

DLG Test Report 6905

MMP Corporation LTD

Stretch film

white, 25 µm



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MONITORING**

DLG Certificate 6905



Overview

The DLG QUALITY MARK test seal is awarded to agricultural equipment that has passed a comprehensive DLG usability test. A DLG usability test is carried out to independent and recognized test criteria. The DLG QUALITY MARK test provides a neutral assessment of the essential features of the product, from performance capability and animal welfare, to stability, occupational and functional safety. These tests are performed in the lab and under a range of operating conditions and rate how the test candidate performs during practical testing on the farm. The specific test conditions and procedures are defined by an independent test commission and described in a test framework which also defines the parameters for evaluation. The test conditions and procedures as defined are revised on an ongoing basis so they reflect what is acknowledged by the current state of the art and to the latest scientific findings and agricultural insights and requirements. The tests are performed in accordance with procedures that allow an objective assessment based on reproducible results. After a product has passed the test, a test report is produced and published and the quality mark is awarded to the product.



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The DLG QUALITY MARK test consists of technical measurements that are carried out on test stands and at the lab on the one hand and of performance tests that are carried out in the field on the other. In this test, the roll length of the film was measured on the test stand. The lab tests included strain, elongation and tensile strength at break, puncture force and tear growth force, relaxation behaviour, cling, oxygen permeability and weathering resistance. All tests were carried out in accordance with the DLG test programme on linear low-density polyethylene stretch film (PE-LLD) as dated November 2017.

The product

Anmelder

MMP Corporation LTD, 3075/1-2 SUKHUMVIT ROAD BANG CHAK PHRA KHANONG,
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Produkt:

MMP stretch film (white, 25 µm)

Contact:

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Description and technical data

The product is a white stretch film, 25 µm thick, made of linear low-density polyethylene (PE-LLD).

The film roll is packed in a cardboard box to protect it from damage during transport.

Table 1:

Specifications (manufacturer information)

| Dimensions and weights | |
|--|----------|
| Rated thickness | 25 µm |
| Length | 1,500 m |
| Width | 75 cm |
| Weight per packaged film roll (75 cm wide) | 26.86 kg |

Assessment in brief

The white and 25 µm MMP stretch film was tested at the lab for its mechanical, physical, chemical and aging properties and roll length. Ease of handling was assessed in a practical test.

Table 2:
Summary of test results

| Parameter tested | Test result | DLG requirement |
|---|---|---|
| Suitability | | |
| | The white and 25 µm MMP stretch film is suitable for wrapping silage bales. | suitable |
| Film dimensions | | |
| | The length and width measured on the test stand were identical with the manufacturer information. Roll length at 1,500 m rated length: 1,566 m | ≥ rated length ≥ 98 % rated width |
| Film thickness | | |
| | Average thickness: 0.026 mm | 0.022 < d < 0.029 mm |
| Material properties | | |
| | The stretch film is white and free of waviness and pores. | uniform colouring; free of waviness and pores |
| Tensile strength in new condition, mechanical properties | | |
| – Strain at 65 % longitudinal stretch | 11.3 N/cm ² | ≥ 10 N/cm ² |
| – Strain at 70 % longitudinal stretch | 11.3 N/cm ² | ≥ 10 N/cm ² |
| – Elongation at break | longitudinal 482 % crosswise 743 % | ≥ 400 % |
| – Tensile strength at break | longitudinal 25.4 N/mm ² crosswise 25.3 N/mm ² | ≥ 10 N/cm ² |
| – Puncture resistance at 80 % stretch | from inside 18.2 N from outside 18.5 N | ≥ 10 N |
| – Tear growth force | longitudinal 2.9 N | ≥ 1.8 N |
| – Relaxation behaviour. Loss of force after 0.1 h at 80 % stretch | longitudinal 34.1 % | < 40 % |
| – Cling | 0.07 N | ≥ 0.05 N |
| Oxygen permeability | | |
| Oxygen permeability at 0.2 barr | 1681 cm ³ /(m ² ·d) in 24 h | < 1800 cm ³ /(m ² ·d) in 24 h |
| Tensile strength after aging/weathering resistance | | |
| Elongation at break | longitudinal 497 % | ≥ 350 % |
| Loss relative to new condition | longitudinal 3.1 % | < 30 % |

The method

Suitability

The suitability, usability and application of the stretch film are assessed in practical use.

Film dimensions

The width of the film is measured with a calibrated tape measure. The roll length is measured on a film roll test stand with the film not pre-stretched.

Film thickness

The thickness of the film is measured to DIN 53370:2006-11, Method P at + 23 °C.

Material properties

The film is visually inspected for uniform colouring, waviness and pores.

