European Organisation for Technical Approvals

Europäische Organisation für Technische Zulassungen

Organisation Européenne pour l'Agrément Technique

ETAG 012

Edition June 2002

GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL

OF

LOG BUILDING KITS

EOTA
KUNSTLAAN 40 AVENUE DES ARTS,
1040 BRUSSELS

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FOREWORD

Background of the subject

This Guideline has been drawn up by EOTA Working Group 02.03/04 – Log Building Kits. The Working Group consisted of members from 8 EEC-countries; Austria, Belgium, Finland (convenorship), France, Germany, Norway, Portugal and Sweden. In the participating Member States co-operation from industry has been taken care of by their representatives. From C.E.I. Bois, one representative from Austria and one representative from Finland have been members of the WG.

In all the main principles, the Timber Frame Building Kits Guideline is followed. A separate guideline for log building kits is, however, motivated because of the different technical characteristics of the two construction principles. The main load-bearing systems of the walls are different, as well as the building physical function of the wall constructions.

The guideline sets out the performance requirements for log building kits used in building construction, the verification methods used to examine the performance, the assessment methods used to evaluate the performance for the intended use, and the presumed conditions for the design and installation of the kits in the works.

Log building kits according to this guideline are construction products defined in the Mandate (ref. Construct 98/307 Rev 1) as follows:

> This Mandate covers those industrially prepared kits, marketed as a building, that are made of pre-designed and prefabricated components intended for production in series. This Mandate defines minimum requirements on the contents of such a kit. Partial kits falling below these minimum requirements are outside the scope of the Mandate and shall not be CE Marked on the basis of the resulting ETAG. These minimum requirements comprise all of the following: the structural elements of the building, the essential components of the external envelope including all necessary thermal insulation, and the internal linings in so far as they are necessary for the satisfaction of the Essential Requirements applied to the building.
>
> The design process (including the approval of detailed plans, applications for planning permission, building permits, …) must comply with the procedures foreseen in the Member States in which the house is to be built. This Mandate does not amend this process in any way. The completed building (the works) must comply with the building regulations (regulations on works) applicable in the Member States in which the house is to be constructed. The procedures foreseen in that Member State for demonstrating compliance with the building regulations must also be followed by the entity held responsible for this act. This Mandate does not amend this process in any way.
>
> Although some components may be prepared in different factories, only the final kit for delivery, and not the different components, can be CE Marked as a whole, under the responsibility of the seller.

The declared performance of the kit shall be compared with the relevant building regulations from case to case, taking into account the intended use of the kit in relation to type of building, site, etc. An ETA is a favourable technical assessment of a construction product for an intended use, i.e. incorporated in the works. The ETA deals only with the product, and states classes or product characteristics to be used by the designer of the works.

Verification and assessment methods of load-bearing performance are based on the provisions in EUROCODE 5. The code has so far been published by CEN as a European prestandard ENV 1995, and is planned to replace the national structural design codes of timber structures in all the Member States. A condition for the application of this guideline to CE marked log building kits is that declared structural performance based on EUROCODE 5 is accepted in the Member States in relation to their building regulations.

Verification and assessment methods of performance in relation to fire is based on the publication of European standards concerning classification for reaction to fire and resistance to fire. If the publication of these standards shall be postponed too long, it may be considered to apply national classifications on a case-by-case basis in a transition period before the relevant European standards are available.

Verification of the performance of log building kits requires an assessment of many construction details, such as the performance of joints between components with respect to air permeability, watertightness

and durability. Relevant standardised verification methods may not always be available or judged to be necessary since the performance of many construction details has been proven to be acceptable by long-term experience from use in traditional designs. In accordance with the general advice in the Format of Guidelines for ETAs it is recognised in this guideline that some product properties can be assessed by a pass/fail approach on the basis of engineering judgement and experience from the use of well-known materials and designs.

REFERENCE DOCUMENTS

Reference documents are referred to within the body of the ETAG and are subject to the specific conditions mentioned therein.

The *list of reference documents* (mentioning the year of issue) for this ETAG is given in annex B. When additional parts for this ETAG are written afterwards, they may comprise modifications to the list of reference documents applicable to that part.

Updating conditions

The edition of a reference document given in this list is that which has been adopted by EOTA for its specific use.

When a new edition becomes available, this supersedes the edition mentioned in the list only when EOTA has verified or re-established (possibly with appropriate linkage) its compatibility with the guideline.

EOTA Technical Reports go into detail in some aspects and as such are not part of the ETAG but express the common understanding of existing knowledge and experience of the EOTA-bodies at that moment. When knowledge and experience is developing, especially through approval work, these reports can be amended and supplemented.

EOTA Comprehension Documents permanently take on board all useful information on the general understanding of this ETAG as developed when delivering ETA's in consensus by the EOTA members. Readers and users of this ETAG are advised to check the current status of these documents with an EOTA member.

EOTA may need to make alterations/corrections to the ETAG during its life. These changes will be incorporated into the official version on the EOTA website www.eota.be and the actions catalogued and dated in the associated **History File**.

Readers and users of this ETAG are advised to check the current status of the content of this document with that on the EOTA website. The front cover will indicate if and when amendment has taken place.

SECTION ONE: INTRODUCTION

1 PRELIMINARIES

1.1 LEGAL BASIS

This ETAG has been established in compliance with the provisions of the Council Directive 89/106/EEC (CPD) and has been established taking into account the following steps:

- the final mandate issued by the EC :09/11/1998
- the final mandate issued by the EFTA :09/11/1998
- adoption of the Guideline by the Executive Commission of EOTA :12/06/2001
- opinion of the Standing Committee for Construction :18-19/12/2001
- endorsement by the EC : 28/05/2002

This document is published by the Member States in their official language or languages according to art. 11.3 of the CPD.

No existing ETAG is superseded.

