

I.C.E. Comfort Slat Mat Ltd.

Floor Cover Comfort Slat Mat

DLG Test Report 5991



**Registering and
manufacturing company**
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Short description

Green-black (also available in black-black or white-black) non profiled elastic rubber curved floor cover with integral spring loaded fixing clip for slatted floors.

The floor cover is suitable for slatted floors consisting of single or twin beam, or larger elements containing 3, 4, 5, 6 or 7 slatted beams in cattle barns.

The mats are supplied singly and they fit over each individual beam or slat and are notched in production to suit the element dimensions.

– Rubber mat height: 19.1 mm / High with fixing clip: ca. 85.5 mm.

– Shore A hardness: 85.



DLG e.V.
Test Center
Technology and Farm Inputs

(Technical data: see page 6.)

Assessment – summarised

Test criterions	Test result	Bewertung
Suitability		
	suitable for slatted floors consisting of single, twin-beam or larger elements which contain larger 3, 4, 5, 6 or 7 slatted beams per element in cattle barns	

Technical criteria

Resistance to wear and tear, durability and ageing (test stand trials)		
Abrasion test	good wear resistance	+
Permanent tread load	no lasting deformation	++
Surface	little wear	○
Acid test	no alterations to the material	+
Measurements adherence		
	no noteworthy changes in length or width	+
Deformations	none	++
Handling, laying		
Do it yourself laying	simple	+
Fixation	stable and reliable	+
Installation instructions	short and comprehensible	○
Surface cleanability		
Soiling	gaps	○
	stepping surfaces	○
Cleaning	no problems	+
Warranty and recycling		
	5 Years	
	Rubber is taken back by manufacturer	+

Animal related criteria

Behavioural observations		
Movement behaviour	increased activity	+
comfort and heat behaviour	pronounced	+
Slip resistance		
Slip resistance during slide pulling tests	good	+
Foothold	good	+
Deformability and elasticity		
in new state	5.0 mm, very good	++
after permanent tread load	6.3 mm, very good	++
Toxicological innocuousness		
	certified by the manufacturer	○

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

Test results

I. SUITABILITY

The Comfort Slat Mat floor cover is suitable as surface covering for slatted floors consisting of single or twin beam or larger elements containing 3, 4, 5, 6 or 7 slatted beams in cattle barns covering beam width of up to 18.6 cm.

II. TECHNICAL CRITERIA

Wear resistance, durability

In a standardised abrasion test during which the surface was grinded with an emery cloth (granulation 280) and a grinding pressure of 500 N (= 8,1 N/cm² surface pressure), the abrasion depth after 10,000 double strokes amounted to 0.2 mm, this corresponds to approximately 4% of the rubber

thickness. Of the ground surface (61,5 cm²) 1.9 grams were rubbed off. The minor abrasion depth and the slight grit implicate a good wear resistance of the rubber.

After continuous stepping strain on a test stand using a steel hoof (footprint 75 cm²) and after 250,000 alternating loads at 5,000 N (corresponds with approximately 500 kg) no noteworthy abrasion (surface and bottom) and no damage to the rubber slats was detected. No lasting deformation was observed.

After the slat mat has been exposed to a permanent tread load exerted by 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 (bearing wall of the claw)) with alternating

loads of 5.000 N (corresponding to ca. 500 kg) little wear on the surface and no damage was detected. Lasting deformation was not observed.

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 50 x 50 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. 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 or destruction.

Table 1:
Test liquids and results acid resistance top cover

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				
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	no changing	resistant
Disinfection liquid				
Disinfection liquid	2 %-solution of a product with formic acid and glyoxyl acid	no changing	no changing	resistant

Table 2:
Test liquids and results acid resistance fixing clip

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				
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	no changing	resistant
Disinfection liquid				
Disinfection liquid	2 %-solution of a product with formic acid and glyoxyl acid	no changing	no changing	resistant

The curved floor cover was resistant against the used test liquids. Because of the resistance against the used feed- and excrement acids and the used disinfection liquid the rubber mat seems to be well suited for the described use.

Measurement adherence

During the test period no noteworthy change in length or width was observed over the period of the practice test subject to correct installation. No deformations took place.

Handling, laying

The handling and laying instructions are short and comprehensible. A condition for the smooth application of the Comfort Slat Mat is that the slat rubber exactly fits each slatted beam of single, twin or larger elements containing 3, 4, 5, 6 or 7 slatted beams elements. This requires taking the exact measurements of the slats installed (gap width, surface area). The supplier should take the necessary measurements.

The laying of the rubber can be done easily by Do it yourself. The fixing clip must be opened so as to allow it to be fitted over the tread

Table 3:
Soiling evaluation schematic

Tread area (height of faeces layer > 1cm)	Gap area
1. Tread area at least 75% free	1. Gap at least 75% free
2. Tread area at least 50% free	2. Gap at least 50% free
3. Tread area at least 25% free	3. Gap at least 25% free
4. Tread area completely closed	4. Gap completely closed

area. As each rubber mat is fitted over each individual slat or beam, it has proven to be stable and reliable.

Cleaning/soiling

As the design of the mat covers the top surface and the main part on each side of the slat, the ingress of moisture (urine and faeces) is clearly reduced and therefore there is no accumulation of urine or faeces on the slat or beam under the mat.

When cleaning and disinfecting the rubber only those products should be used which the manufacturer has recommended. Before and after the installation of the rubber the soiling of the surface area was tested. Per aisle the soiling of 25 gaps and 25 tread areas was assessed and documented by photographs. The soiling of the gap areas as well as the tread areas was evaluated.

