



SLOVENSKI STANDARD
oSIST prEN 14932:2024
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Polimerni materiali - Raztegljive plastomerne folije za zavijanje v bale

Plastics - Thermoplastic stretch films for wrapping silage bales

Kunststoffe - Thermoplastische Stretchfolien zum Umwickeln von Silage-Ballen

Plastiques - Films thermoplastiques étirables pour l'enrubannage de balles d'ensilage

Ta slovenski standard je istoveten z: prEN 14932

ICS:

55.040	Materiali in pripomočki za pakiranje	Packaging materials and accessories
83.140.10	Filmi in folije	Films and sheets

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Plastics - Thermoplastic stretch films for wrapping silage bales

Plastiques - Films thermoplastiques étirables pour l'enrubannage de balles d'ensilage

Kunststoffe - Thermoplastische Stretchfolien zum Umwickeln von Silage-Ballen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 249.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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prEN 14932:2024 (E)

European forward

This document has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by SIS.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14932:2018.

EN 14932:2018 includes the following significant technical changes with respect to EN 14932:2018:

- Clause 4 on materials has been added;
- Clauses 10, 11 and 12 on designation, marking and instructions for storage, installation and use of silage stretch films, respectively, have been modified;
- Clause 13 on the design-for-recycling of end of life of silage stretch films has been added;
- Clause 14 on removal and collection instructions of used silage stretch films has been modified, referring to prEN 18109¹ for additional information;
- the informative Annex F on the determination of oxygen permeability and airtightness on an artificial bale, and the informative Annex H on guidance for use and disposal of stretch films, of the previous edition, have been deleted;
- the informative Annex G on the determination of adhesion characteristic has been modified to become normative Annex E on the determination of tightening force.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

¹ Under preparation

Introduction

The biological and practical requirements for silage stretch films and the interactions with the machinery, used for the wrapping and handling of round bales and square bales, have been considered for the design of this document. However, it is difficult to simulate in laboratory conditions some parameters like leak tightness, oxygen permeability, temperature and the manner they interact.

In order to obtain silage of high quality it is essential to reduce unwanted microbiological activities to very low levels. It is necessary to limit the penetration of oxygen of air inside the bale in order to create the best conditions for conservation. Consequently, the wrapped bale should be as gas tight as possible.

There are discussions regarding how the temperature inside the bale will influence how different types of “good” and “bad” microbiological activities will develop in forage. Although the film can be made of any colour, it is a fact that the pigmentation or colour itself will influence the temperature inside the bale, due to sun-radiation. Therefore, this document also includes a method for the determination of the solar reflectance of stretch films [1].

This document defines the criteria for design for recycling of silage stretch films.

End-of-life management is not covered in this document, as it is under the scope of prEN 18109:2024² Clause 4 and 5.

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² Under preparation

prEN 14932:2024 (E)**1 Scope**

This document specifies the requirements for dimensional, mechanical, oxygen transmission rate and optical characteristics of thermoplastic stretch films for wrapping bales used for ensiling of forage. It specifies a measurement for solar reflectance of the films.

This document specifies also test methods to check these requirements.

This document is applicable to white, black, or coloured films based on polyethylene materials. It covers the width range from 250 mm up to 1 500 mm.

The performances of the stretch films in conformance with this document are based on the use of at least six layers of films, pre-stretched at a ratio between 60 % and 70 % for round bales and a ratio of 55 % and 65 % for wrapping square bales.

This document also gives guidance for design for recycling.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 527-1, *Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1)*

EN ISO 527-3:2018, *Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets (ISO 527-3:2018)*

EN ISO 1133-1, *Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method (ISO 1133-1)*

EN ISO 4892-2:2013, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)*

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EN ISO 6383-2, *Plastics - Film and sheeting - Determination of tear resistance - Part 2: Elmendorf method (ISO 6383-2)*

EN ISO 7765-1, *Plastics film and sheeting - Determination of impact resistance by the free-falling dart method - Part 1: Staircase methods (ISO 7765-1)*

EN ISO 13468-2, *Plastics - Determination of the total luminous transmittance of transparent materials - Part 2: Double-beam instrument (ISO 13468-2)*

ISO 4592, *Plastics — Film and sheeting — Determination of length and width*

ISO 4593, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*

ISO 9845-1:2022, *Solar energy — Reference solar spectral irradiance at the ground at different receiving conditions — Part 1: Direct normal and hemispherical solar irradiance for air mass 1,5*

ISO 15105-2:2003, *Plastics — Film and sheeting — Determination of gas-transmission rate — Part 2: Equal-pressure method*

ISO 22095, *Chain of custody — General terminology and models*

prEN 18109:2024,³ *Agricultural plastic products — Installation, use, removal, sorting, collection, preparation for recycling and design-for-recycling guidelines*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

width

total film width when laid flat

Note 1 to entry: It is expressed in millimetres, *mm*.