1.2 STATUS OF ETAG

a. **An ETA is one of the two types of technical specifications** in the sense of the EC 89/106 Construction Products Directive. This means that Member States shall presume that the approved log building kits are fit for their intended use, i.e. they enable works in which they are employed to satisfy the Essential Requirements during an economically reasonable working life, provided that :

- the works are properly designed and built;
- the conformity of the products with the ETA has been properly attested.

b. **This ETAG is a basis for ETA's**, i.e. a basis for technical assessment of the fitness for use of a log building kit for an intended use. An ETAG is not itself a technical specification in the sense of the CPD.
This ETAG expresses the common understanding of the approval bodies, acting together within EOTA, as to the provisions of the Construction Products Directive 89/106 and of the Interpretative Documents, in relation to the log building kits and uses concerned, and is written within the framework of a mandate given by the Commission and the EFTA secretariat, after consul-ting the Standing Committee for Construction.

c. When accepted by the European Commission after consultation with the Standing Committee for Construction this **ETAG is binding** for the issuing of ETA's for the log building kits for the defined intended uses.
The application and satisfaction of the provisions of an ETAG (examinations, tests and evaluation methods) leads to an ETA and a presumption of fitness of a log building kit for the defined use only through an evaluation and approval process and decision, followed by the corresponding attestation of conformity. This distinguishes an ETAG from a harmonised European standard which is the direct basis for attestation of conformity.

Where appropriate, log building kits which are outside of the precise scope of this ETAG may be considered through the approval procedure without guide-lines according to art. 9.2 of the CPD.

The requirements in this ETAG are set out in terms of objectives and of relevant actions to be taken into account. It specifies values and characteristics, the conformity with which gives the presumption that the requirements set out are satisfied, wherever the state of art permits and after having been confirmed as appropriate for the particular product by the ETA.

This guideline indicates alternate possibilities for the demonstration of the satisfaction of the requirements.

2 SCOPE

2.1 SCOPE

This Guideline covers those industrially prepared log building kits, marketed as a building, that are made of pre-designed and prefabricated components intended for production in series.

The components in a kit are manufactured as pre-cut logs supplemented with timber members or structural frames or additional materials on site, as completely prefabricated two-dimensional building elements, or as complete building sections where the floors, walls and roof are connected in the factory. Although some components may be prepared in different factories, only the final kit for delivery, and not the different components, can be CE marked as a whole, under the responsibility of the ETA holder.

The minimum content of the kit to be assessed shall include the following, as far as is necessary for the satisfaction of the Essential Requirements applied to the building:

- All structural elements necessary for the stability of the building including walls, floors, roof structures, their connections, and the connections of the building to the substructure
- All components of the external envelope, including all necessary thermal insulation and the internal lining
- Preparatory measures for the installation of plumbing, heating, cooling, ventilation and electrical services.
- Constructional solutions to prevent harmful effects of settling.

The kits are assembled according to pre-designed technical solutions for joints and construction details which are part of the log building kit specification for assessment and are supplied as part of each kit.

Components such as windows, external doors, brick cladding, thermal insulation, internal lining and roofing materials which are essential for the performance of the external envelope shall always be specified and assessed as a condition for the fitness in use of the kit, but may not necessarily be delivered by the kit supplier. The connections and detailing of the interface between such components and the kit shall always be part of the kit description.

Products such as internal doors, stairs, surface coverings etc. may be part of the log building kit.

Service installations and complementary structures (including foundation or substructure) are not covered by this Guideline.

Kits which do not cover all the main structural elements and the essential components of the external envelope of a building, e.g. single logs sold separately, are outside this scope and shall not be CE-marked on the basis of this Guideline.

Building kits which have the load bearing construction made of mainly vertically logs fitted together with vertical seams are outside the scope as are building kits containing a frame made of logs in various directions with an infill. This kind of products may be considered through the approval procedure without Guidelines according to art. 9.2 of the CPD.

2.2 USE CATEGORIES/PRODUCT FAMILIES/KITS AND SYSTEMS

The product performance of log building kits in relation to the essential requirements will normally have to correspond with national regulations for the works relevant to the intended use of the kit. These requirements will vary between the Member States and the kit performances have to be expressed in numerical terms. For performance in case of fire, standard European fire classification is applied.

2.3 ASSUMPTIONS

The state of the Art does not enable the development, within a reasonable time, of full and detailed verification methods and corresponding technical criteria/guidance for acceptance for some particular aspects or log building kits. This ETAG contains assumptions taking account of the state of art and makes provisions for appropriate, additional *case by case approaches* when examining ETA-applications, within the general framework of the ETAG and under the CPD consensus procedure between EOTA members.

The guidance remains valid for other cases which do not deviate significantly. The general approach of the ETAG remains valid but the provisions then need to be used case by case in an appropriate way. This use of the ETAG is the responsibility of the ETA-body which receives the special application, and subject to consensus within EOTA. Experience in this respect is collected, after endorsement in EOTA-TB, in the ETAG-Format-Comprehension document.

3 TERMINOLOGY

3.1 COMMON TERMINOLOGY AND ABBREVIATIONS

The common terminology is given in Annex A.

3.2 TERMINOLOGY SPECIFIC TO THIS ETAG

Area-equal thickness	The total cross-sectional area of the round log plus seam divided by the corresponding net height
Cove	A carving on the underside of the log for the sealing strip
Cross corner	A joint made by notching between two or several logs or two walls crossing each other
Design climatic conditions:	Outdoor and indoor air temperature and moisture levels, snow loads, wind speed levels etc, which may be stated in national building regulations or in other specifications to be used for design.
Dowel (peg)	A piece of wood or metal for fixing two logs together horizontally
Grading	Logs may be visually graded according to two grading class systems: 1. Strength: how the knots, slope of grain etc. influence on the load-bearing properties of the log 2. Appearance: how the knots, slope of grain etc. are experienced by man
Integrated components:	Components such as windows, doors, conduits etc. which are built into the main building parts.
Joint/Connection	Junction between two materials, components, elements or parts of a building
Laminated log	A log made by gluing together two or several pieces of wood.
Log	See planed log, laminated log and round log
Log beam	A beam composed of two or several logs bolted together
Log building	The type of building, where the main parts of the construction (characteristically the walls) is a log frame
Log frame	A construction, where the walls (load bearing walls at least) are made of solid wood logs which are horizontally and vertically fixed together with dowels or tie rods or both.
Log (support) pilaster	Log wall can be supported with a single (one-sided) or double (bilateral) vertical log pilaster bolted together with the log wall
Main building parts:	Main construction parts of a building like walls, floors and roof.
Pillar (post)	A round or rectangular vertical support of wood (often supplied with a threaded bolt) for bearing loads above

