

DLG Test Report 6391

Huber Technik Vertriebs GmbH

Comfort Roll N20

Full test

OVERVIEW

A quality mark “DLG-APPROVED FULL TEST“ is awarded to agricultural products which passed DLG’s comprehensive usability test according to independent and approved evaluation criteria. The product’s most important criteria from the farmer’s point of view are evaluated during this test. The test includes investigations on test benches and under various operating conditions and furthermore, the tested item must prove itself during a practical testing on a farm. The test conditions and procedures are fixed in a test framework which is developed by an independent test commission and adjusted regularly according to accepted rules of engineering as well as to latest scientific and agricultural knowledge and requirements. The successful test concludes with the publication of a test report as well as with the award of the quality mark, being valid for five years after the award.

The DLG-APPROVED full test included technical **measurements in the lab** of the DLG Test Center and **practical examinations, behavior observations, joint evaluation and a survey on agricultural farms**. On test rigs in the lab the deformation, the slip resistance and the acid resistance were measured and a permanent tread load test was carried out. The choice behavior of the cows was tested via video recording in the agricultural center of “Haus Düsse”, Germany

The test was based on the DLG Testing Framework for elastic stable flooring, as of April 2010.

THE PRODUCT

Manufacturer and Applicant

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Product:
Comfort Roll N20

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Description and Technical Data

The tested comfort roll N33 is an elastic flooring in the resting area of the cow and cattle in high stalls.

It is a black profiled rubber mat with a thickness of 20mm.

Flooring of solid rubber in rolled form

- Top coat with hammer top surface
- Bottom with nubs of two different sizes: approx. 10mm high
- On request it is possible to install a sealing strip at the head end to avoid ingress of dirt

Main dimensions and weight:

Length	5 to 30 m
Width	1800 mm
Thickness	20 mm
Weight per m²	Appr. 12 kg

EVALUATION – SUMMARY

The tested Huber Comfort Roll N20 is an elastic flooring in the resting area of raised stalls. The „DLG APPROVED full test“ tested properties of durability and comfort. During the field test installation and size accuracy were evaluated. Behavioral observation as well as joint evaluations have been done. In particular, deformability and durability after permanent tread load as well as the health of joints were significantly better than in average.

Test Characteristic	Test Result	Valuation*
Suitability		
	As an elastic flooring in the resting area of high stalls	
TECHNICAL CRITERIA		
Deformability, Elasticity and Aging (bench test)		
Abrasion test	Good abrasion resistance	+
Permanent treat load	No considerable permanent deformation	++
Surface	Very low abrasion	O
Bottom	No considerable abrasion	+
Acid resistance**	No changes on the surface	+
- Feed acid mixture	Resistant	+
- Uric acid	Resistant	+
- Sulfurous acid	Resistant	+
- Ammonia solution	Resistant	+
- Disinfection liquid	Resistant	+
- Peracetic acid	Resistant	+
Dimensional stability		
	no significant alteration in length or width	+
Deformation	none	++

Handling and Installation		
Installation by the owner	Justifiable effort	O
Installation instructions	Short and understandable	O
Cleanliness and Disinfection		
Self-cleaning	Good	+
Daily cleaning	No difficulties	+
High-pressure cleaner	Minimum distance with flat spray nozzle: 10 cm	+
	Minimum distance with dirt blaster: 30 cm	+
Basic cleaning and disinfection	On surface very good possible	+
	On bottom justifiable effort	O
Warranty and Recycling		
	10 years	
	Mat is taken back by producer	+
ANIMAL-RELATED CRITERIA		
Behavioral Observation		
	No deviation from specific behavior noticeable	+
Choice behavior	Accepted very good by the animals	++
Joint evaluation		
	87,3 % without findings	+
Slip Resistance		
Slip Resistance	Very good on dry and wet floor	+
Surefootedness	In field tests very good	+
Deformation and Elasticity		
New state	10,6 mm, good	+
After permanent treat load	10,7 mm, good	+
Toxicological Safety		
	Confirmed by producer	O

* Evaluation range: + = resistant; O = limited resistant; – = not resistant

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

METHOD

Suitability

The suitability and the range of use of the system for building a lying area in cubicle barns were evaluated by a practice-oriented focus.

