



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS K 6745 : 2015

(JPSA/JPIF/JSA)

**Plastics—Unplasticized poly (vinyl
chloride) sheets**

ICS 83.140.10

Reference number : **JIS K 6745 : 2015 (E)**

PROTECTED BY COPYRIGHT

Date of Establishment: 1956-07-17

Date of Revision: 2015-12-21

Date of Public Notice in Official Gazette: 2015-12-21

Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area
Technical Committee on Chemical Products and
Analytical Methods

JIS K 6745:2015, First English edition published in 2016-09

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2016

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

PROTECTED BY COPYRIGHT



NH/AT

Documents

Document Sharing Hub

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Plastic Sheet Association (JPSA)/The Japan Plastics Industry Federation (JPIF)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS K 6745:2008** is replaced with this Standard.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Plastics—Unplasticized poly (vinyl chloride) sheets

Introduction

This Japanese Industrial Standard has been prepared based on the third edition of **ISO 11833-1** published in 2012 with some modifications of the technical contents.

The portions given sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JC.

1 Scope

This Standard specifies the requirements for flat extruded sheets and pressed sheets of unplasticized poly (vinyl chloride) (hereafter referred to as “sheets”). It applies only to sheets of thickness not less than 1.0 mm. It does not cover biaxially stretched poly (vinyl chloride) sheets and embossed sheets.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 11833-1:2012 *Plastics—Unplasticized poly (vinyl chloride) sheets—Types, dimensions and characteristics—Part 1: Sheets of thickness not less than 1 mm* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7502 *Micrometer callipers*

JIS B 7503 *Mechanical dial gauges*

JIS B 7507 *Vernier, dial and digital callipers*

JIS B 7512 *Steel tape measures*

JIS B 7516 *Metal rules*

JIS K 6740-1 *Plastics—Unplasticized poly (vinyl chloride) (PVC-U) moulding and extrusion materials—Part 1: Designation system and specifications*

NOTE : Corresponding International Standard: ISO 1163-1:1995 *Plastics—Unplasticized poly (vinyl chloride) (PVC-U) moulding and extrusion materials—Part 1: Designation system and basis for specifications* (MOD)

JIS K 6900 *Plastics—Vocabulary*

JIS K 7100 *Plastics—Standard atmospheres for conditioning and testing*

NOTE: Corresponding International Standard: ISO 291 *Plastics—Standard atmospheres for conditioning and testing* (MOD)

JIS K 7111-1 *Plastics—Determination of Charpy impact properties—Part 1: Non-instrumented impact test*

NOTE: Corresponding International Standard: ISO 179-1 *Plastics—Determination of Charpy impact properties—Part 1: Non-instrumented impact test* (MOD)

JIS K 7114 *Plastics—Methods of test for the determination of the effects of immersion in liquid chemicals*

JIS K 7144 *Plastics—Preparation of test specimens by machining*

NOTE: Corresponding International Standard: ISO 2818 *Plastics—Preparation of test specimens by machining* (IDT)

JIS K 7161-2 *Plastics—Determination of tensile properties—Part 2: Test conditions for moulding and extrusion plastics*

NOTE: Corresponding International Standard: ISO 527-2 *Plastics—Determination of tensile properties—Part 2: Test conditions for moulding and extrusion plastics* (IDT)

JIS K 7206 *Plastics—Thermoplastic materials—Determination of Vicat softening temperature (VST)*

NOTE: Corresponding International Standard: ISO 306:1994 *Plastics—Thermoplastic materials—Determination of Vicat softening temperature (VST)* (MOD)

JIS K 7361-1 *Plastics—Determination of the total luminous transmittance of transparent materials—Part 1: Single beam instrument*

NOTE: Corresponding International Standard: ISO 13468-1 *Plastics—Determination of the total luminous transmittance of transparent materials—Part 1: Single-beam instrument* (IDT)

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in JIS K 6900 apply.

4 Material

Sheets shall be fabricated from unplasticized poly (vinyl chloride) compounds as defined in clause 1 of JIS K 6740-1. Compounds may contain additives such as stabilizers, lubricants, processing aids, impact modifiers, fillers, flame retardants and colourants. Compounds and additives of unknown identity and composition shall not be used for the processing of sheets.

5 Classification

Sheets are classified into extruded sheets (E) and pressed sheets (P) according to the moulding method, and also into non-critical applications (T₁) and critical applications (T₂) according to the thickness tolerance. Further, they are each classified into five groups characterized by the required properties, as shown in Table 1. The tolerances on width of sheets shall be as specified in Table 4 and Table 5. The required properties of each group are shown in Table 6.