Planed log (square Log)	A log which has an almost rectangular shape. The planed log may also be tongued and grooved.
Pre-designed:	Pre-determined technical solutions.
Production in series:	Production of building kits for a series of buildings on the basis of the same materials, structural design and construction details. The buildings and components do not have to be exactly of the same size or shape.
Production unit:	Production line or production facility where the parts of the log kit are manufactured.
Round log	A log which has a round or almost round shape.
Sealing strip	A band of the flexible material for tightening the seam between two logs
Seam	Horizontal connection between two logs
Separating walls and floors	Walls and floors where national regulations normally require sound insulation and fire resistance performance, e.g. structures between residential flats
Settlement	The sinking of the log wall due to load and shrinkage of logs, but also due to tightening of the seams
Settling space	A margin between a rigid construction (door, window, brick wall etc.) and a settling construction above for the free settlement of the log wall
Supporting documents:	Document which are a formal part of the approval, but where the content is not included in the ETA-document itself. The valid version of a supporting document is the last updated version filed by the approval body.
Suspended floors:	Floor structures with a free span between supports.
T-batten	T-profile for fixing door, window or brick wall to the log wall or fixing the wall permitting its free settlement
Tie rod	A long bolt with base plate and nut mainly in the exterior cross corner for binding the log wall in its entire height.
Two-stage principle	Design principle for claddings, joints etc. in the exterior envelope. An outer construction part (e.g. layer) serves to protect an inner construction part from direct driving rain and sun radiation. The space between the construction parts is ventilated and drained.
Wet area surface:	Floors and wall areas in bathrooms and other “wet rooms” where the surface may be exposed to water spray from showers etc., and where the manufacturer declare the surfaces to be watertight.

SECTION TWO : GUIDANCE FOR THE ASSESSMENT OF THE FITNESS FOR USE

GENERAL NOTES

(a) Applicability of the ETAG

This ETAG provides guidance on the assessment of a family of log building kits and their intended uses. It is the manufacturer or producer who defines the log building kit for which he is seeking an ETA and how it is to be used in the works, and consequently the scale of the assessment.

It is therefore possible that for some log building kits, which are fairly conventional, only some of the tests and corresponding criteria are sufficient to establish fitness for use. In other cases, e. g. special or innovative log building kits or materials, or where there is a range of uses, the whole package of tests and assessment may be applicable.

Common clauses:

(b) General lay out of this section

The assessment of the fitness of log building kits with regard to their fitness for intended use in construction works is a process with three main steps:

- Chapter 4 clarifies *the specific requirements for the works* relevant to the log building kits and uses concerned, beginning with the Essential Requirements for works (CPD art. 11.2) and then listing the corresponding relevant characteristics of log building kits.
- Chapter 5: extends the list in chapter 4 into more precise definitions and *the methods available to verify* product characteristics and to indicate how the requirements and the relevant product characteristics are described. This is done by test procedures, methods of calculation and of proof, etc. (selection of the appropriate methods)
- Chapter 6 provides guidance on *the assessing and judging methods* to confirm fitness for the intended use of the log building kits.
- Chapter 7, *assumptions and recommendations* are only relevant in as far as they concern the basis upon which the assessment of the log building kit is made concerning their fitness for the intended use.

(c) Levels or classes or minimum requirements, related to the essential requirements and to the product performance (see ID clause 1.2 and EC Guidance Paper E)

According to the CPD “Classes” in this ETAG refer only to mandatory levels or classes laid down, in the EC-mandate.

This ETAG indicates however the compulsory way of expressing relevant performance characteristics for the log building kit. If, for some uses at least one Member state has no regulations, a manufacturer always has the right to opt out of one or more of them, in which case the ETA will state “no performance determined” against that aspect, except for those properties for which, when no determination has been made, the log building kit doesn’t any longer fall under the scope of the ETAG; such cases shall be indicated in the ETAG.

(d) Working life (durability) and serviceability

The provisions, test and assessment methods in this guideline or referred to, have been written, based upon the assumed intended working life of the log building kit for the intended use of 50 years for the load-bearing structure and for non-accessible components and materials, and 25 years for repairable or replaceable components and materials like claddings, roofing materials, exterior trims, and integrated components like windows and doors,, provided that the log building kit is subject to appropriate use and maintenance (cf. Ch. 7). The use of components and materials with shorter intended working life must be clearly stated in the ETA. These provisions are based upon the current state of art and the available knowledge and experience.

An “assumed intended working life” means that it is expected that, when an assessment following the ETAG-provisions is made, and when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the essential requirements.

The indications given as to the working life of a log building kit cannot be interpreted as a guarantee given by the producer or the approval body. They shall only be regarded as a means for the specifiers to choose the appropriate criteria for log building kits in relation to the expected, economically reasonable working life of the works (based upon ID. par. 5.2.2).

(e) Fitness for the intended use

According to the CPD it has to be understood that within the terms of this ETAG, log building kits shall "have such characteristics that the works in which they are to be incorporated, assembled, applied or installed, can, if properly designed and built, satisfy the Essential Requirements" (CPD, art. 2.1).

Hence, the log building kits shall be suitable for use in construction works which (as a whole and in their separate parts) are fit for their intended use, account being taken of economy, and in order to satisfy the essential requirements. Such requirements shall, subject to normal maintenance, be satisfied for an economically reasonable working life. The requirements generally concern actions which are foreseeable. "(CPD Annex I, preamble).

4 REQUIREMENTS

This chapter sets out the aspects of performance to be examined in order to satisfy the relevant Essential Requirements, by:

- expressing in more detail, within the scope of the ETAG, the relevant Essential Requirements of the CPD in the Interpretative Documents and in the mandate, for works or parts of the works, taking into account the actions to be considered, as well as the expected durability and serviceability of the works.
- applying them to the scope of the ETAG for log building kits and where appropriate its constituents, components and intended uses, and providing a list of relevant log building kit characteristics and other applicable properties.

When a log building kit characteristic or other applicable property is specific to one of the Essential Requirements, it is dealt with in the appropriate place. If, however, the characteristic or property is relevant to more than one Essential Requirement, it is addressed under the most important one with cross reference to the other(s). This is especially important where a manufacturer claims “No performance determined” for a characteristic or property under one Essential Requirement and it is critical for the assessing and judging under another Essential Requirement. Similarly, characteristics or properties which have a bearing on durability assessments may be dealt with under ER 1 to ER 6, with reference under 4.7. Where there is a characteristic which only relates to durability, this is dealt with in 4.7

This chapter also takes into account further requirements, if any (e.g. resulting from other EC Directives) and identifies aspects of serviceability including specifying characteristics needed to identify the log building kits. (cf. ETA-format par. II.2).

