भारतीय मानक

Indian Standard

IS 2046 (Part 1) : 2024
ISO 4586-1 : 2018

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भाग 1 परिचय और सामान्य जानकारी

(तीसरा पुनरीक्षण)

Decorative Thermosetting Synthetic Resin Bonded Laminated Sheets — Specification

Part 1 Introduction and General Information

(Third Revision)

ICS 83.140.20

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Plastics Sectional Committee, PCD 12

NATIONAL FOREWORD

This Indian Standard (Part 1) (Third Revision) which is identical to ISO 4586-1 : 2018 'High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 1: Introduction and general information' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Plastics Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1962 and subsequently revised in 1969 and 1995. The 1962 version was published to meet the general demand for a standard to cover the use of synthetic resin bonded sheets as a decorative material having a surface which is characterized by its hardness and the materials covered were suitable for use as wall panels or as veneer for wood or other surfaces.

The first revision of this standard was based on BS 3794 : 1964 'Specification for decorative laminated plastics sheets' issued by the British Standards Institution. The second revision was necessitated to harmonize the standard with EN 438-1 : 1991 and EN 438-2 : 1992 issued by the European Committee for Standardization (CEN).

This revision has been brought out to align the Indian Standard with the ISO 4586 (all parts) 'High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates)'. Since the ISO standard is published in 8 parts, the standard (IS 2046) has been also bifurcated in 8 parts. This standard (Part 1) covers the introduction and general information.

Other parts in this series are:

Part 2	Determination of properties
Part 3	Classification and specifications for laminates less than 2 mm thick and intended for bonding to supporting substrates
Part 4	Classification and specifications for compact laminates of thickness 2 mm and greater
Part 5	Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates
Part 6	Classification and specifications for exterior-grade compact laminates of thickness 2 mm and greater
Part 7	Classification and specifications for design laminates
Part 8	Classification and specifications for alternative core laminates

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 4586-2 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 2: Determination of properties	IS 2046 (Part 2) : 20XX/ISO 4586-2 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 2 Determination of properties (*third revision*) (*under preparation*)	Identical
ISO 4586-3 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 3: Classification and specifications for laminates less than 2 mm thick and intended for bonding to supporting substrates	IS 2046 (Part 3) : 20XX/ISO 4586-3 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 3 Classification and specifications for laminates less than 2 mm thick and intended for bonding to supporting substrates (*third revision*) (*under preparation*)	Identical
ISO 4586-4 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 4: Classification and specifications for compact laminates of thickness 2 mm and greater	IS 2046 (Part 4) : 20XX/ISO 4586-4 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 4 Classification and specifications for compact laminates of thickness 2 mm and greater (*third revision*) (*under preparation*)	Identical
ISO 4586-5 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 5: Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates	IS 2046 (Part 5) : 20XX/ISO 4586-5 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 5 Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates (*third revision*) (*under preparation*)	Identical
ISO 4586-6 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 6: Classification and specifications for exterior-grade compact laminates of thickness 2 mm and greater	IS 2046 (Part 6) : 20XX/ISO 4586-6 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 6 Classification and specifications for exterior-grade compact laminates of thickness 2 mm and greater (*third revision*) (*under preparation*)	Identical
ISO 4586-7 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 7: Classification and specifications for design laminates	IS 2046 (Part 7) : 20XX/ISO 4586-7 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 7 Classification and specifications for design laminates (*third revision*) (*under preparation*)	Identical

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 4586-8 High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 8: Classification and specifications for alternative core laminates	IS 2046 (Part 8) : 20XX/ISO 4586-8 : 2018 Decorative thermosetting synthetic resin bonded laminated sheets — Specification: Part 8 Classification and specifications for alternative core laminates (*third revision*) (*under preparation*)	Identical

The committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

International Standard	*Title*
EN 13329	Laminate floor coverings — Specifications, requirements and test methods

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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Introduction

This document has been harmonized with EN 438-1 whenever possible.

Indian Standard

DECORATIVE THERMOSETTING SYNTHETIC RESIN BONDED LAMINATED SHEETS — SPECIFICATION

PART 1 INTRODUCTION AND GENERAL INFORMATION

(Third Revision)

1 Scope

This document is applicable to high-pressure decorative laminates (HPL, HPDL) as defined in Clause 3.

This document gives an overview of the ISO 4586 series, and provides guidance in the selection and application of test methods and specifications contained in ISO 4586-2 to ISO 4586-8.

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.

