held in the relevant cowsheds are examined by an independent specialist with relevant experience, and the animals' behaviour while standing up and lying down on the floor covering is observed.

Mats of the make to be tested are installed in all cubicles at least three months before examination. The examined cows are held exclusively in the relevant cowshed for at least three months before the examination; i.e. they have no access to grazing.

² Exceptions: cows in the first trimester of lactation / non-lactating cows / cows that were held in the relevant cowshed for less than three months prior to examination (e.g. purchased; see 2.4) / cows that often lie in the walkway / cows that are ill or were ill recently (e.g. recumbency after calving) / cows injured due to an accident

Animal health

At three farms, the tarsi (ankle joints) of 105 cows were examined by an independent specialist with relevant experience, and the animals' behaviour while standing up and lying down on the floor covering was observed.

The requirements relating to BTS conformity are met.

Deformability and elasticity

A penetration depth of 12.9 mm was determined in ball-indentation tests in new condition with a calotte (r = 120 mm) and a penetration force of 2,000 N (corresponding to approx. 200 kg). A bearing pressure of 21.1 N/cm² was calculated from this, indicating a relatively small load on the carpal joints when lying down and standing up.

The elasticity was measured following a permanent loading test with a steel foot (contact area 75 cm²) with 100,000 alternating loads at 10,000 N. Following the endurance test, the penetration depth of the calotte decreased from 12.6 mm to 10.6 mm. The





bearing pressure increased from 21.1 N/cm² to 25.0 N/cm² (see Figure 2). This corresponds to a decrease in deformability and elasticity. The requirements relating to BTS conformity are met.

Permanent tread load

No noticeable wear was observed at the base of the honeycomp following permanent tread load with a steel foot (contact area 75 cm²) on a test rig with 100,000 alternating loads at 10,000 N (corresponding to approx. 1,000 kg). No permanent deformation was observed.



Figure 3: The shown joint was examinated

Table 2:Requirements for BTS conformity – test results – evaluation

| | Requirement for BTS conformity ¹ | Test results | Evaluation |
|--|--|--------------|--------------------|
| Animal health | | | |
| Tarsi (ankle joints) with scabs or open wounds as % of examined tarsi | max. 25 % | 4.3 % | requirement met |
| 2. Tarsi with larger scabs (> 2 cm) or larger open wounds (> 2 cm) as % of examined tarsi | max. 8 % | 1.4% | requirement met |
| Tarsi with another serious change (e.g. change in size) as % of examined tarsi | max. 1 % | 0% | requirement met |
| 4. Other serious physical harm to the animals that could be caused by the rubber mat. | none | none | requirement met |
| 5. Behavioural abnormalities that could be caused by the rubber mat. | none | none | requirement met |
| Deformability and elasticity | | | |
| 6. Penetration depth into the rubber mat in new condition | min. 10 mm | 12.6 mm | requirement met |
| Penetration depth into rubber mat following permanent tread load | min. 8 mm | 10.6 mm | requirement met |

Summary

The tested DeLaval sandbedmat Sand Stabilizer meets the requirements of the BTS programme regarding deformable mattresses for bovine livestock (Swiss Ethics Programme Ordinance of 25th June 2008, Annex 3).

¹ Swiss support programme for especially animal-friendly housing systems ("Besonders tierfreundliche Stallhaltungssysteme", BTS)

Further Information

Further test results for mats for lying boxes are available to download at **www.dlg-test.de/** stalleinrichtungen.

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 implementation

The tests are carried out on behalf of the DLG by the DLG TestService GmbH as testing agency.

DLG test scope

BTS programme regarding deformable mattresses for bovine livestock (Swiss Ethics Programme Ordinance of 25th June 2008, Annex 3)

Department

Indoor operations

Head of Department

Graduate engineer. agr. Susanne Gäckler

Test engineer(s)

Dr. Harald Reubold*

* Author

DLG – the open network and professional voice

Founded in 1885 by the German engineer Max Eyth, DLG (Deutsche Landwirtschafts-Gesellschaft – German Agricultural Society) is an expert organisation in the fields of agriculture, agribusiness and the food sector. Its mission is to promote progress through the transfer of knowledge, quality standards and technology. As such, DLG is an open network and acts as the professional voice of the agricultural, agribusiness and food sectors.

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 futureproof 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 techniques at our ultra-modern facilities applying also international standards. The actual testing agency is the DLG TestService GmbH which holds multiple accreditations to perform these tests.

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Testzentrum Technik & Betriebsmittel Max-Eyth-Weg 1 • 64823 Groß-Umstadt • Germany Telefon: +49 69 24788-600 • Fax: +49 69 24788-690 Tech@DLG.org • www.DLG.org Download of all DLG test reports free of charge at: www.DLG Test.de