Table 1 Classification

Division according to the moulding method	Division according to the thickness tolerance	Division according to the required properties
E: Extruded sheet	T ₁ : Non-critical applications	Group 1: General-purpose grade Group 2: Transparent grade Group 3: High-modulus grade
P: Pressed sheet	T ₂ : Critical applications	Group 4: High-impact grade Group 5: Heat-resistant grade

6 Requirements

6.1 Appearance

The surface shall be free of noticeable flaws, cracks, mottling, voids, bubbles, impurities, colour unevenness (both within one sheet and between sheets) and other defects which are not acceptable for the application envisaged. The sheet shall have a smooth surface.

6.2 Nominal dimensions

6.2.1 Length and width

The nominal length and width of sheets shall be agreed between the interested parties. The tolerances on length and width of sheets shall be as specified in Table 2.

Table 2 Tolerances on length and width

Tolerance on nominal dimensions	
Length	Width
$\begin{smallmatrix} +1 \\ 0 \end{smallmatrix} \%$	$\begin{smallmatrix} +1 \\ 0 \end{smallmatrix} \%$

6.2.2 Rectangularity

The rectangularity of a sheet shall be expressed as the absolute value of the difference in length of the diagonals as shown in Figure 1. The tolerances on rectangularity for representative sheet nominal dimensions shall be as specified in Table 3.

Table 3 Tolerances on rectangularity^{a)}

Unit: mm

Nominal dimensions (Length × width)	Difference between diagonals	
	Extruded sheet (E)	Pressed sheet (P)
1 820 × 910	7 max.	5 max.
2 000 × 1 000	7 max.	5 max.
2 424 × 1 212	9 max.	7 max.
3 000 × 1 500	11 max.	8 max.
4 000 × 2 500	17 max.	13 max.
Note ^{a)} The tolerances specified in this Table assume that the length and width of the sheet comply with Table 2.		

Tolerances on sheets of other nominal dimensions shall be calculated, in millimetres, using the following equations and rounded to the nearest integer.

Extruded sheet (E)

$$|\overline{AC} - \overline{BD}| \leq \sqrt{(\overline{AB} + 4\overline{BC}/1\,000)^2 + \overline{BC}^2} - \sqrt{(\overline{AB} - 4\overline{BC}/1\,000)^2 + \overline{BC}^2}$$

Pressed sheet (P)

$$|\overline{AC} - \overline{BD}| \leq \sqrt{(\overline{AB} + 3\overline{BC}/1\,000)^2 + \overline{BC}^2} - \sqrt{(\overline{AB} - 3\overline{BC}/1\,000)^2 + \overline{BC}^2}$$

where, $|\overline{AC} - \overline{BD}|$: Difference between diagonals

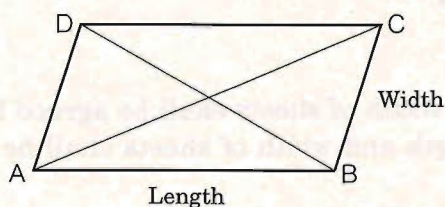


Figure 1 Deviation from rectangularity

6.2.3 Thickness

The tolerance on the thickness shall be as specified in Table 4 for non-critical applications (T₁) and in Table 5 for critical applications (T₂).

Table 4 Tolerances on thickness for non-critical applications (T₁)

Nominal thickness d mm	Tolerance %	
	Extruded sheet (E)	Pressed sheet (P)
$1.0 \leq d \leq 5.0$	± 13	± 15
$5.0 < d \leq 20$	± 10	± 10
$20 < d$	± 7	± 7

Table 5 Tolerances on thickness for critical applications (T₂)

	Tolerance mm
Extruded sheet (E)	$\pm (0.1 + 0.03 \times \text{nominal thickness } d)$
Pressed sheet (P)	$\pm (0.1 + 0.05 \times \text{nominal thickness } d)$

6.3 Basic properties

The basic mechanical, thermal and optical properties of sheets of each group shall be as specified in Table 6.

NOTE : Other properties that can be additionally selected are shown in Annex JB.

