INTERNATIONAL STANDARD

ISO 11833-2

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Plastics — Unplasticized poly(vinyl chloride) sheets — Types, dimensions and characteristics —

Part 2:
Sheets of thickness less than 1 mm

Plastiques — Feuilles en poly(chlorure de vinyle) non plastifié — Types, dimensions et caractéristiques —

Partie 2: Feuilles et films d'épaisseur inférieure à 1 mm

Reference number
ISO 11833-2:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11833-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

ISO 11833 consists of the following parts, under the general title *Unplasticized poly(vinyl chloride) sheets — Types, dimensions and characteristics*:

— *Part 1: Sheets of thickness not less than 1 mm*

— *Part 2: Sheets of thickness less than 1 mm*

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Plastics — Unplasticized poly(vinyl chloride) sheets — Types, dimensions and characteristics —

Part 2:
Sheets of thickness less than 1 mm

1 Scope

1.1 This part of ISO 11833 specifies requirements for sheets and films of unplasticized poly(vinyl chloride) (PVC-U) and the test methods to be used to measure the required values.

1.2 It applies only to sheets of thickness less than 1,0 mm.

1.3 It does not cover thermoshrinkable or biaxially stretched PVC-U sheets and films.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 11833. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11833 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 75-2:1993, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite.*

ISO 291:1997, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 306:1994, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST).*

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

ISO 1163-1:1995, *Plastics — Unplasticized poly(vinyl chloride) (PVC-U) moulding and extrusion materials — Part 1: Designation system and basis for specifications.*

ISO 2818:1994, *Plastics — Preparation of test specimens by machining.*

ISO 2859-1:—[1)], *Sampling procedures for inspection by attributes — Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection.*

ISO 8256:1990, *Plastics — Determination of tensile-impact strength.*

ISO 11501:1995, *Plastics — Film and sheeting — Determination of dimensional change on heating.*

1) To be published. (Revision of ISO 2859-1:1989)

3 Material

Sheets shall be fabricated from unplasticized PVC compounds as defined in ISO 1163-1:1995, subclause 1.3. Compounds may contain additives such as stabilizers, lubricants, processing aids, impact modifiers, flame retardants and colourants. Compounds and additives of unknown identity and composition shall not be used for the processing of sheets.

NOTE — Legal considerations may cause a specific choice of compound.

4 Classification

Sheets are classified into four groups (three of which are subdivided into two classes) by the numerical values of the two most important properties, i.e. the tensile impact strength and the Vicat softening temperature (see table 3).

5 Requirements

5.1 Appearance

The surface shall be free of noticeable flaws, cracks, mottling, voids, bubbles, impurities and other defects which are not acceptable for the application envisaged. The sheet shall have a smooth surface, except for embossed sheets which shall have a uniform pattern. Any further requirements concerning appearance shall be agreed between the interested parties.

5.2 Colour

Colourants shall be distributed uniformly throughout the material. Admissible differences in colour within a sheet and amongst sheets shall be agreed between the interested parties as required.

5.3 Dimensions

5.3.1 Length, width and rectangularity

The length and width of sheets shall be agreed between the interested parties. The tolerances on the dimensions and the rectangularity shall be as specified in table 1.

Table 1 — Tolerances on length, width and rectangularity

Dimensions in millimetres

Dimension/rectangularity		Tolerance
Length	Flat sheet	$+\,^{20}_{0}$
	Rolled sheet	Minus not accepted
Width		$+\,^{5}_{0}$
Rectangularity	Flat sheet	$\Delta l \leq 4$ mm per 1 000 mm of side

5.3.2 Thickness

The tolerance on the thickness shall be as specified in table 2.

Table 2 — Tolerances on thickness

Nominal thickness, d mm	Tolerance %
$d \leqslant 0{,}03$	± 40
$0{,}03 < d \leqslant 0{,}05$	± 30
$0{,}05 < d \leqslant 0{,}1$	± 20
$0{,}1 < d \leqslant 0{,}3$	± 15
$0{,}3 < d \leqslant 0{,}5$	± 13
$0{,}5 < d < 1{,}0$	± 10

5.4 Properties

The properties of sheets of each group and class shall be as specified in table 3.