TECHNICAL CRITERIA

Wear resistance, durability, ageing and Permanent tread load

At the Abrasion Resistance test, the surface of the flooring is rubbed with an emery cloth (grain size 280) with a tracking force of 500 N (= 8.13 N/cm² surface pressure). To exclude any heat influence caused by friction, the emery cloth is continuously cooled by water. The size of the rubbed surface was 61.5 m².

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.

Acid Resistance

A permanent dipping test in accordance to DIN EN ISO 175:2000 (performance of synthetic material against liquid chemicals) was carried out.

Commercial disinfectants as well as often used feed and excrement acids were used for the test. Test samples (size 30 x 30 mm) were completely dipped into 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 were measured. Additional visual evaluation was done for alterations like color changing, swelling, destruction or crystallisation. All samples were evaluated in comparison to the standard water.

Dimensional stability

The dimensional stability (formation of hollows) of the system was evaluated after installation in accordance to the installation instructions from the manufacturer. Additional was evaluated if alteration in length or width or deformation of the mat was noticeable.

Handling, installation and maintenance

The handling, installation and necessary maintenance of the mat were evaluated related to practice.

Cleaning and Disinfection

The cleaning of the mat was evaluated related to practice. At test benches with a high-pressure cleaner (approx. 145 bar, exposure time 1 minute with 25° flat spray nozzle and dirt blaster) the spraying distance was evaluated. No damages on the surface occurred.

Warranty and Recycling

The manufacturer is required to state if and how long a guarantee is granted and which is included in the warranty. The manufacturer is required to state if there is a recycling concept for the mat.

ANIMAL-RELATED CRITERIA

Animal observations

During the practical use behavior observations were executed by direct observations as well as video recording. It was observed if there was some deviation from specific behavior noticeable (e.g. typical movement process getting up and lying down, lying positions) which would have to be attributed to the mat were determined. In addition, no deviations from specific behavioral patterns to evaluate the footedness of the cows direct observation of 20 getting-up processes each on two farms were carried out.

Choice Behavior

The test was made in a cubicle stable (6 boxes, 3 animals, 2 weeks acclimatization, 7 days of evaluation). As comparison flooring a solid rubber mat was used (thickness 18mm, hammer blow surface, tread pattern on the bottom)

Joint Evaluation

On three farms which had installed only the tested mat, cows were examined for externally visible damage in the joint area as of the second third of lactation (joint evaluation). The flooring has been installed minimum 3 months ago. Evaluation comprised the left and right half of the body.

Joint evaluation was always carried out by the same person at the end of the winter-feeding period, every time from the same person. The results were classified according to the following scheme.

Classification of the joint evaluation

Result	Classification
Without any particular result	No alterations
Hairless spots < 2 cm	Small alterations
Hairless spots > 2 cm	Small alterations
Skin abrasions < 2 cm	Medium alterations
Skin abrasions > 2 cm	Medium alterations
Increased circumference in the bursal area, covered	Medium alterations
Increased circumference in the bursal area, open	Great alterations
Joint participation	Great alterations

Slip Resistance

The measurement was made by a mobile Comfort Control Slip Resistance Test Stand of the DLG Test Center. A with 10 kg loaded plastic foot out of polyamide (97 mm diameter, contact area 74 cm², 3mm wide ring) is pulled over the tested mat with a speed of 20 mm/sec.

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).

Toxicological Safety

The manufacturer has to confirm the toxicological safety of the mat.

SURVEY

A written survey was made at those farms which use the tested flooring N20.