ISO 4586-2, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 2: Determination of properties*

ISO 4586-3, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 3: Classification and specifications for laminates less than 2 mm thick and intended for bonding to supporting substrates*

ISO 4586-4, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 4: Classification and specifications for compact laminates of thickness 2 mm and greater*

ISO 4586-5, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 5: Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates*

ISO 4586-6, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 6: Classification and specifications for exterior-grade compact laminates of thickness 2 mm and greater*

ISO 4586-7, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 7: Classification and specifications for design laminates*

ISO 4586-8, *High-pressure decorative laminates (HPL, HPDL) — Sheets based on thermosetting resins (usually called laminates) — Part 8: Classification and specifications for alternative core laminates*

EN 13329, *Laminate floor coverings — Specifications, requirements and test methods*

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 https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
high-pressure decorative laminate
HPL
HPDL
sheet consisting of layers of cellulosic fibrous material (normally paper) impregnated with thermosetting resins and bonded together by the *high-pressure process* (3.2)

Note 1 to entry: This is a general definition of high-pressure decorative laminate(s). More specific product definitions can be found in ISO 4586-3 to ISO 4586-8.

3.2
high-pressure process
simultaneous application of heat (temperature ≥120 °C) and high specific pressure (≥5 MPa), to provide flowing and subsequent curing of the thermosetting resins to obtain a homogeneous non-porous material with increased density (≥1,35 g/cm^3), and with the required surface finish

3.3
surface layer
upper decorative layer consisting in one or more sheets of fibrous material (usually paper) impregnated with aminoplastic thermosetting resins (usually melamine based resins) or other curable resins or other decorative design surfaces such as metal foils, wood-veneers, and textiles, etc. which are not necessarily treated with thermosetting resin

3.4
core layer
fibrous material (usually paper) impregnated with thermosetting resins (usually phenolic based resins) or other curable resins, possibly reinforced by metal layer(s) or metal mesh(es) and others which are not necessarily treated with thermosetting resin

4 Guidance in the use of the ISO 4586 series

4.1 Description of parts

ISO 4586-2 describes the methods of test that shall be used to determine the performance of HPL products in their various internal and external application fields, e.g. construction, transport, furniture, flooring, etc. The test methods have been specifically developed for testing HPL.

It should be noted that not all test methods apply to all types of HPL. For example Test 12, resistance to abrasion, applies only to flooring grade laminates; while Test 11, resistance to surface wear, applies to all types of HPL except flooring grade laminates. It is therefore important to read the scope of the test method to determine whether it is applicable to a particular HPL product.

ISO 4586-3 to ISO 4586-8 specify the performance requirements for different types of high-pressure decorative laminates. Each of these parts is independent of the others, and only requires reference to ISO 4586-2 for details of the appropriate test methods.

ISO 4586-3 applies to laminates less than 2 mm thick intended for bonding to supporting substrates to produce HPL composite panels. Classification systems and performance requirements are specified for heavy duty, horizontal and vertical grades of laminate, in standard, postforming and flame-retardant qualities.

ISO 4586-4 applies to compact laminates of thickness 2 mm and greater, in standard and flame-retardant qualities, intended for interior applications.

ISO 4586-5 applies to flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates, to produce HPL flooring elements. As 'laminate floor coverings' they should meet the requirements of EN 13329.

ISO 4586-6 applies to exterior-grade compact laminates of thickness 2 mm and greater, and specifies requirements for standard and flame-retardant laminates for use in moderate and severe outdoor conditions.

ISO 4586-7 applies to design laminates (pearlescent, wood veneer, and metal surfaces). Classification system and performance requirements are specified for thin and compact laminates.

ISO 4586-8 applies to alternative core laminates (coloured and metal reinforced cores). Classification system and performance requirements are specified for thin and compact laminates.

4.2 Applications

Table 1 shows how the different parts of the series relate to various fields of application.

More information relating to hygienic, health and safety information for laminates intended for interior is given in Annex A.

Table 1 — Applicable fields

Application	ISO 4586-3	ISO 4586-4	ISO 4586-5	ISO 4586-6	ISO 4586-7	ISO 4586-8
Construction (internal)	•	•			•	•
Construction (external)				•		
Transport	•	•			•	•
Furniture	•	•			•	•
Flooring			•			

5 Product classification systems

ISO 4586-3 to ISO 4586-8 include product classification systems. While each of these systems is different, they contain some common elements as follows:

Main classifications:

H denotes **Horizontal grade**

V denotes **Vertical grade**

C denotes **Compact laminate**

E denotes **Exterior grade**

AC denotes **Abrasion Class** for flooring grade

A denotes **Pearlescent** laminate

M denotes **Metal** laminate

W denotes **Wood veneer** laminate

B denotes **Coloured core** laminates

R denotes **Metal reinforced core** laminates

T denotes **Thin** laminate, < 2 mm

Sub-classifications: **D** denotes **Heavy duty or severe use**

G denotes **General purpose or moderate use**

S denotes **Standard grade**

F denotes **Flame-retardant grade**

P denotes **Postforming grade**

In ISO 4586-5, the classification system AC1 to AC6 has been adopted as these classes relate directly to the corresponding product classes in EN 13329.