Table 1 Links between the Essential Requirements (ER) in the EC Construction Products Directive (CPD), the relevant paragraphs of the corresponding Interpretative Documents (ID) to the CPD, and the related requirements and log building kit performances in this ETA Guideline.

ER	Corresponding ID paragraph for works	Corresponding ID paragraph for product performance	ETA-Guideline paragraphs on product characteristics
1	2.1.3 Collapse 2.1.4 Inadmissible deformation	3.2 (2) Permanent actions Variable actions Accidental actions	4.1 Mechanical resistance and stability
2	4.2.3 Limitation of generation and spread of fire and smoke within the construction works 4.2.2 Load bearing capacity of the construction 4.2.4 Limitation of spread of fire for neighbouring construction works	4.3.1.1 Products subject to reaction to fire requirements 4.3.1.3 Products subject to resistance to fire requirements 4.3.1.2 Products for roofs subject to fire requirements	4.2.1 Reaction to fire 4.2.2. Resistance to fire 4.2.3 External fire performance of roof coverings
3	3.3.1.2 Dampness (indirect effect inducing mould-growth and increased deposit of housedust mites) 3.3.1.1 Air quality	3.3.1.2.3.2 e Building products 3.3.1.1.3.2 a Emission and release of radiation and pollutants, susceptibility to the growth of harmful micro-organisms	4.3.1 Vapour permeability and moisture resistance 4.3.2 Water tightness 4.3.3 Release of dangerous substances
4	3.3.1.2 Nature of surfaces	4.2 Capability to avoid slippery floors	4.4.1 Slipperiness of floor finishes
5	2.3.1, 2.3.2 Protection against air-borne and impact noise between enclosed spaces and from outside of works	4.3.2 Acoustic properties (according to 4.3.3)	4.5.1 Airborne sound insulation 4.5.2 Impact sound insulation 4.5.3 Sound absorption
6	4.2 Energy consumption limitation	Table 4.2 Component characteristics	4.6.1 Thermal resistance 4.6.2 Air permeability 4.6.3 Thermal inertia

	Aspects of durability, serviceability and identification	4.7.1. Resistance to deterioration 4.7.2. Floor stiffness 4.7.3. Settling of the construction 4.7.4. Identification

4.1 MECHANICAL RESISTANCE AND STABILITY (ER 1)

The Essential Requirement laid down in the Council Directive 89/106/EEC is as follows:

The construction works must be designed and built in such a way that the loadings that are liable to act on it during its constructions and use will not lead to any of the following:

collapse of the whole or part of the work;

major deformations to an inadmissible degree;

damage to other parts of the works or to fittings or installed equipment as are result of major deformation of the load-bearing construction;

damage by an event to an extent disproportionate to the original cause

The load-bearing structures of the building shall have adequate resistance and safety against structural collapse, inadmissible deformations and disproportionate collapse. The relevant actions to be considered comprise normally self-weight and imposed loads, wind loads, snow loads and seismic loads.

4.2 SAFETY IN CASE OF FIRE (ER 2)

The Essential Requirement laid down in the Council Directive 89/106/EEC is as follows:

The construction works must be designed and built in such a way that in the event of an outbreak of fire:

the load-bearing capacity of the construction can be assumed for a specific period of time.

the generation and spread of fire and smoke within the works are limited

the spread of fire to neighbouring construction works is limited

occupants can leave the works or be rescued by other means

the safety of rescue teams is taken into consideration.

4.2.1 Reaction to fire

Requirements for the reaction to fire of the product/kit/materials part of the kit shall be in accordance with the laws, regulations and administrative provisions applicable to the installed product/kit/materials and shall be specified in accordance with the relevant EC decision and classification documents.

4.2.2 Resistance to fire

Requirements for the resistance to fire of the product/kit/materials part of the kit shall be in accordance with the laws, regulations and administrative provisions applicable to the installed product/kit/materials and shall be specified in accordance with the relevant EC decision and classification documents.

4.2.3 External fire performance of roof coverings

Requirements for the external performance of roof coverings of the product/kit/materials part of the kit shall be in accordance with the laws, regulations and administrative provisions applicable to the installed product/kit/materials and shall be specified in accordance with the relevant EC decision and classification documents.

4.3 HYGIENE, HEALTH AND ENVIRONMENT (ER 3)

The Essential Requirement laid down in the Council Directive 89/106/EEC is as follows:

The construction work, must be designed and built in such a way that it will not be a threat to the hygiene or health of the occupants or neighbours, in particular as a result of any of the following:

the giving-off of toxic gas,

the presence of dangerous particles or gases in the air.

the emission of dangerous radiation

pollution or poisoning of the water or soil,

faulty elimination of waste water, smoke, solid or liquid wastes,

the presence of damp in parts of the works or on surfaces within the works.

4.3.1 Vapour permeability and moisture resistance

The external envelope shall be designed to limit interstitial and surface condensation of moisture which may cause unacceptable growth of micro-organisms and affect the indoor climate.

4.3.2 Water tightness

4.3.2.1 External envelope

The external envelope shall prevent gathering of water from rain and melting snow into the works.

4.3.2.2 Internal surfaces

Internal wall and floor surfaces in bathrooms, toilets etc. claimed to be watertight by the manufacturer shall be sufficiently tight in order to avoid water penetration to rooms below (short-term effects) and to avoid moisture levels in materials and components which may lead to unacceptable growth of micro-organisms (long-term-effects)

4.3.3 Release of dangerous substances

The product/kit must be such that, when installed according to the appropriate provisions of the Member States, it allows for the satisfaction of the ER3 of the CPD as expressed by the national provisions of the Member States and in particular does not cause harmful emission of toxic gases, dangerous particles or radiation to the indoor environment nor contamination of the outdoor environment (air, soil or water).

4.4 SAFETY IN USE (ER 4)

The Essential Requirement laid down in the Council Directive 89/106/EEC is as follows:

The construction work must be designed and built in such a way that it does not present unacceptable risks of accidents in service or in operation such as slipping, falling, collision, burns, electrocution, injury from explosion.

4.4.1 Slipperiness of floor finishes

Floor surfaces shall not be unacceptable slippery in order to prevent accidental falls by normal use of the building.

4.5 PROTECTION AGAINST NOISE (ER 5)

The Essential Requirement laid down in the Council Directive 89/106/EEC is as follows:

The construction works must he designed and built in such a way that noise perceived by the occupants or people nearby is kept down to a level that will not threaten their health and will allow them to sleep, rest and work in satisfactory conditions.

