BRITISH STANDARD

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Timber and wood-based materials in internal windows, internal door leaves and internal doorframes — Requirements and specifications

The European Standard EN 14221:2006 has the status of a British Standard

ICS 79.060.01; 91.060.50

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National foreword

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A list of organizations represented on B/543 can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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Timber and wood-based materials in internal windows, internal door leaves and internal doorframes - Requirements and specifications

Bois et matériaux à base de bois dans les fenêtres intérieures, les vantaux et dormants de portes intérieures - Exigences et spécifications

Holz und Holzwerkstoffe in Innenfenstern, Innentüren und Innentürzargen - Anforderungen und Spezifikationen

This European Standard was approved by CEN on 11 September 2006.

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Foreword

This document (EN 14221:2006) has been prepared by Technical Committee CEN/TC 175 “Round and sawn timber”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by May 2007, and conflicting national standards shall be withdrawn at the latest by October 2007.

This Standard is one of a package to be implemented by 2007.10.31. The Standards included in the Package are:

	Standard Number	Title
1	prEN 942 Revised	Timber in joinery - General requirements
2	EN 13307-1	Timber blanks and semi-finished profiles for non-structural uses – Part 1: Requirements
3	EN 14220	Timber and wood-based materials in external windows, external door leaves and external doorframes – Requirements and specifications
4	EN 14221	Timber and wood-based materials in internal windows, internal door leaves and internal doorframes – Requirements and specifications

Explanation

Standards 3 and 4 rely on both Standards 1 and 2, and Standard 2 relies on 1.

The revised prEN 942 contains changes which directly affect Standards 2, 3 and 4 and therefore shall be available before they can be used effectively.

NOTE Following the completion of the Technical Enquiry for prEN 13307-2 Timber blanks and semi-finished profiles for non-structural uses – Part 2: Production control, it has been agreed to remove this Standard form the package. As a result of the necessary changes it has been agreed to offer prEN 13307-2 as a CEN/TS.

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

Introduction

The classification method given in this standard is applicable to timber and wood-based products after it has been incorporated into internal windows, doors and doorframes. This standard contains the principle material requirements of timber in windows, internal door leaves and doorframes. This standard applies to timber and wood-based products, the processing and the components in the final products. Requirements for mechanical aspects are indirectly considered by appearance and density selection.

Characteristics and principles are listed in Table 1 and clauses 5, 6, 7, 8 and 9. Specific national requirements are given in Annex A.

This standard includes a Normative Annex A providing guidance on National grading requirements.

Tables A.1 and A.2 of Annex A provide default tables for circumstances where a National Annex is not available.

This standard is part of a series of standards on timber in windows, doors and stairs.

1 Scope

This European Standard specifes principle material requirements for timber and wood-based products in internal windows, doors and doorframes (with or without fixed parts), including appearance, biological durability and other physical characteristics.

This European Standard applies to factory assembled internal windows, door leaves and doorframes uncoated or intended to be coated.

If doors are covered by other decorative veneers or films the respective veneer or film Product Standard shall apply.

EXAMPLE Timber veneers may be graded to EN 635: Parts 1, 2, 3 and 5, and ENV 635-4.

2 Normative references

The following referenced documents are indispensable for the application 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 204, *Classification of thermoplastic wood adhesives for non-structural applications*

EN 335-2, *Durability of wood and wood-based products - Definition of use classes - Part 2: Application to solid wood*

EN 844-3:1995, *Round and sawn timber - Terminology - Part 3: General terms relating to sawn timber*

prEN 942:2006, *Timber in joinery - General requirements*

EN 12765, *Classification of thermosetting wood adhesives for non-structural applications*

EN 13307-1, *Timber blanks and semi-finished profiles for non-structural uses - Part 1: Requirements*

EN 13183-1, *Moisture content of a piece of sawn timber – Part 1: Determination by oven dry method*

EN 13183-2, *Moisture content of a piece of sawn timber – Part 2: Estimation by electrical resistance method*

EN 13183-3, *Moisture content of a piece of sawn timber – Part 3: Estimation by capacitance method*

EN 14298, *Sawn timber – Assessment of drying quality*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 844-3:1995, prEN 942:2006 and the following apply.

