BS EN 15060:2006

Paints and varnishes — Guide for the classification and selection of coating systems for wood based materials in furniture for interior use

ICS 87.040,

BSI British Standards

National foreword

This British Standard is the UK implementation of EN 15060-1:2006.

The UK participation in its preparation was entrusted to Technical Committee STI/28, Paint systems for non-metallic substrates.

A list of organizations represented on this committee 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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Beschichtungsstoffe - Leitfaden für die Einteilung und Auswahl von Beschichtungssystemen für Holzmöbel im Innenbereich

This European Standard was approved by CEN on 26 June 2006.

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Foreword

This document (EN 15060:2006) has been prepared by Technical Committee CEN/TC 139 “Paints and varnishes”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by February 2007, and conflicting national standards shall be withdrawn at the latest by February 2007.

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 purpose of this guide is to provide a tool for both a furniture manufacturer and paint and varnish manufacturer, when trying to define the product needed by the furniture manufacturer and/or offered by the paint and varnish manufacturer.

This guide is a working document to be completed jointly by a furniture manufacturer and his or her supplier and may be used in the following two ways:

When used by a furniture manufacturer:

The furniture manufacturer can define the coating system he or she needs, by defining what kind of furniture he or she makes, kind of surface to finish, etc. This is achieved by putting a cross in the table in clause 6 of this guide: details of intended use and function, i.e. he or she needs a paint to finish a working surface in the domestic furniture he or she manufactures.

Then, the manufacturer can define the properties of the coating system he or she needs (e.g. resistance to cold liquids). Of course, he or she can be helped by the paint manufacturer in this definition. When defining the properties and their values, European Standards should be used, but if they do not exist, another reference document can be used (i.e. International or National standards, etc).

The surface to be coated has to be defined as in clause 4.5, as well as the appearance needed (see 4.6).

The application system has to be defined (see 4.3) and the drying and curing process (see 4.4) that the furniture manufacturer intends to use for each of the coats.

For this information, the paint and varnish manufacturer can recommend to the furniture manufacturer another application method, etc.

With all this data, the paint and varnish manufacturer is able to provide the name of his or her products (for each coat of the coating system: primer, stain, undercoat, filler, and topcoat, if all are needed) and their wet properties. Those are the products that the paint and varnish manufacturer is offering to the furniture manufacture to satisfy what he or she needs.

When used by a paint and varnish manufacturer:

A paint and varnish manufacturer can offer a product to a furniture manufacturer by fulfilling this guide from the beginning:

For Table 1, the paint and varnish manufacturer will start by writing the name and characteristics of their products and then will continue with their performances and a description of the application systems, and so on, to end at the last point.

This is useful information provided by a paint and varnish manufacturer to a furniture manufacturer: those products, when combined and applied on a surface as defined, make a coating system with those properties, suitable for this kind of furniture and this kind of surface, etc.

1 Scope

This document provides guidance for the information to be provided by a furniture manufacturer to paint and varnish suppliers and the information to be provided by a paint and varnish supplier to furniture manufacturers, in order to assist in the selection of coating materials and coating systems for wood-based material in furniture for interior use.

This standard should be a reference document to be used with the test methods and specifications of the different types of furniture.

NOTE For the purpose of this guide, wood-based materials with modified surfaces are included in this document (laminates, etc.)

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 13721, *Furniture — Assessment of the surface reflectance*

EN 13722, *Furniture — Assessment of the surface gloss*

EN ISO 4618:2006, *Paints and varnishes — Terms and definitions (ISO 4618:2006)*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 4618:2006 apply.

4 Classification and designation

4.1 Wet properties of each coat of the coating system

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Table 1 — Wet properties of each coat of the coating system

			COAT				
	UNIT[a]	REFERENCE DOCUMENT[b]	PRIMER[C]	STAIN	UNDERCOAT	FILLER	TOP COAT
Name							
Additional component[d]							
Chemical nature of binder[e]							
Chemical nature of solvents[f]							
Non volatile content - delivery - application							
Solvent content: - organic - “non” organic							
Flashpoint:							
Pot life							
Viscosity - delivery - application							

[a] When applicable.

[b] The supplier or manufacturer has to indicate according to which standard, legislation or reference document in general, the results are given.

[c] Primer = e.g. putty, barrier coat, hydroground.

[d] Information has to be given for every component of each coat.

