

CE MARKING

UK APPLICATION GUIDE



No 09/G010

This Guide forms a link between the CE Marking and UK Building Regulations and construction practice.

KERTO-S, KERTO-Q AND KERTO-L LAMINATED VENEER LUMBER (LVL)

Holder

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Generic type of construction product and use

Engineered wood product for use in construction.

This Guide relates to Kerto-S, Kerto-Q and Kerto-L laminated veneer lumber (LVL) for structural applications in accordance with BS EN 14374 : 2004. Additional information is provided to aid use in accordance with BS 5268-2 : 2002.

Basis of this Guide

This Guide gives information supporting the CE Marking to enable the product to be incorporated satisfactorily into the construction works according to UK requirements. This Guide must be read in conjunction with the CE Marking and its accompanying information.

It covers regulatory compliance and voluntary aspects where appropriate. The presentation by the manufacturer of the information underwriting CE Marking has been taken as valid and requiring no further corroboration in accordance with the Construction Products Directive.

A Declaration of Conformity against the relevant technical specification has been provided by the manufacturer as a condition of the issue of this document.

Users must satisfy themselves that the product's performance fulfils their requirements and that the product is being used correctly. Readers are advised to check the current validity of the CE Marking with the Application Guide holder and the validity of this document with the BBA website: www.bbacerts.co.uk

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Part 1 Product Summary

1.1 Kerto-S, Kerto-Q and Kerto-L LVL comprise laminated spruce (*Picea abies*) or pine (*Pinus sylvestris*) veneers of nominal thickness 3 mm, bonded together with a type WBP, phenol-formaldehyde adhesive to BS EN 301 : 2006. Each lamination comprises a series of veneers, each 1910 or 2580 mm long, laid with the grain running parallel. For Kerto-Q and Kerto-L some of the veneers are laid cross grain (see Table 1).

1.2 Kerto-S is available in thicknesses from 27 mm to 90 mm. Kerto-Q and Kerto-L are available in thicknesses from 27 mm to 69 mm. The range of standard sizes and tolerances is given in Tables 2 and 3 respectively.

Table 1 Lay-up of Kerto-Q and Kerto-L products

Nominal thickness (mm)	Number of plies	Lay-up
27	9	- -
33	11	- -
39	13	- - -
45	15	- - -
51	17	- - -
57	19	- - - -
63	21	- - - -
69	23	- - - - -

Table 2 Standard sizes of the Kerto products

Kerto product ⁽¹⁾	Thickness (mm)	Width/height (mm)										
		200	220	225	240	260	300	360	400	450	500	600
-S/-Q/-L	27	X	X	X	X		X					
-S/-Q	33	X	X	X	X	X	X					
-S/-Q	39	X	X	X	X	X	X					
-S/-Q	45	X	X	X	X	X	X	X				
-S/-Q	51	X		X		X	X	X	X			
-S/-Q	57	X		X		X	X	X	X	X		
-S/-Q	63	X		X		X	X	X	X	X	X	
-S/-Q	69	X		X		X	X	X	X	X	X	X
-S	75	X	X	X	X	X	X	X	X	X	X	X
-S	81	X		X		X	X	X	X	X	X	X
-S	90	X	X	X	X	X	X	X	X	X	X	X

(1) Kerto-Q is also available in other widths of up to a maximum of 2500 mm, and Kerto-L in depths up to 300 mm only.

Table 3 Tolerances of Kerto products

Dimension (mm)	Size	Tolerance
Thickness	All	+ (0.8 + 0.03 t) mm
		and - (0.4 + 0.03 t) mm
Width	< 400	± 2 mm
	≥ 400	± 0,5%
Length	All	± 5.0 mm


Part 2 CE Marking – Overview


2.1 CE Marking includes technical information in the form of declared values. It enables a product to be legally placed on the market in any EC Member State. However, this does not necessarily mean the product will be suitable for all end uses in all Member States. A judgement must be made on whether the product is suitable for a particular intended use according to the relevant regulations.


2.2 Technical information given by the CE Marking and the related harmonised standard is indicated in this Guide by the prefix 

2.3 BBA opinions on the suitability of the product in relation to UK regulations and construction practice relates to the information as given in the CE Marking and the manufacturer's declaration and are indicated by the prefix 

2.4 The CE Marking is indelibly marked on the product. The complete technical information is contained in the manufacturer's declaration of conformity.

 2.5 The CE Marking example for this product (see Figure 1) indicates that it was affixed by the Guide holder at its Lohja factory and is under supervision of VTT Building and Transport (notified body number 0809).

 2.6 BS EN 14374 : 2004 is the harmonised technical specification which identifies the relevant characteristics and appropriate test methods and designates the product as a structural LVL.