These definitions shall take into consideration the situation after installation of the product.

Where there is a conflict between the definitions in the Standards referenced and those given below, the definitions given below shall apply.

3.1
profile
planed piece of solid or glue-laminated wood, finger-jointed or not, with a cross-section complying with the window, door leaf or doorframe requirements

3.2
concealed face
face of a joinery part which, after installation of the joinery is completed, is permanently concealed by other parts of the joinery product or by other parts or other elements, including materials such as veneer, plastic or metal

NOTE These faces may be visible before the product is installed.

3.3
semi-concealed face
visible face of a joinery part, which cannot be viewed when the window or door is in the closed position

3.4
visible face
face of a joinery part which, after installation of the joinery is completed, is not permanently concealed or semi-concealed

NOTE 1 An opaque coating system does not constitute concealment.

NOTE 2 Faces which are visible only when moving parts (e.g. window casements or door leaves) are open are classified as semi-concealed.

3.5
appearance class
any surface in joinery classified according to shakes, resin pockets, bark pockets, discoloration, sapwood, exposed pith, ambrosia beetle damage and knots

3.6
coating system
combination of coating materials, which are to be applied or have been applied to the face of a joinery part

4 General requirements

The following requirements for the characteristics of the timber and wood-based products used in internal windows, doors and doorframes shall apply:

— requirements for appearance, which are given in Clause 5;

— requirements for biological durability, which are given in Clause 6;

— requirements for physical properties, which are given in Clauses 7, 8 and 9.

For products where the ultimate location is not known at the time of manufacture, sufficient information shall be provided to enable possible limitations for the product end use to be identified.

5 Appearance

5.1 Characteristics

The characteristics of the profiles that are applicable to the finished product are measured and classified in accordance with the requirements of prEN 942.

5.2 Appearance classes

5.2.1 General

Table 1 identifies the elements for which characteristics shall be assigned and is a template to indicate the form in which the requirements are to be presented. National requirements are presented in Annex A. Where national requirements have not been indicated in Annex A then the values given in Tables A.1 and A.2 are to be used.

The appropriate timber classes are as specified in prEN 942.

Table 1 — Principle appearance classes for elements in internal windows, doors and doorframes

Element	prEN 942 Class				
	Visible face (3.4)		Semi Concealed face (3.3)		Concealed face (3.2)
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors	**	**	**	**	**
Casement and sashes	**	**	**	**	**
Stiles and rails to doors	**	**	**	**	**
Lipping	**	**	**	**	**
Beads and similar small sections	**	**	**	**	**
Thresholds, sills	**	**	**	**	**
Panelling and infills	**	**	**	**	**

**Information to be provided. See Table A.1 for default values.

When classified as concealed, the grade selected shall not impair the serviceability of the product.

5.2.2 Finger jointing, end jointing, edge jointing and laminating

Specific national requirements are given in Annex A. Where specific national requirements are not available the following restrictions shall apply:

— Finger jointing, end jointing, edge jointing and laminating is permitted in all elements of Table 1 unless otherwise specified.

— Infill panels produced from finger jointed pieces shall be manufactured so that when assembled only the fingers of the finger joint are visible.

— Finger jointing is not permitted where a translucent coating system is applied except where agreed.

— Laminated timber shall comply with the requirements of EN 13307-1.

5.3 Adhesives and repair compounds

Glued timber joints or repairs shall be of durability class D2 as specified in EN 204 or C2 as specified in EN 12765.

Any glued timber joints or elements which are in a special condition of high humidity shall use an adhesive of durability not inferior to class D3 as specified in EN 204 or C3 as specified in EN 12765.

At the time of publication no European tests or classifications are available for repair compounds. Repair compounds shall therefore have a similar durability class as the appropriate adhesive.

NOTE Adhesives used to connect timber with non-timber components may need special consideration.