[e] For example: nitrocellulose, unsaturated polyester, saturated polyester, alkyd resin, acrylic resin.

[f] For example: water, volatile organic compounds, reactive organic solvent, solvent free.

4.2 Details of build

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Table 2 — Details of build

			COAT				
	UNIT[a]	REFERENCE DOCUMENT[b]	PRIMER[c]	STAIN	UNDERCOAT	FILLER	TOP COAT
Layer thickness (dry)							
Application rate (wet):[d]							

[a] When applicable.

[b] The supplier or manufacturer has to indicate according to which standard, legislation or reference document in general, the results are given.

[c] Primer = e.g. putty, barrier coat, hydrogrund.

[d] Theoretical application rate. Theoretical consumption without overspray but with evaporating solvent, determination by weight.

4.3 Application system

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Table 3 — Application system

PROCESS[a]		COAT				
		PRIMER	STAIN	UNDERCOAT	FILLER	TOP COAT
Flatting						
Roller coating						
Curtain coating						
Spray coating	air spray					
	airless					
	airmix					
	hot spraying					
	electrostatic					
	others					
Others	dipping					
	vacuum					
	powder coating					
	others					

[a] If necessary, special conditions can be written in the adequate case.

4.4 Drying and curing

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Enter only those parameters that are relevant.

Table 4 — Drying and curing

PROCESS[a]					COAT						
					Primer	Stain	Undercoat		Filler	Top coat	
							First	Second[b]		First	Second[b]
Ambient (23ºC± 2ºC and 50%±5% R.H.)			Temperature (°C)								
			Speed (m/s)								
			Drying time	Manipulation							
				Application other coat							
Accelerated (more than (23 ± 2) ºC	warm temperature (more than 25ºC ± 2ºC)	**Jet dryer**	Temperature (°C)								
			Speed (m/s)								
			Drying time	Blocking							
				Application other coat							
		Vertical oven	Temperature (°C)								
			Speed (m/s)								
			Drying time	Blocking							
				Application other coat							
		Trolleys	Temperature (°C)								
			Speed (m/s)								
			Drying time	Blocking							
				Application other coat							
		Infrared	Temperature (°C)								
			Speed (m/min)								
			Drying time	Manipulation							

PROCESS[a]					COAT						
					Primer	Stain	Undercoat		Filler	Top coat	
							First	Second[b]		First	Second[b]
				Application other coat (previous sanding)							
		Others (to be indicated)	Temperature (°C)								
			Speed (m/min)								
			Drying time	Manipulation							
				Application other coat							
	UV	Low press lamps	Number of lamps								
			Power/lamp (W/cm)								
			Speed (m/s)								
		High press lamps	Number of lamps								
			Power/lamp (W/cm)								
			Speed (m/s)								
		Galio lamps	Number of lamps								
			Power/lamp (W/cm)								
			Speed (m/s)								
		Others (to be indicated)									
	EBC										
	Others (to be indicated)										

[a] If necessary, special conditions can be written in the adequate gap. To fulfil as many gaps as necessary for every coat.

[b] To indicate if the application is after sanding or wet on wet.

4.5 Surface to be coated

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Table 5 — Surface to be coated and support

Details of surface to be coated[a]	- Type of wood or veneer	
	- Type of foil or laminate.	
	- Type of board (if directly coated).	
Substrate Board (support of surface to be coated)		

[a] Enter only the applicable terms in each case. Use as many terms as necessary. Choose generally among: Substrate of the surface to be coated (for veneer and laminated, normally): chipboard, MDF, hardboard, plywood, solid wood, other (specify); Type of wood or veneer (for solid wood, veneer and plywood): Wood species according to the annex; Type of foil or laminate: foil (finish, base), urea-laminated, melamine-laminated, low press laminated, high press laminated, PVC, ABS; Type of board (for chipboard, fibreboard and others): chipboard (multilayer, OSB, homogeneous,...), fiber board (MDF, hardboard, low density board,...).

4.6 Appearance

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Table 6 — Appearance

BUILD		GLOSS[a]	PORES		STAIN		REFLECTANCE[b]
clear			brushed		patina		
stained			open pored		limed		
tinted			halfopen pored		semitransparent		
opaque			close pored		transparent		
textured			free of pores		in pores		
others							

[a] In accordance with EN 13722.

[b] If required, in accordance with EN 13721.