 2.7 Additional declared values appear on the manufacturer's declaration of conformity, relating to:

- bending strength
- tension strength
- compression strength
- shear strength
- modulus of elasticity
- shear modulus
- density
- reaction-to-fire class
- release of formaldehyde class
- durability class.


Figure 1 Typical CE Marking



Part 3 CE Marking Detailed interpretation

Of the six Essential Requirements under the Construction Products Directive (CPD), only the following are relevant to the UK in relation to LVL in the considered applications.

Essential Requirement 1 – Mechanical resistance and stability

 3.1 Kerto is classified as structural LVL. For structural applications, design and detailing should be carried out in accordance with BS EN 1995-1-1 : 2004 (Eurocode 5) together with its National Annex.

 3.2 The characteristic strength values associated with the CE Marking can be converted into long-term grade strength values for the BS 5268-2 : 2002 permissible stress basis of design by using the equation:

$$X_d = k_{mod} X_k / (\gamma_F \gamma_M)$$

where:

X_d = Long-term grade strength value

X_k = Characteristic strength value

k_{mod} = Modification factor for strength and service class 1 = 0.7

γ_M = Materials partial factor for LVL = 1.2

γ_F = Load partial factor = 1.425

3.3 The characteristic moduli values may be taken as equivalent to the long-term moduli values for permissible stress basis of design. Grade strengths and moduli for use in accordance with BS 5268-2 : 2002 derived in accordance with the above are given in Table 4.

Table 4 Grade strengths and moduli for use in accordance with BS 5268-2 : 2002

Characteristic (unit)	Kerto-S	Kerto-Q	Kerto-L
Bending edgewise – joist (N·mm ⁻²)	18.01	13.10	8.39
Bending flatwise – plank (N·mm ⁻²)	20.47	14.74	10.23
Tension parallel to grain (N·mm ⁻²)	14.33	10.64	6.96
Tension edgewise perpendicular to grain (N·mm ⁻²)	0.33	2.46	–
Compression parallel to grain (N·mm ⁻²)	14.33	10.64	7.78
Compression edgewise perpendicular to grain (N·mm ⁻²)	2.46	3.68	3.27
Compression flatwise perpendicular to grain (N·mm ⁻²)	0.74	0.74	0.82
Shear edgewise (N·mm ⁻²)	1.68	1.84	1.43
Shear flatwise (N·mm ⁻²)	0.94	0.53	0.53
Min MOE ⁽¹⁾ parallel to grain (N·mm ⁻²)	11600	8800	6500
Mean MOE ⁽¹⁾ parallel to grain (N·mm ⁻²)	13800	10500	7500
Min G ⁽²⁾ parallel to grain (N·mm ⁻²)	400	400	450
Mean G ⁽²⁾ parallel to grain (N·mm ⁻²)	600	600	550
characteristic density (kg·m ⁻³)	480	480	410
mean density (kg·m ⁻³)	510	510	440

(1) MOE = modulus of elasticity.

(2) G = shear modulus.

Essential Requirement 2 – Safety in case of fire

Reaction to fire



3.4 The declared value for reaction to fire is Euroclass D-s1, d0.



3.5 The product is assessed as having a Class 3 surface spread of flame classification in accordance with BS 476-7 : 1997. In common with other timber products, the product is a combustible material. This classification may limit the allowable exposed surface required to meet regulatory requirements.

Resistance to fire

3.6 Guidance is given in BS 5268-4.1 : 1978 on the methods of assessment of fire resistance of timber members. The charring rate for category (a) species listed in Table 1 of this Standard is applicable.

Essential Requirement 3 – Hygiene, health and environment



3.7 The declared class for release of formaldehyde (HCHO) is E1.



3.8 Formaldehyde is not subject to control under UK Building Regulations for this product and use. Products of class E1 can be used without causing an indoor air concentration greater than 0.1 ppm HCHO in conditions according to BS EN 717-1 : 2004. Therefore, the quantity of gas emitted from the board alone, in the context of use given in this Guide, should not increase the level of gas within the building to an extent which will affect habitability.

Aspects of durability, serviceability and identification



3.9 The declared class for natural durability against biological attack is type 4 in accordance with BS EN 350-2 : 1994.



3.10 LVL of this type is for use in biological use classes 1 and 2 as given in BS EN 335-3 : 1996. This type of LVL is appropriate for protected external applications (eg behind cladding or under roof coverings) but is also capable of resisting weather exposure for short periods (eg when exposed during the construction). It is also suitable for interior situations where the service moisture condition is raised above humidity of dry conditions. The product has been assessed as untreated, therefore, its use is restricted in roof spaces in the geographical areas specified in Approved Document A to the England and Wales Building Regulations (A1/2, clause 2B2) in relation to information on the House Longhorn beetle (*Hylotrupes bajulus* L).

