SLOVENSKI STANDARD
SIST EN 13207:2018

01-maj-2018

Nadomešča:
SIST EN 13207:2002

Polimerni materiali - Termoplastične silažne folije in cevi za uporabo v kmetijstvu

Plastics - Thermoplastic silage films and tubes for use in agriculture

Kunststoffe - Thermoplastische Silofolien und -schläuche für den Einsatz in der Landwirtschaft

Plastiques - Films d'ensilage thermoplastiques et gaines pour utilisation en agriculture

Ta slovenski standard je istoveten z: EN 13207:2018

ICS:

65.040.20	Poslopja in naprave za predelavo in skladiščenje kmetijskih pridelkov	Buildings and installations for processing and storage of agricultural produce
83.140.10	Filmi in folije	Films and sheets

SIST EN 13207:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13207

February 2018

ICS 83.140.10

Supersedes EN 13207:2001

English Version

Plastics - Thermoplastic silage films and tubes for use in agriculture

Plastiques - Films d'ensilage thermoplastiques et gaines pour utilisation en agriculture

Kunststoffe - Thermoplastische Silofolien und -schläuche für den Einsatz in der Landwirtschaft

This European Standard was approved by CEN on 10 December 2017.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 13207:2018 E

Contents

Page

European foreword

This document (EN 13207:2018) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2018 and conflicting national standards shall be withdrawn at the latest by August 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13207:2001.

The following technical changes have been made in comparison to EN 13207:2001:

— the scope is extended to installation and removal conditions and the intended use for the applications is specified in extended way;

— Clause 4 Types and use, has been added;

— in Clause 5 Material, the barrier polymer, has been added;

— a new Clause 6 Durability, has been drafted on the basis of the old Clause 5 Duration of the silage film;

— the Clause for requirements, test methods, acceptance, storage and handling have been drafted in a new frame;

— the Clauses on instructions disposal of silage films and end-of-life, have been added.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the requirements related to dimensional, mechanical and optical characteristics of thermoplastic films and tubes used during the manufacture of silage and designed to last at least one year for protecting fodder.

It specifies a classification for the durability of silage films and the test methods referred to in this standard.

This European Standard is applicable to transparent, black, white or coloured (e.g. black/white) thermoplastic silage films based on polyethylene, ethylene copolymer, EVOH and polyamide.

These films are intended for covering bunker silos, silage tubes or silage clamps for preserving forage. They protect the forage and preserve it from rain and air. These films are not intended to cover bales piles (e.g. straw bales and hay bales).

Silage films obtained by sealing two or more films in machine direction are out of the scope of this document.

This European Standard also defines installation, use and removal conditions of silage films. It defines the conventional useful lifetime, as well as rules that allow evaluating the remaining use potential in the event of a failure before the normal end-of-use date.

NOTE These rules allow estimating the residual value of the films. These provisions only apply to the film itself and the damage it has undergone. Any other problem falls within the scope of professional practices and the general terms and conditions of sale.

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 527-3:1995, *Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets (ISO 527-3:1995)*

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

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)*

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

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

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

3 Terms and definitions

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

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

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

3.1
width
overall width of the film when laid flat

Note 1 to entry: It is expressed in millimetres (mm).

3.2
nominal width
width of the film, as declared by the manufacturer/supplier

Note 1 to entry: It is expressed in millimetres (mm).

3.3
nominal thickness
thickness of a film, as declared by the manufacturer/supplier

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

3.4
roll length
largest dimension of a film corresponding to the length of the unwinded roll

Note 1 to entry: It is expressed in metres (m).

3.5
nominal length
length of a film roll or a sheet, as declared by the manufacturer/supplier

Note 1 to entry: It is expressed in metres (m).

3.6
nominal mass
mass of a roll or a sheet, as declared by the manufacturer/supplier

Note 1 to entry: It is expressed in kilograms (kg).

3.7
longitudinal direction
MD
direction parallel to the roll length, corresponding to the extrusion direction

3.8
transverse direction
TD
direction parallel to the width (at right angle to the length)

3.9
conventional expected lifetime
expected lifetime defined by agreement between the manufacturer/supplier and the customer or, by default, minimum twelve months

Note 1 to entry: It is expressed in years or months.

3.10
radiant exposure
H
time integral of irradiance

Note 1 to entry: It is measured in joules per square metre ($J \cdot m^{-2}$).

[SOURCE: ISO 9370:2017, 3.27[1]]

4 Types and use

The different types of silage films are given in Table 1.

Table 1 — Types of films

Type	Characteristics
SA	Film or tube with a nominal thickness ≥ 90 µm suitable for food contact
SB	Film or tube with a nominal thickness ≥ 100 µm not suitable for food contact
SC	Film with a nominal thickness ≥ 35 µm used as lining in combination addition to a type A or B silage film
SD	Film or tube with a thickness ≥ 90 µm having at least one coextruded layer made from a gas barrier polymer (e.g. EVOH or polyamide)
SE	Film with a nominal thickness ≥ 35 µm having at least one coextruded layer made from a gas barrier polymer used as lining in combination addition to a type A or B silage film

5 Material

Silage films in accordance with this standard are usually manufactured from:

— low density polyethylene (PE-LD), linear low density polyethylene (PE-LLD) and their blends;

— ethylene vinyl acetate copolymers (EVAC) and their blends with PE-LD or PE-LLD;

— ethylene butyl acrylate copolymers (EBAK) and their blends with PE-LD or PE-LLD;

— gas barrier polymer, e.g. EVOH or polyamide.