5 Properties of coating systems

Fill in the blanks with the adequate information, when appropriate. See examples in Annex A (informative).

Table 7 — Properties of coating systems

Properties	Unit	Value	Reference document[a]
5.1- Adhesion			
5.2.-Impact resistance			
5.3.- Abrasion resistance			
5.4.-Scratch resistance			
5.5.- light resistance (colour fastness)			
5.6.- Metal marking			
5.7.- Blocking resistance			
5.8.- Mar resistance			
5.9 Surface resistance to cold liquids[b]			
5.9.1 Acetic acid (10%)			
5.9.2 Acetic acid (4,4%)			
5.9.3 Acetone			
5.9.4 Ammonia solution (10%)			
5.9.5 Blackcurrant juice			
5.9.6 Citric acid (10%)			
5.9.7 Cleansing agent			
5.9.8 Coffee (4g / 1l water)			
5.9.9 Disinfectant			
5.9.10 Endorsing ink			
5.9.11 Ethanol, non denatured (96%)			
5.9.12 Ethanol, non denatured (48%)			

Properties	Unit	Value	Reference document[a]
5.9.13 Ethyl-butyl acetate			
5.9.14 Milk, condensed (10% fat)			
5.9.15 Olive oil			
5.9.16 Paraffin oil			
5.9.17 Sodium carbonate (10%)			
5.9.18 Sodium carbonate (0,5%)			
5.9.19 Sodium chloride (15%)			
5.9.20 Sodium chloride (5%)			
5.9.21 Tea (10g/ 1l water)			
5.9.22 Deionized or distilled water			
5.10 Resistance to heat			
5.10.1 Resistance to dry heat[c]			
5.10.2 Resistance to wet heat[d]			
5.11 Film behaviour in changing conditions (ageing resistance)			
5.11.1 In changing temperature conditions			
5.11.2 In changing humidity conditions			

[a] European Standards should be used. If one does not exist, indicate the reference of the document used.

[b] Selected contact times: 16h, 1h, 10min, 2min, 10s.

[c] Selected temperatures: 160°C, 140°C, 100°C, 120°C, 85°C, 70°C.

[d] Selected temperatures: 100°C, 85°C, 70°C, 55°C.

6 Details to intended use and function

Fill in the blanks with the adequate information when appropriate. See examples in Annex A (informative).

Table 8 — Details to intended use and function

Domestic furniture		Contract furniture		Other uses		Function		Working surface		Vertical		Subsidiary surfaces	
Domestic (except kitchen and bathroom)		school		doors		table		table top		door		rear surface	
kitchen		hospital		ceilings		chair		desk		front drawer		bottom surface	
bathroom		military		floors		armchair		shelve		side		shelve	
office		laboratory		panelling		cupboard		others		others		others	
children		hotel		stairs		others							
others		others		others									

Security and toxicological information will be provided by safety data sheet.

Annex A
(Informative)

Examples of completed tables

The names, references, "x", units, standards, quantities and other data given in the following tables are examples provided to aid comprehension.

Table A.1 — Wet properties of each coat of the coating system

			COAT				
	UNIT[a]	REFERENCE DOCUMENT[b]	PRIMER[c]	STAIN	UNDERCOAT	FILLER	TOP COAT
Name			A - 501	HC – 200	5: PU – 302	NO FILLER	5: PU – 305
Additional component[d]					1: NCO – 800	NO FILLER	2: NCO - 803
Chemical nature of binder[e]			ALKYD RESIN		POLYURETHANE	NO FILLER	POLYURETHANE
Chemical nature of solvents[f]			Organic solvent	WATER + ALCOHOL	Organic solvent	NO FILLER	Organic solvent
Non volatile content - delivery - application	%	EN ISO 3251	35%		D: 50% A: 35%	NO FILLER	D: 40% A: 25%
Solvent content: - organic - “non” organic	%	CHROMATO-GRAPHY	100 % ORGANIC	50 % ALCOHOL 50% WATER	100 % ORGANIC	NO FILLER	100% ORGANIC
Flashpoint:	ºC	“CLOSED CUP” ISO 1516	20 ºC	15 ºC	12 ºC	NO FILLER	12ºC
Pot life	h	EN XXX	----------	----------	4h	NO FILLER	6h
Viscosity - delivery - application	S	EN ISO 2431	----------	----------	D: 28S A: 15S	NO FILLER	D: 23S A: 14S

[a] When applicable.