Attestation of conformity

3.11 The CE Marking has been affixed on the basis of compliance with the relevant requirements of BS EN 14374 : 2004. The Attestation of Conformity level associated with the CE Marking is system 1. Attestation of Conformity is intended to ensure that the product is made and tested on a consistent basis. It involves tasks for the manufacturer and certification body.

3.12 Tasks for the manufacturer are:

- Factory Production Control
- further testing of samples taken at the factory
- initial type-testing by a notified body
- initial type-testing or assessment.

3.13 Tasks for the certification body are:

- initial type-testing
- initial inspection of factory and the Factory Production Control
- continuous surveillance, and assessment and approval of the Factory Production Control.

3.14 These tasks have been carried out by VTT Building and Transport (notified body number 0809). It has issued Certificates of Conformity:

Lohja factory

0809-CPD-0505 for Kerto-S and Kerto-Q

0809-CPD-0579 for Kerto-L

Punkaharju factory

0809-CPD-0506 for Kerto-S and Kerto-Q

0809-CPD-0580 for Kerto-L.

Part 4 Factors relating to UK Regulations

UK implementation of the CPD

4.1 Statutory Instrument 1991, No 1620. The Building and Building Construction Products Regulations 1991 as amended by the Construction Products (Amendment) Regulations 1994 (Statutory Instruments 1994, No 3051)

4.2 These Regulations implement Council Directive 89/106/EEC of 21 December 1988⁽¹⁾, modified by the Council Directive 93/68/EEC of 22 July 1993 and lay down the criteria for CE Marking of construction products. Where the stated performance values accompanying the CE Marking pass the minimum legal requirements for the intended use, if used appropriately and in satisfactory conditions, a product bearing CE Marking shall be presumed by the building control body to satisfy the relevant requirements unless there are reasonable grounds for suspecting otherwise.

(1) Known as the Construction Products Directive (CPD).

The Building Regulations 2000 (as amended) (England and Wales)

4.3 In the opinion of the BBA, the CE Marking indicates that Kerto LVL, if used in accordance with the provisions of this Guide and the conditions associated with CE Marking, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Requirement: A1	Loading
Comment:	When contributing to the structural strength and stability of a timber structure, the product is satisfactory provided the design is in accordance with sections 3.1 and 3.2 of this Guide. The products have been assessed as untreated and, therefore, are restricted under this Regulation. See sections 3.8 of this Guide.
Requirement: B2	Internal fire spread (linings)
Requirement: B3(4)	Internal fire spread (structure)
Comment:	The product has a declared reaction to fire class of D-s1, d0. The product has a Class 3 surface and is a combustible material. See sections 3.3 and 3.4 of this Guide. The fire resistance of the product can be determined using the procedures referenced in section 3.4 of this Guide.
Requirement: Regulation 7	Materials and workmanship
Comment:	The CE Marking shows that the product can contribute to a construction satisfying these Regulations.

The Building (Scotland) Regulations 2004 (as amended)

4.4 In the opinion of the BBA, the CE Marking indicates that Kerto LVL, if used in accordance with the provisions of this Guide and the conditions associated with CE Marking, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The CE Marking shows that the product can contribute to a construction satisfying these Regulations.
Regulation:	9	Building standards – construction
Standard:	1.1(a)(b)	Structure
Comment:		The product is deemed to have sufficient strength and stability to sustain and transmit the design loads and, therefore, can contribute to satisfying this Standard, with reference to clause 1.1.1 ⁽¹⁾⁽²⁾ . See sections 3.1 and 3.2 of this Guide.
Standard:	2.3	Structural protection
Standard:	2.5	Internal linings
Comment:		The product has a declared reaction to fire class D-s1, d0 and, therefore, is deemed to be combustible, is classified as 'high risk' in relation to reaction to fire and able to contribute to satisfying these Standards, with reference to clauses 2.3.0 ⁽¹⁾⁽²⁾ , 2.3.2 ⁽¹⁾⁽²⁾ and 2.5.1 ⁽¹⁾⁽²⁾ . The product has a Class 3 surface and is a combustible material. See sections 3.3 and 3.4 of this Guide. The fire resistance of the product can be determined using the procedures referenced in section 3.4 of this Guide. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2000 (as amended)

4.5 In the opinion of the BBA, the CE Marking indicates that Kerto LVL, if used in accordance with the provisions of this Guide and the conditions associated with CE Marking, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The CE Marking shows that the product can contribute to a construction satisfying these Regulations.
Regulation:	D1	Stability
Comment:		When contributing to the structural strength and stability of a timber structure, the product is deemed to be satisfactory provided the design is in accordance with sections 3.1 and 3.2 of this Guide.
Regulation:	E3(a)(b)	Internal fire spread – Linings
Regulation:	E4(4)	Internal fire spread – Structure
Comment:		The product has a declared reaction to fire class of D-s1, d0. The product has a Class 3 surface and is a combustible material. See sections 3.3 and 3.4 of this Guide. The fire resistance of the product can be determined using the procedures referenced in section 3.4 of this Guide.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

4.6 Information in this Guide is intended to assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: *Health and safety* (section 6.4).