TEST RESULTS IN DETAIL

Suitability

Huber Comfort Roll N20 is an elastic flooring for the lying area in cubicle barns. Due to the installation of rolls and not separate sheets self-supporting partitions of boxes are necessary. Requirement for a trouble-free usage of the mat is a professional concrete foundation with continuous slope of 3%, better 4%. To make the cleaning easier and to bind moisture a small amount of bedding material is recommended.

TECHNICAL CRITERIA

Wear resistance, durability, ageing and Permanent tread load

The depth of abrasion after 10,000 double cycles is 0.9 mm, which amounts 5% of the total surface level. 0.9 g of the material were rubbed off. This very low depth of abrasion leads to a very good wear resistance of the flooring.

After exposure to a permanent tread load exerted by a round steel foot (contact area 75 cm²) on a test stand and 100.000 alternating loads of 10.000 N (corresponding to approx. 1000 kg), no noticeable wear at the cross link of the mat was determined. No lasting deformation could be observed. Very low abrasion but no damages on the surface have been measured.

Acid Resistance

The Huber comfort roll N20 was resistant against all tested mediums (see following chart). 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 suit for the described use very well.

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				
Urin 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	No changing	resistant
Disinfection liquid				
Barn Disinfection liquid	2%-solution of a product with formanic acid and glyoxyl acid	No changing	No changing	resistant
Peractetic acid	3000 ppm	No changing	No changing	resistant

Dimensional stability

During the test period, a noticeable alteration of length and width did not occur in practice after proper installation. Deformation (formation of craters and channels) was not observed.

Handling, installation and maintenance

The installation instructions are concise and easy to understand. The installation is possible with reasonable effort on the farmer's part. Installation requires min. two persons. The mat is fixed with 3 screws plus dowel per cow space at the head area.

Cleaning and Disinfection

The self-cleaning effect is good and the daily cleaning of the surface does not cause any difficulties. With low intersperse of litter the resting areas are very dry and the cows are clean. Due to the impermeable surface of the mat it is possible to do a basic cleaning (e.g. high-pressure cleaner) and disinfection. A previous soaking of the dirt is recommended. At the bench test with a high-pressure cleaner the surface got damaged only if the minimum distance of 30 cm (use of a dirt blaster) and 10cm (use of a flat spray nozzle) was lower. It is unavoidable that some moisture accumulates under the flooring. A cleaning can be done with justifiable effort, because the flooring is only fixed at the head area. When cleaning and disinfecting the flooring only from the manufacturer permitted detergents should be used.

Warranty and Recycling

According to its warranty conditions, the registering company grants a linear warranty of 10 years for the comfort roll N20. The clean rolls can be sent on own costs to the manufacturer. A written agreement with the manufacturer is recommended.

ANIMAL-RELATED CRITERIA

Animal observations

During one year of practical use, behavioral observations in the form of video- and direct observations were carried out. The direct observation of 20 getting-up processes each on two farms did not show any deviation from the normal movement process. In addition, no deviations from specific behavioral patterns (e.g. typical movement process getting up and lying down, lying positions) which would have to be attributed to the floor cover were determined.

Choice Behavior

The video recording show, that the cows accept the flooring very well. The average time of lying and standing on the flooring is 14.0 hours per day. The lying behavior doesn't show any deviation of normal lying behavior. Interrupted lying processes could not be measured. The evaluation shows that within 24 hours the animals stand or lie on average 15.2 hours in the boxes. In this time, the cows spent 14.0 hours on the Huber comfort roll N20 and only 1.2 hours in comparable boxes. Also the average lying time was longer on Huber comfort roll N20 compared to other floorings.

Joint Evaluation

On three farms which had installed only the tested comfort roll, a total of 101 cows were examined for externally visible damage in the joint area as of the second third of lactation (joint evaluation). Evaluation comprised the left and right half of the body and focused on the 10 spots exposed during resting. Joint evaluation was always carried out by the same person at the end of the winter-feeding period.