6 Durability

The durability of silage films is characterized by the class C0, C1 or C2. This classification, given in Table 2, is depending on the duration of exposure of the film to an artificial weathering using xenon-arc lamps according to 8.5, which induces a decrease of the value of tensile strain at break equal or less than 50 % of the initial value.

The class of durability shall be declared by the manufacturer/supplier.

Table 2 — Resistance to weathering classification

Class	Minimum duration of exposure h
C0[a]	140
C1	1 400
C2	2 100
[a] For Type SC and SE film, only.	

For C1, corresponding to a duration of natural exposure of 12 months for a film used in a climatic zone ≤ 130 kly/year[1)]

For C2 corresponding to a duration of natural exposure of 12 months for a film used in a climatic zone between 131 kly/year and 160 kly/year and of 18 months for a film used in a climatic zone ≤ 130 kly/year[1)].

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. This may be useful when the durations of the exposure to xenon-arc lamps as defined in Table 2 are too long. Details of these methods are given in Annex A (informative).

In case of dispute, the exposure to xenon-arc lamps according to 8.5 and the classification according to Table 2 shall be used.

7 Requirements

7.1 General requirements

Silage films shall fulfil the requirements of Table 3.

1) 1 kly = 0,041 84 GJ/m^2.

Table 3 — Requirements for silage films and tubes

Characteristics	Unit	Type					Test method
		SA	SB	SC	SD	SE	Clause
Nominal thickness	µm	**≥ 90**	**≥ 100**	**≥ 35**	**≥ 90**	**≥ 35**	
Appearance	-	Shall conform to 7.2					7.2
Dimensional characteristics							
Tolerance of average thickness/nominal thickness	%	±5					8.1
Tolerance of single point thickness/nominal thickness	%	from – 20 to 20	- 20	from – 20 to 25	from – 20 to 20	from – 20 to 25	8.1
Width tolerance/ nominal width	%	±2					8.2
length tolerance/ nominal length	%	−1, +2					8.2
Mechanical characteristics of unexposed film							
Tensile stress at break (MD, TD)	MPa	≥ 22	≥ 17	≥ 20	≥ 20	≥ 20	8.3
Tensile strain at break:	%						8.3
MD		≥ 400	≥ 300	≥ 350	≥ 350	≥ 350	
TD		≥ 500	≥ 400	≥ 450	≥ 450	≥ 450	
Impact resistance							
Flat area F50	g	≥ 500	≥ 250	≥ 100	≥ 350	≥ 100	8.4.2
Fold area (no break)	g	≥ 200	≥ 100	≥ 50	≥ 100	≥ 50	8.4.3
Oxygen transmission rate[a]	$cm^3/(m^2$ 24 h bar [b])	ns	ns	ns	≤ 150	≤ 150	8.6

ns = not specified

[a] A commonly used unit for the oxygen gas transmission rate is the cm^3 (STP)/(m^2 · d) at one atmosphere pressure differential, where: 1 cm^3 at Standard Temperature and Pressure (STP = 273,15 K; 1,013 × 10^5 Pa) is 44,62 µmol and one day is 86,4 × 10^3 s. The oxygen transmission rate in mol/(m^2 · s · Pa) is abstained multiplying the value in cm^3 (STP)/(m^2 · d) by 5,165 × 10^{-10}.

[b] 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

7.2 Requirements for appearance

The film shall be free of holes which will affect the fitness for purpose of the film; check by unrolling at least 2 m of the film and examining it against the light holding it tight at arms' length.

8 Test methods

8.1 Determination of thickness

The thickness of single points of the film and the average thickness of the film shall be determined in accordance with ISO 4593. The test is performed using one strip of film cut in transverse direction of the roll (TD).

8.2 Determination of width and length of the film

The width and the length of the film shall be determined in accordance with ISO 4592.

8.3 Determination of tensile characteristics

The tensile characteristics shall be determined according to EN ISO 527-1 and EN ISO 527-3 using five test pieces type 2 (see Figure 1 of EN ISO 527-3:1995), 10 mm wide, cut in each direction of the film [longitudinal direction (MD) and transversal direction (TD)], at a testing speed of 500 mm/min.

Calculate the arithmetic average value of the five measurements.

8.4 Determination of impact resistance

8.4.1 General

In case of a folded film, a distinction shall be made between the test pieces taken from the folds produced during extrusion process (fold area) and sample sheets taken from areas which have not been folded (flat area)

NOTE Films which are wider than 2 000 mm are usually folded lengthwise at least once before winding on a reel. These folds are retained even when the film is laid out flat, and this can affect test results

8.4.2 Flat area

The impact resistance (Dart drop test) in flat area shall be determined in accordance with EN ISO 7765-1, method A.

Calculate the impact failure mass m_f, in grams, in accordance with EN ISO 7765-1.

The impact failure mass m_f shall fulfil the requirements of Table 3.

8.4.3 Fold area

The impact resistance (Dart drop test) in fold area shall be determined using the apparatus specified in EN ISO 7765-1, method A.

Spread out the film with the marked face onto the apparatus and test every folds tangentially twice, alternately internal and external folds, with a mass as specified in Table 3. The tangential test is obtained by shifting forward the fold of 13 mm from the vertical axle of the specimen clamp. See Figure 1.

If no failure occurs, the result is declared “pass”.

If one failure occurs, carry out two additional tests on the fold which failed in the same position (internal or external fold). Then, if no failure occurs, the result is declared “pass” and if one or two failure(s) occur(s), the result is declared “fail”.

If two failures occur, the result is declared “fail”.