5.4 Slope of grain

The slope of grain of timber used shall not exceed 1:10 (10 %), except in knot areas. In addition, the cumulative length of areas with sloped grain, evaluated along the axis of the timber member, shall not exceed 0,5 m or 20 % of the length of the piece, whichever is shorter.

NOTE Slope of grain may also have an effect on the stability of the product.

5.5 Repairs

5.5.1 Features

Where indicated in prEN 942 the following features shall be improved, using a repair compound or wooden plugs secured with adhesive, unless specifically excluded by the specification:

- Loose or unsound knots;
- Shakes;
- Resin pockets and other areas of resin exudation;
- Bark pockets;
- Exposed pith;
- Ambrosia beetle attack.

5.5.2 Plugs

Any plug shall:

a) be of the same species or species with similar characteristics as the surrounding timber;

b) be secured with an appropriate adhesive (see Clause 5.3);

c) whenever possible lie with its grain direction in the same general direction as the grain of the piece in which it is inserted;

d) be of a width (i.e. the lesser dimension) not greater than 6 mm above the maximum limit of knot size for the specified class (the width of a non-cylindrical plug shall be not more than 30 mm);

NOTE It is possible that a plug may be produced from 'branch material' to create the appearance of a knot.

e) be within (+0 -2!) percentage points of the moisture content of the timber;

f) be within the moisture content range recommended by the adhesive manufacturer;

g) have at least 2/3 of its diameter within the face when occurring at an arris.

Only one plug shall be used for a single repair below a translucent surface, elsewhere, not more than two cylindrical plugs shall be used for a repair. When two plugs are used for a single repair they shall not overlap. The repair of a knot is classified as a sound inter-grown knot.

5.5.3 Filler

Where surfaces or defects are required to be filled, the filler shall be compatible with the intended end use of the timber.

5.6 Wood-based products

Wood-based products, which are used as cores and faces in doors, shall meet the appropriate durability requirements as specified in EN 13986 for wood-based panels used as non-structural components internally in dry or humid conditions.

Moulded skin door facings produced either by post forming MDF or by pressing directly from cellulosic fibres shall also conform to the specific requirements of:

— EN 622–1 Fibreboards (dry process boards) - Board Class A

— EN 622–5:1997 Requirements for dry process boards – Table 2

6 Biological durability

Timber shall, as a minimum, meet the requirements of at least Use Class 1 as defined in EN 335-2.

NOTE For special conditions of high humidity a higher class may be required.

7 Moisture content

Moisture content is usually subject to national requirements and end use conditions. Where national requirements and end use are not available, the moisture content of the timber shall not exceed 13 % for heated buildings or 16 % for use in unheated buildings. Specific national requirements are given in Annex A. The measurement method shall comply with EN 14298.

The moisture content shall be estimated using either the method described in EN 13183-2, or EN 13183-3. In the case of a dispute the method to be used shall be the method described in EN 13183-1 (Destructive method).

NOTE 1 The more accurate method described in EN 13183-1 is a Destructive method and may not always be appropriate.

Moisture content measurements are applicable at the completion time of product manufacture and prior to coating

NOTE 2 For special conditions the contract may specify alternative moisture contents.

8 Surface finish

The surface of timber in visible faces shall be able to accept a coating system without any further operation other than light sanding.

9 Density

Unless otherwise indicated in the specific national requirements (see Annex A), the following minimum density for timber (in 95 % of the tested products), measured at a 20 ºC and 65 % RH (moisture content of 12 %), shall be used: Softwood 350 kg/m^3 Hardwood 450 kg/m^3

NOTE 1 The density of the timber used in internal windows, doors and internal doorframes will have a significant effect on their physical properties.

NOTE 2 For special constructions a lower density timber can be used if it does not reduce the serviceability of the product.