[b] The supplier or manufacturer has to indicate according to which standard, legislation or reference document in general, the results are given.

[c] Primer = e.g. putty, barrier coat, hydrogrund.

[d] Information has to be given for every component of each coat.

[e] For example: nitrocellulose, unsaturated polyester, saturated polyester, alkyd resin, acrylic resin.

[f] For example: water, volatile organic compounds, reactive organic solvent, solvent free.

Table A.2 — Details of build

			COAT				
	UNIT[a]	**REFERENCE DOCUMENT[b]**	**PRIMER[c]**	**STAIN**	**UNDERCOAT**	**FILLER**	TOP COAT
Layer thickness (dry)	µm	UNE 48031			36 µm		21 µm
Application rate (wet):[d]	g/m^2				100 g/m^2		80 g/m^2

[a] When applicable.

[b] The supplier or manufacturer has to indicate according to which standard, legislation or reference document in general, the results are given.

[c] Primer = e.g. putty, barrier coat, hydrogrund.

[d] Theoretical application rate. Theoretical consumption without overspray but with evaporating solvent, determination by weight.

Table A.3 — Application system

PROCESS[a]		COAT				
		PRIMER	STAIN	UNDERCOAT	FILLER	TOP COAT
Flatting					X	
Roller coating		X		X		X
Curtain coating					X	
Spray coating	air spray					
	airless		X			
	airmix					
	hot spraying					
	electrostatic					
	others					
Others	dipping					
	vacuum					
	powder coating					
	others					

[a] If necessary, special conditions can be written in the adequate case.

Table A.4 — Drying and curing

PROCESS[a]					COAT						
					Primer	Stain	Undercoat		Filler	Top coat	
							First	Second[b]		First	Second[b]
Ambient (23ºC± 2ºC and 50%±5% R.H.)			**Temperature (°C)**			23 ± 5					
			Speed (m/s)			------					
			Drying time	**Manipulation**		**[2,0**±0,5]h					
				Application other coat		**[4,0**±0,5]h					
Accelerated (more than 23ºC ± 2ºC)	warm temperature (more than 25ºC ± 2 ºC)	**Jet dryer**	**Temperature (°C)**								
			Speed (m/s)								
			Drying time	**Blocking**							
				Application other coat							
		Vertical oven	**Temperature (°C)**								
			Speed (m/s)								
			Drying time	**Blocking**							
				Application other coat							
		Trolleys	**Temperature (°C)**								
			Speed (m/s)								
			Drying time	**Blocking**							
				Application other coat							
		Infrared	**Temperature (°C)**							**35**±5	
			Speed (m/min)							**[10**±3]	
			Drying time	**Manipulation**						**[30**±15]min	
				Application other coat (previous sanding)						--------	
		Others (to be indicated)	**Temperature (°C)**								
			Speed (m/min)								

PROCESS[a]				COAT						
				Primer	Stain	Undercoat		Filler	Top coat	
						First	Second[b]		First	Second[b]
		Drying time	Manipulation							
			Application other coat							
UV	Low press lamps	Number of lamps				12				
		Power/lamp (W/cm)				40				
		Speed (m/s)				[8±2]				
	High press lamps	Number of lamps				2				
		Power/lamp (W/cm)				120				
		Speed (m/s)				[8±2]				
	Galio lamps	Number of lamps				------				
		Power/lamp (W/cm)				------				
		Speed (m/s)				-------				
	Others (to be indicated)									
EBC										
Others (to be indicated)										

[a] If necessary, special conditions can be written in the adequate gap. To fulfil as much gaps as necessary for every coat.

[b] To indicate if the application is after sanding or wet on wet.

Table A.5 — Surface to be coated and support

Details of surface to be coated[a]	- Type of wood or veneer	COARSE PORED WOOD (OAK)
	- Type of foil or laminate.	
	- Type of board (if directly coated).	
Substrate Board (support of surface to be coated)		PARTICLEBOARD

[a] Enter only the applicable terms in each case; use as many terms as necessary, choose generally among: Substrate of the surface to be coated [for veneer and laminated, normally: chipboard, MDF, hardboard, plywood, solid wood, other (specify)]; Type of wood or veneer [for solid wood, veneer and plywood: Wood species according to the annex; Type of foil or laminate:[(foil [finish, base), urea-laminated, melamine-laminated, low press laminated, high press laminated, PVC, AB.; Type of board (for chipboard, fibreboard and others): chipboard (multilayer, OSB, homogeneous,...), fiber board (MDF, hardboard, low density board,...)].