Annex A
(informative)

Addendum relating to hygienic, health and safety information for laminates intended for interior use

A.1 Cleanability

Because they are easy to clean and maintain, high-pressure decorative laminates are suitable for use in hygienic applications such as hospitals, pharmacies, food processing areas, abattoirs, clean rooms, etc. For routine cleaning, wiping the surface with water and mild detergent is usually sufficient, but more severe methods such as hosing down with hot water or steam cleaning can be used where required by the application. Solvents such as alcohols, white spirit, acetone or cellulose thinners can also be used (e.g. for graffiti removal) as they will not affect the laminate.

A.2 Hygiene

When used in hospitals and surgeries, HPL melamine and other curable resin surfaces can be disinfected using any of the common disinfectants such as ethanol 70 %, formalin 1 % to 5 %, *p*-chlorine-*m*-cresol 0,3 %, chloramine T 1 % to 5 %, or alkylbenzyldimethylammonium chloride 0,1 %. High-pressure decorative laminates show a high resistance to fungal and bacterial growth, when tested in accordance with ISO 846.

A.3 Contact with foodstuffs

When determination of the overall and specific migration is carried out in accordance with the test method shown below, the following results are typical of those for HPL melamine and other curable resin surfaces:

Overall migration	< 10 mg/dm^2
Specific migration (formaldehyde)	< 2,5 mg/dm^2

Test methods — Methods for the examination of consumer goods, basic rules for the determination of the migration in simulant solvents corresponding to Reference [17] and according to the parts of the EN 1186.

Conditions	24 h at 40 °C
Test simulants	acetic acid with a mass fraction of 3 %
	ethanol with a volume fraction of 10 %
	ethanol with a volume fraction of 95 %
Test procedure	one-sided contact

Reference [18] sets forth those resinous and polymeric coatings which may, when used in accordance with the conditions prescribed, be safely used as food contact surfaces.

Reference [18] should be consulted to determine which resins commonly used in the manufacture of high-pressure decorative laminates are safe for use as food contact surfaces.

A.4 Dangerous substances

Pentachlorophenol, asbestos, halogens, or heavy metals (antimony, barium, cadmium, chromium III and VI, lead, mercury, selenium) are not used for the production of HPL.

Bibliography

[1] ISO 846, *Plastics — Evaluation of the action of microorganisms*

[2] EN 1186-1:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 1: Guide to the selection of conditions and test methods for overall migration*

[3] EN 1186-2:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 2: Test methods for overall migration into olive oil by total immersion*

[4] EN 1186-3:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 3: Test methods for overall migration into aqueous food simulants by total immersion*

[5] EN 1186-4:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 4: Test methods for overall migration into olive oil by cell*

[6] EN 1186-5:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 5: Test methods for overall migration into aqueous food simulants by cell*

[7] EN 1186-6:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 6: Test methods for overall migration into olive oil using a pouch*

[8] EN 1186-7:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 7: Test methods for overall migration into aqueous food simulants using a pouch*

[9] EN 1186-8:2002, *Materials and articles in contact with foodstuffs —Plastics — Part 8: Test methods for overall migration into olive oil by article filling*

[10] EN 1186-9:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 9: Test methods for overall migration into aqueous food simulants by article filling*

[11] EN 1186-10:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 10: Test methods for overall migration into olive oil (modified method for use in cases where incomplete extraction of olive oil occurs)*

[12] EN 1186-11:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 11: Test methods for overall migration into mixtures of C-labelled synthetic triglycerides*

[13] EN 1186-12:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 12: Test methods for overall migration at low temperatures*

[14] EN 1186-13:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 13: Test methods for overall migration at high temperatures*

[15] EN 1186-14:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 14: Test methods for 'substitute tests' for overall migration from plastics intended to come into contact with fatty foodstuffs using test media iso-octane and 95 % ethanol*

[16] EN 1186-15:2002, *Materials and articles in contact with foodstuffs — Plastics — Part 15: Alternative test methods to migration into fatty food simulants by rapid extraction into iso-octane and/or 95 % ethanol*

[17] Commission Regulation (EU) No 10/2011 of 14 January 2011

[18] Section 175.300 of the (US) Code of Federal Regulations, Title 21, April 1, 2013

[19] EN 438-1, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (usually called laminates) — Part 1: Introduction and general information*

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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