Annex A
(informative)

Quality recommendations for elements in internal windows, door leaves and internal doorframes

Table A.1 — Recommended minimum grading characteristics for elements in internal windows, door leaves and internal doorframes where National appearance class tables have not been provided

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors	J30	J10	J30	J30	J50
Casement and sashes	J10	J10	J10	J10	J40
Stiles and Rails to doors	J30	J30	J30	J30	J40
Lipping	J2	J2	J2	J2	J2
Beads and similar small sections	J10	J10	J10	J10	J10
Thresholds, sills	J30	J10	J30	J10	J30
Panelling and infills	J30	J10	J40	J30	J50

Table A.2 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	
Maximum moisture content	Clause 7	Not greater than 16 % for all elements
Minimum density	Clause 9	Softwood - 350 kg/m^3 Hardwood - 450 kg/m^3

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.3 — National minimum grading characterisrics for elements in internal windows, door leaves and internal doorframes for Austria

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors					
Casement and sashes					
Stiles and Rails to doors					
Lipping					
Beads and similar small sections					
Thresholds, sills					
Panelling and infills					

Table A.4 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	
Maximum moisture content	Clause 7	
Minimum density	Clause 9	

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.5 — National minimum grading characteristics for elements in internal windows, door leaves and internal doorframes for Finland

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors					
Casement and sashes					
Stiles and Rails to doors					
Lipping					
Beads and similar small sections					
Thresholds, sills					
Panelling and infills					

Table A.6 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	
Maximum moisture content	Clause 7	
Minimum density	Clause 9	

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.7 — National minimum grading characteristics for elements in internal windows, door leaves and internal doorframes for France

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
9.1.1 Non loading frames to windows and doors	J 30	J 20	J 30	J 20	J 50
Casement and sashes and frames load-bearing members	J 20	J 10	J 20	J 20	J 20
Stiles and rails to doors	J 30	J 20	J 30	J 20	J 20
Lipping	J 2	J 2	J 2	J 2	J 2
Beads and similar small sections	J 2	J 2	J 2	J 2	J 2
Thresholds, sills	J 10	J 10	J 10	J 10	J 30
Panelling and infills	J 20	J 10	J 30	J 20	J 50

NOTE 1 A higher grade may be required for elements that are subject to wind load.

NOTE 2 Hidden features may be classed as concealed faces if the serviceability of the product is not impaired.

NOTE 3 Grades selected for concealed face must not impair the serviceability of the product.

NOTE 4 On visible faces, knots or knots clusters larger than 10 mm shall be distributed at centers no closer than 150 mm on average, measured over the length of the piece. For all classes, when considering distribution, knots of 10 mm or less shall be disregarded.

Table A.8 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	See Clause 5.2.2
Maximum moisture content	Clause 7	See Clause 7
Minimum density	Clause 9	Softwood – 350 kg/m^3 Hardwood –– 350 kg/m^3

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.9 — Natonal minimum grading characteristics for elements in internal windows, door leaves and doorframes for Germany

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors	J10	J10	J30	J10	J30
Casement and sashes	J10	J10	J30	J10	J30
Stiles and Rails to doors	J10	J10	J30	J10	J30
Lipping	J10	J10	J10	J10	J30
Beads and similar small sections	J2	J2	J2	J2	J2
Thresholds, sills	J10	J10	J30	J10	J30
Panelling and infills	J10	J10	J30	J10	J30

Table A.10 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.1	See Clause 5.2.2
Maximum moisture content	Clause 7	(13 ± 2)%
Minimum density	Clause 9	Softwood – 350 kg/m^3 Hardwood – 450 kg/m^3

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.11 — National minimum grading characteristics for elements in internal windows, door leaves and doorframes for Italy

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors					
Casement and sashes					
Stiles and Rails to doors					
Lipping					
Beads and similar small sections					
Thresholds, sills					
Panelling and infills					

Table A.12 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints		
Maximum moisture content		
Minimum density		

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.13 — National minimum grading characteristics for elements in internal windows, door leaves and doorframes for Norway

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors	J30	J30	J30	J30	J40
Casement and sashes	J30	J30	J30	J30	J40
Stiles and Rails to doors	J30	J30	J30	J30	J40
Lipping	J2	J2	J2	J2	J2
Beads and similar small sections	J10	J10	J10	J10	J10
Thresholds, sills	J30	J30	J30	J30	J30
Panelling and infills	J30	J10	J30	J30	J40