Table 6 Required properties

Properties	Requirements										Test method
	Extruded sheet (E)					Pressed sheet (P)					
	Group 1 General purpose	Group 2 Trans-parent	Group 3 High modulus	Group 4 High impact	Group 5 Heat resistant	Group 1 General purpose	Group 2 Trans-parent	Group 3 High modulus	Group 4 High impact	Group 5 Heat resistant	
Tensile stress at yield MPa	≥ 50	≥ 45	≥ 60	≥ 45	≥ 50	≥ 50	≥ 45	≥ 60	≥ 45	≥ 50	7.4.1
Nominal strain at break %	≥ 8	≥ 5	≥ 3	≥ 8	≥ 10	≥ 5	≥ 5	≥ 8	≥ 10	≥ 8	7.4.1
Modulus of elasticity in tension MPa	≥ 2 500	≥ 2 000	≥ 3 200	≥ 2 300	≥ 2 500	≥ 2 500	≥ 2 500	≥ 3 000	≥ 2 000	≥ 2 500	7.4.2
Charpy impact strength of notched specimens kJ/m ²	≥ 2	≥ 1	≥ 2	≥ 5	≥ 2	≥ 2	≥ 1	≥ 2	≥ 10	≥ 2	7.4.3
Vicat softening temperature °C	≥ 70	≥ 60	≥ 70	≥ 70	≥ 85	≥ 75	≥ 65	≥ 78	≥ 70	≥ 90	7.5.1
Dimen-sional change on heating %	Nominal thickness 1.0 mm ≤ d ≤ 2.0 mm : ± 10 Nominal thickness 2.0 mm < d ≤ 5.0 mm : ± 5 Nominal thickness 5.0 mm < d ≤ 10 mm : ± 4 Nominal thickness 10 mm < d : ± 4					Nominal thickness 1.0 mm ≤ d : ± 3					7.5.2.2
Delamina-tion of composite layers	Not applicable					No blisters, cracks or flaking (delamination)					7.5.2.3
Total luminous transmittance ^{a)} %	Nominal thickness 1.0 mm ≤ d ≤ 2.0 mm : ≥ 82 Nominal thickness 2.0 mm < d ≤ 6.0 mm : ≥ 78 Nominal thickness 6.0 mm < d ≤ 10 mm : ≥ 75 Nominal thickness 10 mm < d : -										7.6
Chemical resistance ^{b)}	Pass the test	—	—	—	—	Pass the test	—	—	—	—	Annex JA
Notes ^{a)} Applicable only to extruded sheets of Group 2 and pressed sheets of Group 2. ^{b)} Applicable only to extruded sheets of Group 1 and pressed sheets of Group 1.											

7 Test methods

7.1 General

7.1.1 Sampling and frequency of tests

In sampling for appearance test and dimension measurement, one sheet or more shall be taken from each lot of products, each lot being as defined in Table 7.

In sampling for properties tests, one sheet or more shall be taken from a lot chosen at random and a specimen for each test shall be prepared in accordance with the procedure specified in each test method (see 7.4 to 7.7). The properties tests shall be performed at least once a year.

7.1.2 Preparation of specimens

Prepare all specimens in accordance with **JIS K 7144**.

The surface of the specimens shall be free of damage or faults in order to avoid notch effects. Should any burrs be present on a specimen, remove them without damaging the surface. If necessary, finish the edges of the machined surfaces with sandpaper.

When it is necessary to machine the sheet to reduce the thickness for a particular test, leave one original surface intact.

7.1.3 Conditioning and testing of specimens

The specimen shall be conditioned in standard atmosphere Grade 2 [temperature $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and relative humidity $(50 \pm 10)\%$] as specified in **JIS K 7100** for the duration of 16 h or more. The test shall be performed in the same conditions as above, except in the cases of appearance inspection and dimensions measurement.

7.2 Appearance

Examine the surfaces with the naked eye from an approximate distance of 60 cm. Frequency of appearance tests shall be in accordance with Table 7.

NOTE : Ultrasonic or X-ray examination may also be used to detect voids.

7.3 Dimensions

7.3.1 Length, width and rectangularity

Measure the length, width and diagonals of the sheet to the nearest 1 mm, using a metal rule specified in **JIS B 7516** or steel measure specified in **JIS B 7512**, and the result shall be rounded to an integer.

For dimension measurement, $23\text{ }^{\circ}\text{C}$ shall be the standard. When measurement is performed at any other temperature ($t\text{ }^{\circ}\text{C}$) than $23\text{ }^{\circ}\text{C}$, the value converted to $23\text{ }^{\circ}\text{C}$ by using following equation shall be adopted.

$$l_{23} = \frac{l}{[1 + 7 \times 10^{-5} \times (t - 23)]}$$

where, l_{23} : length or width converted to $23\text{ }^{\circ}\text{C}$ (mm)
 t : temperature at the time of measurement ($^{\circ}\text{C}$)
 l : length or width measured at $t\text{ }^{\circ}\text{C}$ (mm)
 7×10^{-5} : linear expansion coefficient of sheet ($1/^{\circ}\text{C}$)

7.3.2 Thickness

Express the thickness of the sheet by the value of its thickness measured to the nearest 0.01 mm using a dial gauge specified in **JIS B 7503** or a micrometer specified in **JIS B 7502**.