Tensile strength and mechanical properties

Critical parameters for determining tensile strength and the mechanical properties of stretch film are strain, elongation at break, tensile strength at break, puncture force, tear growth force, relaxation behaviour and cling.

Longitudinal strain at 65 % stretch on square bales and at 70 % stretch on round bales and elongation at break and tensile strength at break (both longitudinally and crosswise) are tested to DIN EN ISO 527-3:2003-07 at +23 °C and at a rate of 500 mm/min. The type of the sample is Type 2; the extent of deformation is measured between two marks and on new film.

The puncture force (at 80 % stretch) is measured to DIN EN ISO 12236 : 2006-11 using a 12.5 mm diameter mandrel with its tip chamfered to 60°.

Tear growth force is measured to DIN ISO 34-1 : 2004-07, Method B, Procedure (b).

The relaxation behaviour (drop of force after 6 min at 80 % stretch) is measured to DIN EN ISO 527-3 : 2003-07.

Cling is measured in a peeling test with the inside surface on the outside surface; the film is not stretched, the temperature is +23 °C; the width of the sample is 50 mm; the test rate is 50mm/min.

Oxygen permeability

Oxygen permeability is measured on unstrained film and on a single-layer wrap to DIN 53380-3 : 1998-07; oxygen at +23 °C and 0.2 bar.

Aging and weathering resistance

Weathering is tested according to DIN EN ISO 4892-2, Procedure A.

Continued quality monitoring by DLG

The quality of the product is monitored annually as part of the DLG monitoring programme.

In addition, the manufacturer is required to monitor their internal production processes to ensure a consistent quality of the product.

Detailed account of the test results

Suitability

The MMP stretch film (white, 25 µm) is suitable for wrapping silage bales.

The film performed well during a field application in the 2018 season.

Film dimensions

The length and width as measured in the test were identical with the manufacturer information.

The roll length measured was 1,566 m, the width measured was 75 cm.

Film thickness

The mean thickness measured 0.026 mm.

The smallest measurement was 0.025 mm; the highest measurement was 0.027 mm.

These measurements comply with the DLG requirements for average film thickness and are within the permissible range of deviation from the mean value.

Material properties

The film is white and free of waviness and pores.

Tensile strength and mechanical properties

Longitudinal strain at 65 % and 70 % stretch was 11.3 N/mm² (10.0 N/mm² min. requirement for each stretch percentage).

The longitudinal elongation at break was 482 %; the crosswise elongation at break was 743 %.

Both percentages exceed the required minimum elongation of 400 %. The longitudinal tensile strength at break was 25.4 N/mm², the crosswise tensile strength at break was 25.3 N/mm². This is higher than the required minimum of 10.0 N/mm².

The puncture force at 80 % stretch was 18.2 N when applied from the inside and 18.5 N when applied from the outside of the film (10.0 N min. requirement for each test). The longitudinal tear growth force was 2.9 N, hence better than the min. requirement of 1.8 N.

The longitudinal relaxation (the loss of force after 0.1 h at 80 % stretch) was 34.1 %, which is less than the required maximum value of 40 %.

The clinging force was 0.07 N and higher than the required minimum of 0.05 N for film with integral adhesive particles.

As a result, the film complied with all DLG requirements as to tensile strength and mechanical properties.

Oxygen permeability

The oxygen permeability (one layer, unstretched) at 0.2 bar was 1,681 cm³/(m²·d) which is less than the tolerated maximum permeability (1,800 cm³/(m²·d) in 24 h).

Aging and weathering resistance

After simulating a 12-month exposure to natural weathering and 2000 MJ/m², the longitudinal elongation at break was 497 % (min. requirement is 350 %). This translates into a 3.1 % reduction of its resistance to break when elongated. This result compares to a permissible reduction of 30 % of the new film and proves that the film is resistant to weathering.

Summary

The criteria tested in this DLG QUALITY MARK test were the mechanical, physical and aging properties of the white and 25 µm MMP stretch film which was tested on the test stand, at the lab and in the field.

These tests have shown that the mechanical, physical and aging characteristics of the white and 25 µm MMP stretch film meet all requirements.

More information

Test implementation

DLG TestService GmbH, Gross-Umstadt location
The tests are conducted on behalf of DLG e.V.

DLG test scope

DLG quality seal
“The DLG testing scheme for linear
low-density polyethylene stretch film (PE-LLD)”
Date of issue 11/2017

Special tests carried out at

SKZ – Testing GmbH, Friedrich-Bergius-Ring 22,
97076 Würzburg

Kunststoff-Zentrum in Leipzig gGmbH,
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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 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.

Internal test code DLG: 2016-998

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