4.5.1 Airborne sound insulation

Walls and floors shall provide the necessary airborne sound insulation applicable to the intended use of the building.
The external envelope shall provide the necessary sound insulation applicable to the intended use of the building concerning airborne noise from the outside (i.e. noise from industry, road and air traffic etc.).

4.5.2 Impact sound insulation

Floors shall provide the necessary impact sound insulation applicable to the intended use of the building.

4.5.3 Sound absorption

The internal surfaces which are part of the kit shall provide the necessary sound absorption applicable to the intended use of the building.

4.6 ENERGY ECONOMY AND HEAT RETENTION (ER 6)

The Essential Requirement laid down in the Council Directive 89/106/EEC is as follows:

The construction works and its heating, cooling and ventilation installations must be designed and built in such a way that the amount of energy required in use shall be low, having regard to the climatic conditions of the location and the occupants.

4.6.1 Thermal resistance

The external envelope shall provide the necessary thermal insulation which is applicable to the intended use of the building. Thermal bridges which may cause uncomfortable low temperatures or water vapour condensation affecting hygiene, health and environment related to ER 3 shall be avoided.

4.6.2 Air permeability

The external envelope shall provide adequate airtightness, in order to limit unnecessary energy loss and to prevent unacceptable cold draughts which may affect the health of persons (ER3).

4.6.3 Thermal inertia

Thermal inertia of the main building parts shall be known where applicable in order to assess the effect on energy and heat retention.

4.7 ASPECTS OF DURABILITY, SERVICEABILITY AND IDENTIFICATION

4.7.1 Aspects of durability

The design of the log building kit shall ensure that deterioration of materials and components during the assumed intended working life does not significantly affect the performance of the kit in relation to fulfilling all the Essential Requirements 1 - 6. Deterioration may be caused by physical, biological and chemical agents.

4.7.2 Floor stiffness

Suspended floors shall have sufficient stiffness to avoid unacceptable vibrations from normal use.

4.7.3 Settling of the construction

If the log construction is of the settling type, the settlement shall be taken into account in the design, planning and erection as well as maintenance of the construction.

4.7.4 Identification

The materials used in the log building kit shall be identifiable to their properties which have an influence to the ability of the kit to fulfil the Essential Requirements.

5 METHODS OF VERIFICATION

This chapter refers to the verification methods used to determine the various aspects of performance of the log building kits in relation to the requirements for the works (calculations, tests, engineering knowledge, site experience, etc.) as set out in chapter 4.

The possibility exists to use existing data in accordance with the EOTA Guidance Document No 004 on "The provision of data for assessment leading to ETA".

Verification by testing shall be done according to the test methods given in this Guideline.

When the performance is assessed by reference to traditional methods, general experience, etc, the Technical Dossier of the ETA shall as far as possible refer to documents where such methods or experience are described.

Assessment of individual materials and components which are part of the kit shall be carried out on the basis of the relevant product standards or approvals for these products, or as far as possible on the basis of technical specifications for products with the same intended use.

When EUROCODES are quoted in this ETAG as the methods for the verification of certain product characteristics, their application in this ETAG, as well as in the subsequent ETAs issued according to this ETAG, shall be in accordance with the principles laid down in the EC Guidance Paper on the use of EUROCODES in harmonised European technical specifications

Table 2 Relationship between the log building kit performance, characteristics and the corresponding paragraphs on verification methods.

ER	ETA-Guideline paragraphs on product characteristics	ETAG paragraph on verification method
1	4.1 Mechanical resistance and stability	5.1.1 Verification of structural capacities in general 5.1.2 Verification by calculation 5.1.3 Verification by testing
2	4.2.1 Reaction to fire 4.2.2. Resistance to fire 4.2.3 External fire performance of the roof covering	5.2.1 Reaction to fire 5.2.2 Resistance to fire 5.2.3 External fire performance of roof coverings
3	4.3.1 Vapour permeability and moisture resistance 4.3.2 Water tightness 4.3.3 Release of dangerous substances	5.3.1 Vapour permeability and moisture resistance 5.3.2 Water tightness 5.3.3 Release of dangerous substances
4	4.4.1 Slipperiness of floor finishes	5.4.1 Slipperiness of floor finishes
5	4.5.1 Airborne sound insulation 4.5.2 Impact sound insulation 4.5.3 Sound absorption	5.5.1 Airborne sound insulation 5.5.2 Impact sound insulation 5.5.3 Sound absorption
6	4.6.1 Thermal resistance 4.6.2 Air permeability 4.6.3 Thermal inertia	5.6.1 Thermal resistance 5.6.2 Air permeability 5.6.3 Thermal inertia
	4.7.1 Resistance to deterioration 4.7.2 Floor stiffness 4.7.3 Settling of the construction 4.7.4 Identification	5.7.1 Resistance to deterioration 5.7.2 Floor stiffness 5.7.3 Settling of the construction 5.7.4 Identification

5.1 MECHANICAL RESISTANCE AND STABILITY

5.1.1 Verification of structural capacities in general

The load-bearing capacities of the pre-designed structural parts of the kit, including relevant connections and joints, shall be verified in conformity with the basis of design as given in ENV 1991-1 (*EUROCODE 1: Basis of design and actions on structures - Part 1: Basis of design*), i.e. according to the limit state design method. The verification can normally be done by structural calculations, by testing or by a combination of testing and calculation (design assisted by testing), and shall, when relevant, include resistance against disproportionate collapse.

5.1.2 Verification by calculation

The calculation of load-bearing capacities shall be made according to the principles of ENV 1995-1-1 (*EUROCODE 5: Design of timber structures - Part 1-1: General rules and rules for buildings*). The boxed values which are given in the standard shall be used to calculate the declared values for structural capacity in the ETA. (Adjustments of capacities due to the various boxed values given in National Application Documents may be undertaken as part of the specific structural designs for each individual work).

Specifically for log buildings is that the vertical loads are transferred by compression perpendicular to the grain. The distribution of a vertical point load shall be assumed in an angle of 45°. The load carrying surface may be assumed to be the whole seam area between the logs. The seam between the logs is not assumed to transfer any tensional forces. The static function of any reinforcement of the structure can be taken into account.. The buckling of the wall shall be considered in accordance with these premises.

