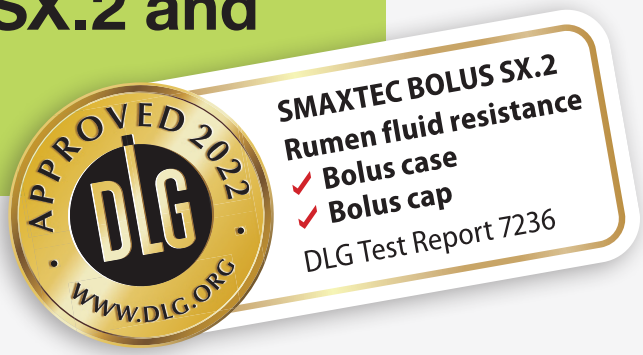
DLG Test Report 7236

smaXtec animal care GmbH

smaXtec Classic Bolus SX.2 and smaXtec pH Bolus SX.2

Rumen fluid resistance



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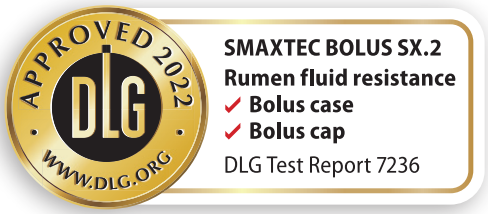
Overview



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.

In the present test the chemical material resistance of plastic bolus case and plastic bolus cap were evaluated.

All results shown refer only to the tested samples. Other criteria were not tested.

Assessment in brief

The tested components of the intraruminal measurement system were resistant to the artificially produced rumen fluid.

The DLG test mark „DLG APPROVED in single criteria“ is awarded for the feature “rumen fluid resistance”.

Table 1:
Overview of results

DLG QUALITY PROFILE	Evaluation*
Single Criteria Rumen fluid resistance	
Scenario: physiological, pH-value 6.2 (40 °C/60 °C)	
– Bolus case	✓
– Bolus cap	✓
Scenario: Acidosis, pH-value 5.2 (40 °C/60 °C)	
– Bolus case	✓
– Bolus cap	✓

* Evaluation range: requirements fulfilled (✓) / requirements not fulfilled (✗)

The product

Manufacturer and applicant

smaXtec animal care GmbH
Belgiergasse 3
8020 Graz
Austria

Product:
smaXtec Classic Bolus SX.2 & smaXtec pH Bolus SX.2

Description and technical data

The tested materials are individual components of a special bolus from smaXtec animal care GmbH. They are used in the Classic Bolus SX.2 and pH Plus Bolus SX.2 versions.

Another component used in the bolus is the sealing ring, which was also tested for its resistance to rumen fluid in a previous DLG test (see DLG test report 5973F).

smaXtec boluses are entered once using a bolus applicator and remain in the reticulum.
By positioning the bolus in the reticulum, external influences on the measurements are largely excluded, which should significantly improve the quality of the data collected.

The data are measured continuously and automatically read out by the smaXtec Base Station reading device. They are then transmitted to the smaXtec cloud and analysed using artificial intelligence. Data access by the user takes place via PC, smartphone or tablet.

According to the manufacturer's information, the characteristic values listed in Table 2 are measured.

Table 2:
Data measured by smaXtec boluses

Value	Classic Bolus SX.2	pH Bolus SX.2
Inner body temperature	yes	yes
Activity levels	yes	yes
Drinking cycles	yes	yes
Rumination	yes	yes
Rumen pH	no	yes
Diameter	35 mm	35 mm
Length	105 mm	132 mm

Through the continuous monitoring of the various parameters and the messages on health status, estrus, calving and feeding, the farmer is informed early. This enables him to react quickly if necessary.
This contributes to increasing animal health. Earlier disease detection helps to avoid severe disease progression, reduces the use of medication and reduces performance losses.

The method

Background and purpose

The test serves to evaluate the chemical resistance of materials to the rumen environment. For this purpose, the test items are treated with artificial rumen fluid under standardized conditions.