Table A.6 — Appearance

BUILD		GLOSS[a]	PORES		STAIN		REFLECTANCE[b]
clear		VALUE: 30	brushed		patina	X	Y= 30 %
stained	X		open pored	X	limed		
tinted		measured at an ANGLE: 85°	half-open pored		semitransparent		
opaque			close pored		transparent		According to EN 13721
textured		According to EN 13722	free of pores		in pores		
others							

[a] In accordance with EN 13722.

[b] If required, in accordance with EN 13721.

Table A.7 — Properties of coating systems

Properties	Unit	Value		Reference document[a]
5.1- Adhesion	Assessment code	4		EN XXX
5.2.-Impact resistance				
5.3.- Abrasion resistance				
5.4.-Scratch resistance				
5.5.- light resistance (colour fastness)	--------	----------		prEN 15187
5.6.- Metal marking				
5.7.- Blocking resistance				
5.8.- Mar resistance				
5.9 Surface resistance to cold liquids[b]	Assessment code	Contact time	Assessment	EN 12720
5.9.1 Acetic acid (10%)		10 min	4	
5.9.2 Acetic acid (4,4%)				
5.9.3 Acetone				
5.9.4 Ammonia solution (10%)				
5.9.5 Blackcurrant juice				
5.9.6 Citric acid (10%)				
5.9.7 Cleansing agent				
5.9.8 Coffee (4g / 1l water)				
5.9.9 Disinfectant				
5.9.10 Endorsing ink				
5.9.11 Ethanol, non denatured (96%)				
5.9.12 Ethanol, non denatured (48%)				
5.9.13 Ethyl-butyl acetate				
5.9.14 Milk, condensed (10% fat)				
5.9.15 Olive oil				
5.9.16 Paraffin oil				

Properties	Unit	Value		Reference document[a]
5.9.17 Sodium carbonate (10%)				
5.9.18 Sodium carbonate (0,5%)				
5.9.19 Sodium chloride (15%)				
5.9.20 Sodium chloride (5%)				
5.9.21 Tea (10g/ 1l water)				
5.9.22 Deionized or distilled water				
5.10 Resistance to heat	Assessment code	Temperature	Assessment	
5.10.1 Resistance to dry heat[c]		120ºC	3	EN 12722
5.10.2 Resistance to wet heat[d]		85ºC	4/5	EN 12721
5.11 Film behaviour in changing conditions (ageing resistance)	Kind of failure	Changing conditions	Assessment	
5.11.1 In changing temperature conditions		1h, 60 ºC / 1 h – 20 ºC	Without defects	UNE 48025
5.11.2 In changing humidity conditions		21 days, 90 % / 21 days 30 %	Without defects	UNE 56843

a European Standards should be used, if they do not exist, indicate the reference of the document used.

b Selected contact times: 16h, 1h, 10min, 2min, 10s.

c Selected temperatures: 160°C, 140°C, 100°C, 120°C, 85°C, 70°C

d Selected temperatures: 100°C, 85°C, 70°C, 55°C

Table A.8 — Details to intended use and function

Domestic furniture		Contract furniture		Other uses		Function		Working surface		Vertical		Subsidiary surfaces	
Domestic (except kitchen and bathroom)	X	school		doors		table	X	table top	X	door		rear surface	
kitchen		hospital		ceilings		chair		desk		front drawer		bottom surface	
bathroom		military		floors		armchair		others		side		shelve	
office		laboratory		panelling		cupboard				others		others	
children		hotel		stairs		others							
others		others		others									

Bibliography

[1] EN 12720:1997, *Furniture — Assessment of the surface resistance to cold liquids (ISO 4211:1979 modified)*

[2] EN ISO 1516:2002, *Determination of flash/no flash — Closed cup equilibrium method (ISO 1516:2002)*

[3] prEN 15187:2005, *Furniture — Assessment of the effect of light exposure*

[4] EN ISO 2813:1999, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85° (ISO 2813:1994, including Technical Corrigendum 1:1997)*

[5] EN ISO 3251:2003, *Paints, varnishes and plastics — Determination of non-volatile matter content (ISO 3251:2003)*

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