International Standard 4586/1

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Plastics — Decorative laminated sheets based on thermosetting resins — Part 1 : Specification

Plastiques — Plaques de stratifié décoratif à base de résines thermodurcissables — Partie 1 : Spécifications

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4586/1 was developed by Technical Committee ISO/TC 61, *Plastics*, and was circulated to the member bodies in June 1978.

It has been approved by the member bodies of the following countries :

Australia	Hungary	South Africa, Rep. of
Austria	India	Spain
Belgium	Iran	Sweden
Brazil	Israel	Switzerland
Bulgaria	Italy	Turkey
Canada	Japan	United Kingdom
Egypt, Arab Rep. of	Mexico	USA
Finland	Netherlands	USSR
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The member body of the following country expressed disapproval of the document on technical grounds :

New Zealand

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Plastics — Decorative laminated sheets based on thermosetting resins — Part 1 : Specification

0 Introduction

This International Standard includes requirements for nine types of material (see table 3) classified as described in clause 4. The requirements are complete except for those for resistance to scratching, which will remain under consideration until a satisfactory test method has been developed.

Several properties may be determined by alternative test methods. These have been included where the requirements for either method are approximately equivalent, and either where expensive equipment of different types is in satisfactory use, or where experience is limited to one of the alternatives in certain countries. In the latter case, it may later prove possible to delete one of the alternatives after experience has been gained about their relative significance.

1 Scope and field of application

This part of ISO 4586 specifies requirements and a classification for decorative laminated sheets according to their performance and main recommended applications, and also provides requirements for materials with special characteristics, for example postformability or defined reaction to fire. Requirements for resistance to scratching will be included when a satisfactory test method has been developed.

Requirements are given for those types of material that are most commonly used, but additional types may be added as required. The specified limit values apply to the types of material most commonly used, but it may be possible, within each classification, to obtain variants having much higher performance.

The materials are characterized by their decorative surfaces, which are relatively hard and resistant to wear, scratching, impact, boiling water, domestic stains and moderate heat. They are intended for interior applications and are ready for use. The back surface of sheets having only one decorative face is manufactured so that it is suitable for adhesive bonding to a substrate.

This International Standard applies only to decorative laminated sheets as defined in clause 3.

ISO 4586/2 specifies the relevant methods of test.

2 Reference

ISO 4586/2, *Plastics — Decorative laminated sheets based on thermosetting resins — Part 2 : Determination of properties.*

3 Definition

For the purpose of this International Standard, the following definition applies.

decorative laminated sheet : A sheet consisting of layers of fibrous sheet material (for example paper) impregnated with thermosetting resins and bonded together by means of heat and a pressure of not less than 5 MPa*, the outer layer or layers on one or both sides having decorative colours or designs.

NOTE — Decorative laminated sheet as defined in this International Standard is made from core layers impregnated with phenolic resins and a surface layer or layers impregnated with aminoplastic resins (mainly melamine resins).

4 Classification

4.1 Application characteristics

Materials are available in the classes defined in table 1. The list of typical applications given for each class is for guidance only and is not intended to be comprehensive.

* 1 MPa = 1 MN/m^2

Table 1 — Application characteristics

Class	Performance category	Typical applications
HD (Heavy duty)	Materials with greater resistance to abrasion than Class HG	Flooring, and supermarket checkout counters
HG (Horizontal, general purpose)	Materials of high performance for general use in horizontal applications, and for use in vertical applications requiring particularly high performance	Kitchen working surfaces; restaurant and hotel tables; heavy-duty doors and wall coverings; interior walls of public transport vehicles
VG (Vertical, general purpose)	Materials of less high performance than Class HG, for general use in vertical applications, and for use in some horizontal applications where only moderate performance is required	Kitchen front panels; wall coverings; shelves
VL (Vertical, light duty)	Materials of moderate performance for use in vertical applications where the requirements are less demanding than in Class VG	Exposed side components of cupboards
CL (Cabinet liner)	Materials of moderate performance but with lower standards of surface appearance, colour fastness and resistance to heat and moisture than in Class VL, for use in vertical applications not normally exposed to light or view	Interior components of cupboards

4.2 Special characteristics

The classes of material listed in 4.1 are all available as standard type decorative laminated sheet (type S) having the basic characteristics described in clause 1.

In some classes of material, additional types (type P and type F) are also available, possessing the special properties described below.

4.2.1 Type P — Postformable decorative laminated sheet

Type P sheet is similar to type S, but it can also be formed under controlled temperature and flexure in accordance with the manufacturer's recommendations.

4.2.2 Type F — Decorative laminated sheet having defined reaction to fire

Type F sheet is similar to type S, but it also meets special requirements of specified fire tests, which may vary according to the application of the material and the country of use.

4.3 Nomenclature

The symbols for classes and types are combined in describing the materials covered by this specification; for example, horizontal general purpose postformable laminate is described as type HGP.

5 Requirements

5.1 Compliance

In order to comply with the requirements of this International Standard, material of each type shall meet the requirements of every property for which a value or requirement is specified in clause 6.