Part 5 Factors relating to UK home warranty provider

NHBC Standards 2008

In the opinion of the BBA, the CE Marking indicates that Kerto LVL, if used in accordance with the provisions of this Guide and the conditions associated with CE Marking, will satisfy or contribute to satisfying the various NHBC Standards in the following situations:

- Chapter 5.2 Suspended ground floors
- Chapter 6.2 External timber framed walls
- Chapter 6.3 Internal walls
- Chapter 6.4 Timber and concrete upper floors
- Chapter 7.1 Flat roofs and balconies
- Chapter 7.2 Pitched roofs

Comment: The product, when used in timber-frame construction, can contribute to the structural strength and stability of the building provided the design is in accordance with sections 3.1 to 3.8 of this Guide. The product has been assessed as untreated and therefore restricted under these requirements.

Part 6 Additional factors

Installation



- 6.1 The product can be cut and fixed using conventional woodworking techniques.
- 6.2 The hygroscopic properties of LVL differ from those of solid timber and, under the same exposure conditions, its equilibrium moisture content can be 2% to 3% less than, and the time taken to reach its equilibrium moisture content greater than, that for solid timber.
- 6.3 Where a building construction is likely to be sensitive to the relative movement of the product, it is recommended that the product should:
- be checked for moisture content at the time of the installation; the determination of moisture content by a calibrated moisture meter will be sufficiently accurate for this purpose
 - have a moisture content at the time of installation close to the moisture content it will attain in service.

Health and safety



- 6.4 Normal precautions should be exercised to avoid inhalation of wood dust when cutting, drilling and sanding the product.

Environmental information

Kerto is certified under PEFC⁽¹⁾ and has a Chain of Custody independently audited and verified by BM-TRADA (BMT-PEFC-0009) and Bureau Veritas International (No 200618). Holding these licences provides an assurance that the timber used in Kerto originates from certified, sustainable and legal sources.

(1) Programme for the Endorsement of Forest Certification.

Part 7 Bibliography

- BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*
- BS 5250 : 2002 *Code of practice for control of condensation in buildings*
- BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*
- BS 5268-4.1 : 1978 *Structural use of timber — Fire resistance of timber structures — Recommendations for calculating fire resistance of timber members*
- BS EN 301 : 2006 *Adhesives, phenolic and aminoplastic, for load-bearing timber structures: Classification and performance requirements*
- BS EN 335-3 : 1996 *Durability of wood and wood-based products — Definition of hazard classes of biological attack — Application to wood-based panels*
- BS EN 717-1 : 2004 *Wood-based panels — Determination of formaldehyde release — Formaldehyde emission by the chamber method*
- BS EN 789 : 2004 *Timber structures — Test methods — Determination of mechanical properties of wood-based panels*
- BS EN 1058 : 1996 *Wood-based panels — Determination of characteristic values of mechanical properties and density*
- BS EN 1195 : 1998 *Timber structures — Test methods — Performance of structural floor decking*
- BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
- BS EN 12871 : 2001 *Wood-based panels — Performance specifications and requirements for load bearing boards for use in floors, walls and roofs*
- BS EN 13986 : 2004 *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking*
- BS EN 14374 : 2004 *Timber structures — Structural laminated veneer lumber — Requirements*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- CEN/TS 12872 : 2008 *Wood-based panels — Guidance on the use of load-bearing boards in floors, walls and roofs*

Part 8 Terms and Conditions

Conditions

8.1 This Guide:

- relates only to the product that is named, described, installed, used and maintained as set out in this Guide;
- is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Guide;
- is valid only within the UK;
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- is copyright of the BBA;
- is subject to English law.

8.2 Publications and documents referred to in this Guide are those that the BBA deems to be relevant at the date of issue or re-issue of this Guide and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

8.3 This Guide will remain valid for an unlimited period provided that:

- the product, the manufacture and/or fabrication remain unchanged;
- the CE Marking remains valid;
- it is reviewed by the BBA as and when it considers appropriate: and
- the manufacturer confirms the Declaration of Conformity at six-monthly intervals.

8.4 In granting this Guide, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- the right of the Guide holder to market, supply, install or maintain the product;
- the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works: and
- the accuracy and validity of the information relating to the CE Marking.

8.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Guide are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Guide or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Guide, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.

On behalf of the British Board of Agrément



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