The artificial rumen fluid simulates the chemical-physiological conditions in the rumen. The artificial rumen fluid consists of a buffer solution which simulates the “rumen saliva”. Macro- and trace elements are added in order to imitate the osmotic conditions in the mucus membrane of the rumen. Chloride compounds are the main component of the trace element solution. The artificial rumen fluid does not contain any microorganisms. Their natural reaction products and the resulting physiological conditions are simulated by adding a fatty acid mixture.

The pH of the solution is adjusted to 6.2 with the fatty acid mixture. This corresponds to a concentration of about 100 mmol/l. In addition to the physiological conditions, the test also simulates rumen acidosis as the “worst case”. For this purpose, the pH value of the physiological artificial rumen solution is lowered to 5.2 with lactic acid.

Test methodology and test conditions

The test was carried out as a static immersion test in the laboratory based on the DIN EN ISO 175 standard for the determination of the resistance of plastic materials against liquid chemicals.

Each material is stored in a separate, covered container filled with the required medium and placed in a drying chamber.

Two storage temperatures are chosen for each material and each medium:

- 40 °C, which corresponds to the physiological conditions in the rumen, and
- 60 °C for the acceleration of the material test and the assessment of the results.

The test solution is replaced weekly.

Fully desalted water (FD water) serve as a reference solution and duplicate determinations are carried out for all test conditions.

The brand-new samples are rinsed with deionized water and dried to constant weight. Before and after the immersion time of 28 days, the tested bodies were evaluated visually and examined for specific material properties such as mass, measurements, and Shore hardness. For this purpose, the samples are weighed with a laboratory scale, measured with a digital caliper and the hardness is determined with a Shore hardness measuring device. After the immersion time, the test specimens are rinsed again with deionized water, dried at room temperature and measured again.

Assesment

Changes in properties caused by treatment with artificial rumen fluid are used to evaluate the results. The DLG evaluation scheme is shown in Table 3.

Table 3:
DLG assesment scheme ‘rumen fluid resistance’

Difference	< ±5 %	±5 % to ±10 %	> ±10 %
Evaluation	resistant	conditionally resistant	non-resistant

Detailed account of the test results

The delivered test samples were subjected to a visual assessment in the untreated condition and after treatment with water and artificial rumen fluids. No abnormalities were found either in new condition or after treatment.

The measurements carried out showed no significant influence of the treatments on the weight, the thickness, the length or the diameter as well as the shore hardness of the test samples. Table 4 shows the individual results.

The changes in the tested properties are within the tolerable range and the test samples can therefore be classified as resistant to rumen fluid under normal use.

Table 4:
Change in material properties – individual results

Change in material properties in % from the initial state before treatment (average of 3 measurements)						
Component	**Medium**	**Weight**	**Shore hardness**	**Thickness**	**Length or diameter**	**Evaluation**
Temperature 40 °C						
Bolus case	L1*	0.13	2.7	0.21	< 0.01	resistant
Bolus cap	L1*	0.08	0.7	0.33	< 0.01	resistant
Bolus case	L2**	0.14	0.5	0.27	< 0.01	resistant
Bolus cap	L2**	0.08	2.1	0.76	< 0.01	resistant
Temperature 60 °C						
Bolus case	L1*	0.19	1.4	0.18	< 0.01	resistant
Bolus cap	L1*	0.11	< 0.1	0.99	< 0.01	resistant
Bolus case	L2**	0.14	2.3	0.55	< 0.01	resistant
Bolus cap	L2**	0.11	< 0.1	0.33	< 0.01	resistant

* L1 = artificial rumen fluid pH 6.2 / ** L2 = artificial rumen fluid pH 5.2

Summary

The DLG test included chemical tests in the chemical-technical laboratory. The chemical material resistance of individual components to an artificially produced rumen fluid was examined.

The two components tested, plastic case and the plastic cap from smaXtec animal care GmbH, proved to be resistant to an artificially produced rumen fluid. The test mark DLG-APPROVED in individual criteria is awarded for the characteristic “rumen fluid resistance”.

Other criteria were not tested.

Further information

Testing agency

DLG TestService GmbH,
Groß-Umstadt location, Germany

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

DLG test method

Material resistance test “Artificial rumen juice” (current as of 09/2021)

Department

Agriculture

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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.

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Internal test code DLG: 2108-0038

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