Table A.14 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	
Maximum moisture content	Clause 7	Not greater than 16 % in all elements
Minimum density	Clause 9	Softwood – 350 kg/m^3 Hardwood - 450 kg/m^3

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.15 — National minimum grading characteristics for elements in internal windows, door leaves and internal doorframes for Sweden

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors	J30	J10	J30	J30	J50
Casement and sashes	J10	J10	J10	J10	J40
Stiles and Rails to doors	J30	J30	J30	J30	J40
Lipping	J2	J2	J2	J2	J2
Beads and similar small sections	J10	J10	J10	J10	J10
Thresholds, sills	J30	J10	J30	J10	J30
Panelling[a)] and infills	J30	J10	J40	J30	J50
NOTE 1 A higher grade may be required for elements that are subject to wind load.					
NOTE 2 Hidden features may be classed as a concealed face if the serviceability of the product is not impaired.					
NOTE 3 Grades selected for a concealed face must not impair the serviceablity of the product.					
NOTE 4 Knots and knot clusters shall be distributed at centres no closer than 150 mm on average, measured over the length of the piece. Knots of 10 mm or less shall be disregarded.					
[a)] For requirements on panels of softwood see EN 14519 and of hardwood see EN 14951.					

Table A.16 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	See clause 5.2.2
Maximum moisture content	Clause 7	(9 ± 3)%
Minimum density	Clause 9	Softwood - 450 kg/m^3 Hardwood - 600 kg/m^3
NOTE For requirements on panels of softwood see EN 14519 and of hardwood see EN 14951.		

These classes are recommendations. If the manufacturer uses other classes these should be declared.

Table A.17 — National minimum grading characteristics for elements in internal windows, door leaves and doorframes for United Kingdom

Element	prEN 942 Class				
	Visible face		Semi Concealed face		Concealed face
	Opaque coating system	Translucent Coating system	Opaque coating system	Translucent Coating system	
Frames to windows and doors	J30	J10			J50
Casement and sashes	J10	J10			J40
Stiles and Rails to doors	J30	J30			J40
Lipping	J2	J2			J2
Beads and similar small sections	J10	J10			J10
Thresholds, sills	J30	J10			J30
Panelling and infills	J30	J10			J50

Table A.18 — Supplementary recommendations

	Clause Number	Recommendation
Finger joints	Clause 5.2.2	
Maximum moisture content	Clause 7	
Minimum density	Clause 9	

These classes are recommendations. If the manufacturer uses other classes these should be declared.

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[1] EN 351-1, *Durability of wood and wood-based products – Preservative treated solid wood – Part 1: Classification of preservative penetration and retention*

[2] EN 635- 1*, Plywood - Classification by surface appearance - Part 1: General*

[3] EN 635- *2, Plywood - Classification by surface appearance - Part 2: Hardwood*

[4] EN 635 - 3*, Plywood - Classification by surface appearance - Part 3: Softwood*

[5] ENV 635- 4*, Plywood - Classification by surface appearance - Part 4: Parameters of ability for finishing - Guideline*

[6] EN 635- 5*, Plywood - Classification by surface appearance - Part 5: Methods for measuring and expressing characteristics and defects*

[7] prCEN/TS 13307-2, *Timber blanks and semi-finished profiles for non-structural uses – Part 2 : Production control and testing*

[8] EN 14220, *Timber and wood-based materials in external windows, external door leaves and external doorframes – Requirements and specifications*

[9] EN 14519, *Solid softwood panelling and cladding – Machined profiles with tongue and groove*

[10] EN 14951*, Solid hardwood panelling and cladding – Machined profiles elements*

[11] EN 622-1, *Fibreboards – Specifications – Part 1: General requirements*

[12] EN 622-5, *Fibreboards – Specifications – Part 5 : Requirements for dry process boards (MDF)*

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