The horizontal loads are usually transferred by the seams. The shape of the seam and possible dowels have an effect as well as the friction in the seam. Normally, these effects cannot be calculated.

Supplementary calculations which are relevant for the resistance against seismic actions should be done according to the provisions in ENV 1998-1-3 (EUROCODE *8, Part 1-3 General rules – Specific rules for various materials and elements)*, or according to national regulations valid in member States where the kit is put on the market.

5.1.3 Verification by testing

Load-bearing performance may be verified by testing. The test procedures shall in general follow EN 380 (*Timber structures - Test methods - General principles for static load testing)* and other relevant EN-standards for testing of wood-based components and materials (see Annex B). When full scale tests are used to verify the load-bearing capacity, the assessment can be based on three tests.

If justified, design assisted by testing can be used to extrapolate test results obtained from one type of wall to other types of wall (e.g. varying thickness or detailing) or to other use conditions (e.g. humidity or excentricity of the load). In order to obtain specific data for calculation (e.g. resistance of wall connections or reinforcements) tests on small specimens can be used. Guidelines for design assisted by testing are given in prEN 1990 section 5 and Annex D.

Test methods used for the assessment of the load-bearing performance shall be specified with complete references to the number and edition of the standard, the conditioning of the specimens, and if relevant any deviations made from the standard.

5.2 SAFETY IN CASE OF FIRE

The ETAG is based upon the European Commission Decisions, as well as tests and classifications according to relevant EN-standards. If these standards are not available at the time when the ETAG is to be made operational, the verification of the fire resistance and reaction to fire shall also be made possible on the basis of data from national test methods (taking into account the intended use of the kits, and the countries where the kit is put on the market).

5.2.1 Reaction to fire

For reaction to fire, the evaluation shall be made as specified in prEN 13501-1 (*Fire classification of construction products and building elements – Part 1 – Classification using test data from reaction to fire tests) f*ollowing Commission Decision 2000/147/EC.
Products which comprise materials included in the Commission Decision 2000/605/EC can be considered as Euroclass A_1, without testing.

5.2.2 Resistance to fire

Fire resistance shall be verified by tests according to the test methods specified in prEN 13501-2 (*Fire classification of construction products and building elements – Part 2 – Classification using data from resistance to fire tests (excluding products for use in ventilation systems))* following Commission Decision 2000/367/EC. Determination of the load-bearing capacity of the structural parts of the kit when exposed to fire may also be undertaken by calculation according to ENV 1995-1-2 (*EUROCODE 5: Design of timber structures - Part 1-2: General rules - Structural fire design)*.

5.2.3 External fire performance of roof coverings

External fire performance of roofing materials shall be verified by tests according to CEN CR 1187: 2001 (*Test methods for External fire exposure of roofs),* following Commission Decision 2001/671/EC.
Products which comprise materials included in the Commission Decision 2000/553/EC can be considered as deemed to satisfy, without testing.

5.3 HYGIENE, HEALTH AND ENVIRONMENT

5.3.1 Vapour permeability and moisture resistance

Assessment shall be undertaken on the basis of calculations according to prEN 13788 (*Hygrothermal performance of building components and building elements – Estimation of internal surface temperatures to avoid critical surface humidity and calculation of interstitial condensation (ISO/DIS 13788:1997))*, taking into account the relevant design climatic conditions.

The evaluation of interstitial or internal surface condensation risk in order to avoid the growth of micro-organisms shall be based on the assumption that humidity in the additional insulation layer only exceeds 80 % RH for limited periods of time at design climatic conditions.

The risk of condensation can normally be evaluated on the basis of the hygrothermal characteristics of the products used in each component and the construction details.

Water vapour resistance factor of the relevant layers shall be based upon:

- Values given in EN 12524:2000-04 (*Building materials and products – Energy related properties – Tabulated design values)* or European technical specifications

or

- Tests according to prEN ISO 12572 (*Building materials - Determination of Water Vapour Transmission Properties)* or European technical specifications

For verification of condensation risks due to low surface temperatures or air leaks see 5.6.1 and 5.6.2. Moisture resistance of materials in terms of durability is covered under chap. 5.7.1.

5.3.2 Water tightness

Water tightness need to be examined for different wall constructions (e.g. with or without additional insulation, the insulation outside or inside the logs) and conditions of exposure; verification by laboratory test results is not always sufficient.

5.3.2.1 External envelope

For log buildings, the water tightness of the construction shall be verified using existing knowledge or by test.

The periodic wetting of the external log surface by rain is not harmful in the sense of essential requirement 3, if the tightness of the wall is sufficient to prohibit water leakage inside the wall or in the room. On the other hand, the approval body shall evaluate, if water may penetrate into the wall so that drying is not

possible within reasonable time. The approval body shall also evaluate the corner details of the building and the measures to prohibit water to penetrate into the wall via corners.

Water leakage resistance of the building envelope, including driving rain on façades and possibly snow penetration, shall primarily be assessed by the approval body on the basis of the standard construction details for the kit, and by using the available technical knowledge and experience from similar well-known technical solutions.

The assessment of resistance against the penetration of driving snow into the external envelope may normally be based upon design or engineering knowledge. The assessment must include the full external envelope, including joints between prefabricated components in the kit and principal solutions for joints between the kit and the substructure.

The external envelope should normally be designed according to the two-stage principle unless other acceptable solutions can be demonstrated.

If the resistance against weather influence cannot be assessed by the use of existing knowledge, e.g. because of unfamiliar solutions to the relevant construction details, the approval body may find it necessary to require testing of the external envelope performance. Laboratory tests may be carried out according to prEN 1027 (*Windows and doors - Water tightness - Test method)*, prEN 12155 (*Curtain walling - Water tightness - Laboratory test under static pressure)*, and prEN 12865-1 (*Hygrothermal performance of buildings – Determination of resistance to driving rain under pulsating air pressure – Part 1: External wall systems)*.

5.3.2.2 Internal surfaces

The performance of watertight membranes or surface layers in wet areas of bathrooms, etc may be assessed on the basis of experience/technical knowledge, verified by references to conformity with relevant performance standards for the products which are applied, e.g. product standards for roofing membrane systems, or by verification according to the Nordtest methods NT BUILD 058 (*Walls in bathrooms: Watertightness and resistance to water and moisture. Edition 3, 1998)*, NT BUILD 230 (*Bathroom floors: Watertightness. Edition 2, 1995)* and NT BUILD 448 (*Wall coverings and bushings for water pipes and taps in bathrooms: Watertightness. Edition 1996)* for products with unknown performance.