Two methods of test are given for the measurement of dimensional stability, resistance to impact, resistance to colour change in artificial light, formability and resistance to cigarette burns. Where there is a choice of method, material satisfying the requirements of either method shall be deemed to comply with the specification for that property; however the choice of method may be agreed between the interested parties. The method selected shall be stated in the test report.

5.2 Notes on requirements for reaction to fire

The requirements for reaction to fire are determined by the fire regulations of the country in which the material is to be used.

At present, it is not possible, with any test, to predict compliance with all national and other requirements. No test is therefore included in this specification and reference must be made to those other requirements when appropriate.

The selection of a suitable test or tests for inclusion in this International Standard will be considered when International Standards specifying fire tests for building materials and structures have been agreed.

6 Properties

6.1 Colour and pattern

The colour and pattern of the decorative effect, and their quality and consistency, shall be as agreed between purchaser and supplier.

NOTE — Since sheets may vary slightly in colour and appearance, it is recommended that sheets to be used side by side should be matched and supplied at the same time.

6.2 Surface finish

6.2.1 The surface finish of the decorative surface, and its consistency, shall be as agreed between purchaser and supplier.

6.2.2 The reverse side of sheets having only one decorative surface shall be suitable for adhesive bonding.

6.3 Thickness

No requirements for nominal thickness are specified for individual types of material listed in table 3; however, variations from the nominal thickness supplied shall at no point exceed the limits shown in table 2. The thickness shall be measured by the method specified in clause 4 of ISO 4586/2.

Table 2 — Permitted variation of thickness

Values in millimetres

Nominal thickness		Maximum variation
Greater than	Not greater than	
0,5	1,0	± 0,10
1,0	2,0	± 0,15
2,0	2,5	± 0,18
2,5	3,0	± 0,20
3,0	4,0	± 0,25
4,0	5,0	± 0,3
5,0		as agreed

6.4 Other properties

When tested by the appropriate test methods, the requirements for each type of material shall be as listed in table 3.

Table 3 — Property requirements

Property	Test method ISO 4586/2 Clause No.	Property or attribute	Units max. or min.	Material type								
				HDS	HGS	HGP	HGF	VGS	VGP	VGF	VLS	CLS
Appearance	5	appearance		D	D	D	D	D	D	D	D	E
Resistance to surface wear	6	abrasion to end-point	revolutions, min.	1 000	350	300	350	150	150	150	50	X
Resistance to boiling water	7	increase in mass	% max.	10	10	15	12	12	20	14	20	20
		increase in thickness	% max.	10	10	20	12	12	25	14	25	25
		appearance		F	F	F	F	F	F	F	F	F
Resistance to dry heat	8	appearance		F	F	F	F	X	X	X	X	X
Dimensional stability	9 (alternative)	dimensional change	% max. (L) % max. (T)	0,45 0,90	0,45 0,90	0,7 1,2	0,45 0,90	0,7 1,2	0,7 1,2	0,7 1,2	0,7 1,2	0,7 1,2
		appearance		F	F	F	F	F	F	F	F	F
	10 (alternative)	dimensional change	% max. (L) % max. (T)	0,3 0,6	0,3 0,6	0,4 0,7	0,3 0,6	0,4 0,7	0,4 0,7	0,4 0,7	0,4 0,7	0,4 0,7
		appearance		F	F	F	F	F	F	F	F	F
Resistance to impact	11 (alternative)	spring force	N min.	25	25	20	25	20	15	20	15	15
	12 (alternative)	energy	J min.	0,27	0,27	0,18	0,27	0,07	0,07	0,07	X	X
Resistance to cracking	13	susceptibility (applies only to materials less than 2 mm thick)	grade (not worse than)	1	1	1	1	1	1	1	1	2
Resistance to scratching	14 (C)	load	N min.	C	C	C	C	C	C	C	C	C
Resistance to stains	15	appearance		G	G	G	G	G	G	G	G	G
Resistance to colour change in artificial light	16 (alternative)	wool standard	min.	6	6	6	6	6	6	6	6	X
	17 (alternative)	wool standard	min.	5	5	5	5	5	5	5	5	X
Resistance to cigarette burns	18 (alternative)	appearance		H	H	H	H	H	X	X	X	X
	19 (alternative)	time to failure	s min.	110	110	100	100	80	X	X	X	X
Formability	20 (alternative)	radius	mm	X	X	19	X	X	13	X	X	X
	21 (preferred)	radius spring-back	mm °max.	X X	X X	19 30	X X	X X	13 30	X X	X X	X X
Reaction to fire	22 (C)			X	X	X	Q	X	X	Q	X	X

Key to letters used in table 3

C Under consideration.

D No defects shall be visible from a viewing distance of 2 m.

E No defects shall be visible from a viewing distance of 3 m.

F No deterioration other than loss of gloss shall be visible to the naked eye.

G No blistering or discoloration shall show at the final examination.

H No deterioration other than slight loss of gloss and slight permanent brown staining shall be visible to the naked eye. It should be noted that some cigarettes are very hot burning and may cause greater damage to the surface.

J joule.

L In the machine direction of the fibrous sheet material (normally the direction of the longest dimension of the laminated sheet).

N newton.

Q Material shall meet specific requirements for reaction to fire in its application in the country of use.

T In the cross-machine direction of the fibrous sheet material (at right angles to direction L).

X No requirement is specified.