The percentage of the results found in the 101 animals examined is shown in the figure. 87.3 % of the spots evaluated did not show any pathological result. Great alterations, like increased circumference in the bursal area, open joint participation were not found.

Small alterations, such as hairless spots were found at 10.7 % of the spots evaluated. At 2.0 % of the spots evaluated medium alterations, such as skin abrasions and increased circumference in the bursal area (covered) at the joints were found. The pathological results determined were mainly found in the

tarsal joint and knees. Only in a few cases were pathological results found in the ankles or the carpal joint.

Slip Resistance

The measurement by the mobile Comfort Control Slip Resistance Test Stand lead to a good slip resistance on dry and wet surface. The coefficient of friction (μ) are above the minimum value of $\mu = 0.45$.

At two farms 20 getting-up processes were evaluated via visual inspection. A very good surefootedness of the animals could be seen. The animals didn't slip at all.

Deformability and Elasticity

In ball impression tests in new condition with a calotte ($r=120$ mm) the deformation was measured. The penetration depth in new condition was 10.6 mm. The calculated bearing pressure was 26.2 N/cm² and leads to a low load of the carpal joint during the lying-down process.

Elasticity was measured after a permanent tread load exerted by the steel foot (contact area 75 cm²) with 100,000 variations in stress with 10,000 N. After the endurance test, the penetration depth increased from 10.6mm to 10.7mm. The contact pressure decreased from 26.2 N/cm² to 26.0 N/cm². This means that deformability and elasticity increased little.

Toxicological Safety

The manufacturer confirmed the toxicological safety of the mat.

SURVEY

A survey among 17 farms, which have been using the comfort roll N20 up to 1 years, confirmed the experiences of the test. On the farms, a total of 946 cubicles were equipped with the comfort roll N20. All installations were made by the farmers. All of them stated that installation was easy and did not require any practice. At all farms the cubicles were accepted. In all farms no slipping of the animals was observed. The comfort roll N20 was evaluated very all farmers. All farmers would purchase the Huber comfort roll N20 again if necessary.

RESULT

The utility value test included technical measurements on test rigs and practical tests with regard to durability and comfort properties of the Huber comfort roll N20 as a system for building a lying area in cubicle barns for cows and cattle.

The "DLG APPROVED full test" is related to the DLG Test 5378 (DLG SignumTest September 2004), using the new testing framework. The tested Huber comfort roll N20 met the requirements of the Testing Framework with respect to the investigated criteria.

FURTHER INFORMATION

Please go to www.dlg-test.de/stalleinrichtungen to download more reports on animal welfare and cattle farming.

ABOUT DLG

In addition to being the executing body of well-known tests for agricultural engineering, farm inputs and foods, the DLG is also an open forum for the exchange of knowledge and opinions in the agricultural and food industry. Some 180 full-time employees and more than 3,000 volunteer experts are developing solutions to current problems. There are over 80 committees, working groups and committees who create the base of expertise for professional work. At the DLG, a great deal of specialist information for agriculture is created in the form of information leaflets and working papers, as well as articles in journals and books. DLG organizes the world's leading professional exhibitions for the agriculture and food sector. This contributes to the transparent presentation of modern products, processes and services to the public. Further information can be obtained under www.dlg.org/mitgliedschaft.

The DLG Test Center Technology and Farm Inputs

The DLG Test Centre Technology and Farm Inputs in Groß-Umstadt is the benchmark for testing agricultural products and farm inputs, as well as a leading testing and certification service provider for independent technology tests. The DLG test engineers precisely examine product developments and innovations by utilizing state-of-the-art measurement technology and testing methods gained from experience. As an accredited and EU registered testing laboratory the DLG Test Center Technology and Farm Inputs offers farmers and practitioners vital information and decision-making support for the investment planning of agricultural technology and farm inputs through recognized technology tests and DLG testing.

Please find all pictures, graphs, charts and seals in the official German version of the DLG test.