Special attention shall be paid to details between the log construction and other construction parts.

5.3.3 Release of dangerous substances

5.3.3.1 Presence of dangerous substances in the product

The applicant shall submit a written declaration stating whether or not the product/kit contains dangerous substances according to European and national regulations, when and where relevant in the Member States of destination, and shall list these substances.

5.3.3.2 Compliance with the applicable regulations

If the product/kit contains dangerous substances as declared above, the ETA will provide the method(s) which has been used for demonstrating compliance with the applicable regulations in the Member States of destination, according to the dated EU data-base (method(s) of content or release, as appropriate).

5.3.3.3 Application of the precautionary principle

An EOTA member has the possibility to provide to the other members, through the Secretary General, warning about substances which, according to Health authorities of its country, are considered to be dangerous under sound scientific evidence, but are not yet regulated. Complete references about this evidence will be provided.

This information once agreed upon, will be kept in an EOTA data base, and will be transferred to the Commission services.

The information contained in this EOTA data base will also be communicated to any ETA applicant.

On the basis of this information, a protocol of assessment of the product, regarding this substance, could be established on request of a manufacturer with the participation of the Approval Body which raised the issue.

5.4 SAFETY IN USE

5.4.1 Slipperiness of floor finishes

Verification of slip resistance of flooring materials shall be done in accordance with the relevant EN-standards for the specified finished flooring products.

5.5 PROTECTION AGAINST NOISE

5.5.1 Airborne sound insulation

The airborne sound insulation performance of the main building parts of an assembled kit shall be verified by either laboratory or field tests according to the relevant parts of EN ISO 140 (*Acoustics - Measurement of sound insulation in buildings and of building elements)*. The rating of airborne sound insulation shall be undertaken according to EN ISO 717-1 (*Acoustics - Rating of sound insulation in buildings and of building elements).*

Estimated values for airborne sound insulation in completed buildings, based on laboratory tests, can be determined according to prEN ISO 12354, Parts 1 and 2 (*Building acoustics - Estimation of acoustic performance of buildings from the performance of products)*.

The sound insulation performance may also be verified by references to data for common log building construction designs given in national standards, textbooks or authoritative guides, provided that such data are based upon tests and classification in accordance with the ISO-standards mentioned above.

5.5.2 Impact sound insulation

The impact sound insulation performance of the floors of an assembled kit shall be verified by either laboratory or field tests according to the relevant parts of EN ISO 140 (*Acoustics - Measurement of sound insulation in buildings and of building elements)*, and the rating of impact sound insulation shall be done according to EN ISO 717-1 (*Acoustics - Rating of sound insulation in buildings and of building elements)*.

Estimated values for impact noise level in completed buildings, based on laboratory tests, shall be determined according to prEN ISO 12354, Parts 1 and 2 (*Building acoustics - Estimation of acoustic performance of buildings from the performance of products)*.

5.5.3 Sound absorption

Sound absorption is usually not relevant for log building kits. If needed, sound absorption is measured according to EN ISO 20 354 and EN 20 354/A1 (*Acoustics – Measurement of sound absorption in reverberation room)*.

5.6 ENERGY ECONOMY AND HEAT RETENTION

5.6.1 Thermal resistance

Thermal resistance (R-value) and the corresponding thermal transmittance (U-value) of the main building parts in a kit shall be calculated according to EN ISO 6946 (*Building components and building elements - Thermal resistance and thermal transmittance- Calculation method)*, using the design thermal conductivity values for materials according to EN 12524 (*Building materials and products – Energy related properties – Tabulated design values)*, relevant European product standards, or conductivities determined according to EN ISO 10456 (*Thermal insulation - Building materials and components - Determination of declared values and design thermal values)*. Alternatively the thermal resistance may be verified by testing according to EN ISO 8990 (*Thermal insulation - Determination of steady-state thermal transmission - Calibrated and guarded hot box*).

In the calculation, the profile of the log wall can be averaged. For the wall made of rectangular logs the maximum thickness of the log may be used. For the wall made of round logs the area-equal thickness may be used. The effect of the seal or the cracks can be neglected.

Verification of thermal transmittance for windows, doors and shutters may be done by calculation according to prEN 10077-1 (*Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 1: Simplified method)*, or by testing according to relevant EN/ISO-standards for these products.

If the design has technical solutions with special thermal bridges that are not covered by the ordinary verification of the thermal resistance as mentioned above, the effect on the overall thermal resistance and the surface temperatures in relation to 4.3.3 shall be verified when the approval body find this necessary, e.g. the effect of moisture due to thermal bridges. Such verification may be done by calculation according to EN ISO 10211-1 and 2 (*Thermal bridges in building construction - Heat flows and surface temperatures –Part 1: General calculation methods, Part 2: Calculation of linear thermal bridges)*, or by testing according to EN ISO 8990 (*Thermal insulation - Determination of steady-state thermal transmission - Calibrated and guarded hot box*) or relevant test standards for specific products.

5.6.2 Air permeability

The air permeability of the log wall shall be verified using existing knowledge. If the wall contains internal insulation in combination with vapour barrier the construction can be evaluated as a timber frame construction.

Assessment of the airtightness of the external envelope is normally done by judgement of the construction details, on the basis of the knowledge and experience from traditional technical solutions. The assessment shall include joints between components in the kit, and if relevant also joints between the kit and other building parts.

The assessment of air tightness shall be done both with regard to energy economy (unintended ventilation), cold draughts (see clause 4.6.2) and risks of water vapour condensation inside the construction (see clause 4.3.1). The assessment shall be done on the basis of the intended use of the building kit, taking into account the internal and external design climates (e.g. geographical areas).

When the approval body finds it advisable, e.g. when non-traditional joints are applied, the air permeability can be verified by testing. Test may be carried out by pressurisation of the completed building according to ISO 9972, or by laboratory testing according to EN 1026, EN 12114 or other relevant test standards. The evaluation shall include long-term performance when relevant

5.6.3 Thermal inertia

Verification of thermal inertia is undertaken on the basis of the following properties of the main building parts: the total mass per unit area, density and specific heat capacity of relevant materials and thermal resistance. Specific heat capacities are tabulated in EN 12524, and material densities are shown in ENV 1991-2-1.