In addition the temperature of the environment and the relative humidity was measured.

The evaluations were made in a period of 4 month before and after the installation during three different days. The assessment was made according to the evaluation schematic shown in table 3. The soiling of the gap and the tread areas did not increase after installing the Comfort Slat Mat.

Warranty and recycling

The manufacturer allows a warranty of 5 years with linear depreciation according to his warranty conditions. In case of absorption of charges the manufacturer takes the rubber back subject to prior cleaning. A written accord of the manufacturer concerning the taking back of rubber is on hand.



Picture 2:
Laying Comfort Slat Mat



Picture 3:
No accumulation of urine or faeces on the slat or beam under the Comfort Slat Mat

III. ANIMAL RELATED CRITERIA

Animal behaviour

The observations concerning the behaviour took place in a test farm containing about 134 dairy cows of the "Deutsche Schwarz- and Rotbunte" race kept in rest boxes.

Movement behaviour

After installing the mats the motional activity of the cows has increased significantly. The motion sequence is easy and relaxed. By direct observation of ten animals selected at random step lengths of 71 to 92 cm were observed whilst moving easily and evenly. Because of the increased motional activity slipping occurs without noticeable curtailing of animal behaviour. Posture of the head whilst moving was observed in twenty animals. A difference was made between high (angle between neck-withers-line and the prolonged back line smaller than 20°) and low (angle larger than 20°) position of the head. 80% of the animals observed showed a high and 20% a low position of the head. The high head position speaks for a secure and relaxed motion sequence.

Comfort and heat behaviour

During a period of one hour 14 active dairy cows were observed, which neither rested in their rest boxes nor fed at the troughs. 21 times a licking of the rear part was observed whilst the animals were standing securely on three legs. The heat behaviour was decidedly pronounced shown by numerous mounts. During a period of one hour 8 times mounting was observed. The mounting as well as the mounted dairy cows stood securely without slipping on the mats. After installing the mats on the test farm it was observed that individual animals were not lying down in the aisle. In the case of not ideally arranged rest boxes the risk of animals lying in the aisle increases.

Slip resistance

Slide pulling tests using a round plastic foot (with a contact area of 75 cm²) and with a velocity of 20 mm/s showed a good slip resistance on the dry or wet rubber surface in mint condition. After 3 months usage in practice the slide pulling tests were repeated in at least 12 areas of the stables (at least three areas per aisle).

The measured friction coefficients (μ) surpassed in the average the minimal value of $\mu = 0.45$ which speaks for a good slip resistance. After the animal behaviour observations the foothold of the animals is evaluated as good.

Deformability and elasticity

Indentation tests in new condition (in fixed position) using a 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 (bearing wall of the claw)) and an indenting pressure of 2.000 N (corresponding to approximately 200 kg), the indentation depth was 5.0 mm. The calculated indenting pressure is 26.67 N/cm².

Elasticity was measured after a permanent tread load of 250.000 alternating loads exerted by the steel foot and a pressure of 5.000 N. After this extended time test the indentation depth of the steel foot increased from 5.0 mm to 6.3 mm.

Toxicological innocuousness

The manufacturer has certified the toxicological innocuousness.

IV. SURVEY RESULT

A survey held in 3 agricultural enterprises, which have used the Comfort Slat Mats for up to, 15 month have confirmed the test results.

These farms have in total used 2.500 m² of these tread surface

covering rubber. The laying was done as internal labour on all farms. All of the persons surveyed indicated that the installation had been simple and practical to realize.

The soiling of this slat rubber system after installation has been rated reduced by all of the persons surveyed.

In all farms heat behaviour was decidedly pronounced. On one farm single cows are laying down in the aisles after installation of the surface covering mats.

The foothold of the animals was evaluated from one person with good and from two persons with satisfactory because some skidding of animals was observed.

On all of the farms there is a decrease of the mechanical-traumatical claw findings. A change of the claws (hoof wall, growth of claw horn) has been noted only on one farm.

Two persons surveyed have stated very good opinion about the Comfort Slat Mat and one person has a satisfactory up to good opinion about the Comfort Slat Mat. Two persons surveyed would buy it again if the necessity should arise.

Warranty

5 years

The floor cover is suitable with the following width

(in mm)

70, 75, 80, 85, 90, 95, 100, 104, 118, 121, 123, 127, 131, 137, 140, 143, 146, 151, 154, 157, 162, 165, 168, 171, 175, 178, 180, 183, 186.

Depending on demand other width are available.

Main measurements and weight (single piece)

length	normally up to 5 m (longer lengths can be produced on demand)
width	70 bis 186 mm
thickness rubber mat	approx. 19,1 mm
weight, per m ²	approx. 12 kg

Available length of the floor cover

As most slatted floors are made to a maximum of 5 metres, mats can be provided to suit.

However the production process facilitates the production of longer lengths if required, this can be done on request.

Test

The DLG SignumTest is based on the technical measurements on the test stands and in the chemical lab of the DLG Test Centre as well as individual tests, behavioral observations and a survey among test farms.

The tests carried out on test stands included examinations of deformability and material hardness using a indentation test, durability tests of elasticity using alternating loads, examinations of abrasion resistance in an abrasion test using an emery cloth, examinations of slip resistance with the aid of slide pulling tests and examinations of the resistance of the surface against acid.

Realization of the tests

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More information about the Network is available at www.entam.com or by writing.
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