3.2

nominal width

W_0

film width, as declared by the manufacturer

Note 1 to entry: It is expressed in millimetres, *mm*.

3.3

nominal thickness

film thickness, as declared by the manufacturer

Note 1 to entry: It is expressed in micrometres, μm .

3.4

film length

largest dimension of a film corresponding to the length of the unwinded roll (or reel)

Note 1 to entry: It is expressed in metres, *m*.

3.5

nominal length

L_0

length of the film, as declared by the manufacturer

Note 1 to entry: It is expressed in metres, *m*.

3.6

longitudinal direction

MD

direction parallel to the film length corresponding to the extrusion direction

³ Under preparation

prEN 14932:2024 (E)**3.7****transverse direction****TD**

direction parallel to the film width, at right angles to the length

3.8**core protrusion** **C_p**

distance from the edge of a roll to the edge of its core

Note 1 to entry: It is expressed in millimetres, *mm*.

3.9**neck-in** **N_i**

shrinkage of a film in the transverse direction (TD) induced by stretching the film in longitudinal direction (MD)

Note 1 to entry: It is expressed as a percentage, %.

3.10**radiant exposure****H**

time integral of irradiance

Note 1 to entry: It is expressed in ($J \cdot m^{-2}$)

[SOURCE: ISO 9370:2017, 3.27] [2]

3.11**mantle film****net replacement film**

film which is by materials and process similar to the stretch film for wrapping bales but has the purpose to hold together the bale instead of a conventional net wrap

3.12**design for recycling****DFR**

design of product, including the related accessories, in order to ensure its recyclability under the current practices of removal, sorting, collection and recycling systems

Note 1 to entry: The purpose with the design for recycling criteria is to be able to use the recyclates back in the same product, independent of producer of material.

[SOURCE: prEN 18109:2024, 3.1.14]

3.13**mechanical recycling**

processing of plastic waste into secondary raw materials or products without significantly changing the chemical structure of the material

Note 1 to entry: Plastics secondary raw material is a synonym of recyclate.

[SOURCE: EN ISO 472:2013[3], 2.1697, modified — Note 1 to entry changed; “plastics waste” changed to read “plastic waste”] [4]

3.14

post-consumer plastic

plastic, generated by the end-users of products, that has fulfilled its intended purpose and can no longer be used for its intended purpose

Note 1 to entry: The term “post-use” is sometimes used synonymously

Note 2 to entry: Often abbreviated as PCR

[SOURCE: EN 17615:2022 [4], 3.192, modified]

3.15

pre-consumer plastic

material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it

3.16

recycled content

proportion, by mass, of recycled plastic in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content, consistent with the following usage of terms

3.17

controlled blending model

chain of custody model in which materials or products with a set of specified characteristics are mixed according to certain criteria with materials or products without that set of characteristics resulting in a known proportion of the specified characteristics in the final output

Note 1 to entry: The adhered claim may refer to a certain percentage, at batch-level and /or site-level.

[SOURCE: ISO 22095:2020, 3.3.3]

3.18

national collection scheme

NCS

voluntary or mandatory national collection system of defined plastic fractions used in agriculture or horticulture applications

4 Materials

Stretch films for wrapping silage bales and mantle films/net replacement films according to this document are manufactured from polyethylene, copolymers thereof and additives.

The product shall be suitable for mechanical recycling as a PE fraction, according to the design for recycling defined in Clause 12.

Recycled content in the film shall be verified with ratio of post-consumer plastic recyclates and/or pre-consumer plastic recyclates following a controlled blending model according to ISO 22095.

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The core, which is a part of the stretch film product, enables winding of the stretch film in production and wrapping of the bales. The core shall be recyclable and clearly marked for which material fraction to be sorted.

5 Solar reflectance

The solar reflectance shall be determined according to Annex C by using one layer of unstretched film [2].

The solar reflectance shall be declared by the manufacturer.

6 Durability

The durability of stretch forage films shall be declared by the manufacturer in kLy⁴.

The duration of exposure of the film shall be determined by an artificial weathering using xenon-arc lamps, conforming to 8.11, which induces a decrease of the value of tensile strain at break equal or less than 50 % of the initial value.

Other light sources may be used provided that a correlation between the test results obtained with these light sources and these obtained after a natural exposure can be demonstrated. Details of these methods are given in Annex A.

NOTE A numerical correlation between durability of stretch films exposed to artificial weathering and natural exposure is given in Annex B.

7 Requirements

7.1 General requirements

Stretch silage films shall fulfil the requirements given in Table 2. Mantle films/Net replacement films shall fulfil the requirements given in Table 3.

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⁴ 1kLy = 0,04184 GJ/m²