Table 3 — Properties of sheets

Property	Test method	Unit	Requirements							See subclause
			Group 1		Group 2		Group 3		Group 4	
			Class 1	Class 2	Class 1	Class 2	Class 1	Class 2		
Tensile stress at yield	ISO 527-3 Type 1B 50 mm/min	MPa	⩾ 40	⩾ 40	⩾ 40	⩾ 40	⩾ 40	⩾ 40	⩾ 40	6.4.1
Nominal strain at break	ISO 527-3 Type 1B 50 mm/min	%	⩾ 20	⩾ 20	⩾ 20	⩾ 20	⩾ 20	⩾ 20	⩾ 20	6.4.1
Tensile impact strength	ISO 8256 Method A Type 3	kJ/m^2	—	—	⩾ 300	⩾ 300	⩾ 400	⩾ 400	—	6.4.2
Vicat softening temperature	ISO 306 Method B	°C	⩾ 60	⩾ 70	⩾ 60	⩾ 70	⩾ 60	⩾ 70	⩾ 90	6.5

The requirements for the optional properties given in table 4 shall be agreed between the interested parties as required.

Table 4 — Optional properties

Property	Test method	Unit
Temperature of deflection under load	ISO 75-2 Method A	°C
Dimensional change on heating	ISO 11501	%

5.5 Chemical and physiological properties

5.5.1 Flammability

Requirements for flammability shall be agreed between the interested parties as required. Relevant national and international standards shall be considered in the agreement.

5.5.2 Chemical resistance

Requirements for chemical resistance for specific applications shall be agreed between the interested parties as required.

5.5.3 Physiological behaviour

Requirements for physiological behaviour shall be agreed between the interested parties as required. The relevant legislation shall be taken into consideration if the sheet will come into contact with food.

6 Test methods

6.1 General

6.1.1 Sampling

Take a sample sufficient to determine the compliance of the material with this specification. The sampling procedure given in ISO 2859-1 is recommended.

6.1.2 Preparation of specimens

Prepare all specimens in accordance with ISO 2818. Prepare the specimens for tensile strength, tensile impact strength and dimensional change on heating by stamping or cutting. The surface of the specimens shall be free of any damage or faults in order to avoid notch effects. Should any burrs be present on a specimen, remove them without damaging the surface.

6.1.3 Conditioning and testing of specimens

Unless otherwise specified in the applicable test method, carry out testing in one of the standard atmospheres specified in ISO 291, after conditioning the specimens for at least 16 h in the same atmosphere.

6.2 Appearance examination

Examine the surfaces and cut edges with the naked eye from a distance of 60 cm for noticeable flaws, cracks, mottling, voids, bubbles, impurities and other defects, inspecting the sheet in the direction opposite to that of the incident light.

6.3 Dimensions

6.3.1 Measure the length, width and diagonals of the sheet to the nearest 1 mm, using a calibrated ruler.

6.3.2 Measure the thickness to the nearest 0,01 mm, using a calibrated thickness gauge.

6.3.3 Rectangularity

Determine the rectangularity Δl as shown in figure 1.

Dimensions in millimetres

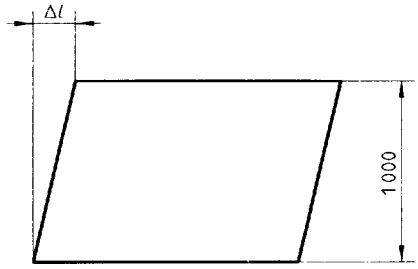


Figure 1 — Rectangularity

6.4 Mechanical properties

6.4.1 Tensile stress at yield and nominal strain at break

Determine the tensile stress at yield and the nominal strain at break in accordance with ISO 527-3, using at least five type 1B specimens for each direction and a test speed of 50 mm/min.

6.4.2 Tensile impact strength

Determine the tensile impact strength in accordance with ISO 8256.

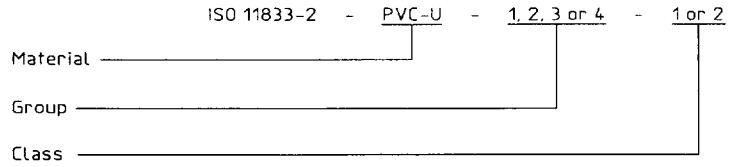
6.5 Vicat softening temperature

Determine the Vicat softening temperature in accordance with ISO 306, Method B.

7 Marking

The following information shall be marked on each package of sheets:

a) the number of this part of ISO 11833, the material and the product designation as shown below:



b) the dimensions;

c) the manufacturer's name and country, and the year and month of manufacture or lot number.

ICS 83.140.10

Descriptors: plastics products, unplasticized polyvinyl chloride, plastic sheets, classification, specifications, dimensions, characteristics, mechanical properties, physical properties, tests, dimensional measurements.

Price based on 5 pages