5.7 ASPECTS OF DURABILITY, SERVICEABILITY AND IDENTIFICATION

5.7.1 Aspects of durability

The estimated working life of the various parts of the kit will normally have to be evaluated by the approval body on the basis of experience and general knowledge, and mainly by examining the building details which are part of the kit.

The approval body shall take into account the influence of climatic conditions when assessing the estimated working life of the log building kit. The EC Guidance Paper F on Durability and the Construction Products Directive may be consulted with regard to relevant degradation factors and climatic sub-divisions of Europe. The most important aspects related to the durability of log building kits are:

-Insects attacking wood materials
-Fungi attacking wood materials which have excessive moisture content due to interstitial condensation or driving rain penetrating the external envelope
-Corrosion of metal fasteners in wet climates

An external log wall will frequently be wetted and have local moisture content above 20 %. In the meantime, the construction may be able to dry. The approval body shall check that the natural durability and moisture transfer ability of the specimen is sufficient so that occasional wetting is not harmful. When appropriate an adequate treatment needs to be specified.

The durability of materials and components in the kit shall be assessed for resistance to the major degrading agents such as moisture etc., making reference to the relevant standards for each product (see Annex B). Appropriate adhesives and gluing methods shall be used in glued members depending on the use conditions.

When assessing the durability of materials and components in the kit it shall be borne in mind that durability is normally best ensured by good design measures. Logs shall not have any rests of bark left to avoid attacks of insects. Excessive moisture content shall primarily be prevented by adequate construction details.

5.7.1.1 Wood and wood-based products

The natural durability of wood based materials shall be identified according to EN 350-1 and EN 350-2 and selected according to EN 460 for use in the appropriate hazard class described in EN 335-1 and EN 335-2. If preservative treatment is proposed, the preservative shall be specified according to EN 599-1 and EN 599-2, and the treated timber shall comply with a specification written according to EN 351-1, or a national classification and labelling which corresponds to these standards. (See flow chart diagram in EN 351-1 Annex A).

5.7.1.2 Fasteners

Fasteners shall be assigned to one of the service classes given in ENV 1995-1-1. The following classes are normally applicable:

Service class 1: Internal fixings and fasteners inside the external sheathing or the thermal insulation

Service class 2: Fixing of sheathing, battens, etc, and fasteners outside the thermal insulation, not directly exposed to the weather

Service class 3: Fixing of external claddings, trims, etc, and anchors and fasteners directly exposed to the weather.

Example of fasteners for service class 1 are products made of unprotected steel.

Example of fasteners for service class 2 are products made of zinc-coated steel in class Z275 according to EN 10147.

Example of fasteners for service class 3 are products made of zinc-coated steel with a minimum thickness of 50μm zinc, and fasteners manufactured from stainless steel according to prEN 10088-2.

5.7.2 Floor stiffness

Deflection values related to the structural design of the load-bearing structures shall be determined by calculations or tests mentioned in 5.1.

The stiffness of suspended floor structures shall be calculated in accordance with clause 4.4.3 in EUROCODE 5 in order to check adequate serviceability under normal traffic loads.

5.7.3 Settling of the construction

The approval body shall evaluate by experience the amount of settling and that the measures to take the settling into account are sufficient.

Settling is mainly caused by the following factors:

- tightening of the seams between the logs due to loads (typically about 5 mm /seam)
- drying of the logs from the moisture content directly after erection of the building to the equilibrium in the heated building (typically about 2 mm /m and % of change in moisture content)
- the shape change of especially round logs because of the drying (to be considered separately)

5.7.4 Identification

The identification parameters shall be chosen appropriately so that they give a clear comprehension about the properties of the log building kit. Such parameters may be:

- strength of the logs (manufacturer's grading standard)
- mean moisture content of the logs when they leave the factory
- geometry of the components
- any chemical treatment of the components
- additional materials properties related with Essential Requirements

The specifications of materials and components shall as far as possible provide maximum flexibility to choose alternative products for a kit, without affecting the declared performances or the fitness for the intended use. Hence the specifications shall as far as possible be made by references either to relevant European technical specifications and the evaluation methods defined in them.

There are no strength grading standards for logs. One possibility to decide the strength class of the logs is, that the manufacturer makes his own standard visual grading procedure according to EN 519, *Structural timber, Grading, Requirements for visual strength grading standards,* taking into account standard EN 1912, *Structural timber, Strength classes, assignment of visual grades and species.* This manufacturer's grading standard shall be evaluated by the approval body either by testing or by experience.

The glue used in laminated load-bearing logs shall be classified as specified in EN 301, *Adhesives, phenolic and aminoplastic, for load-bearing timber structures. Classification and performance requirements.*

The mean moisture content of the logs when they leave the factory shall be evaluated. This is of purpose for both resistance to deterioration and for settling. The moisture content may be measured using an electronic measurement device as described in prEN 13183-2 or other calibrated methods.

6 ASSESSING AND JUDGING THE FITNESS FOR USE

This chapter details the performance requirements to be met (chapter 4) in precise and measurable (as far as possible and proportional to the importance of the risk) or qualitative terms, related to the product and its intended use, using the outcome of the verification methods (chapter 5).

Table 3 Type and options of product performance to be declared.

ER	ETAG paragraph on verification method	Type of performance declaration in ETAs*
1	5.1.1 Verification of structural capacities in general 5.1.2 Verification by calculation 5.1.3 Verification by testing	6.1.2.1 External walls Vertical load capacity Horizontal load capacity Combined vertical/hor. load capacity Anchorage load capacity 6.1.2.2 Internal load-bearing walls Vertical load capacity 6.1.2.3 Suspended floors Imposed load capacity Horizontal diaphragm shear load capacity 6.1.2.4 Roof structures Snow and/or wind load capacity Concentrated imposed load capacity Horizontal diaphragm shear load capacity
2	5.2.1 Reaction to fire	6.2.1 Classification according to Euroclass A_1 – F (Commission Decision 2000/147/EC)
	5.2.2 Resistance to fire	6.2.2 Classification REI 15 – REI 120 for load-bearing walls, floors and roof Classification EI 15 – EI 120 for non load-bearing walls (Commission Decision 2000/367/EC)
	5.2.3 External fire performance of roof coverings	6.2.3 Classification according to Commission Decision 2001/671/EC referring to CEN CR 1187
3	5.3.1 Vapour permeability and moisture resistance	6.3.1 Assessed to be acceptable in relation to the intended use of the building and any limitations regarding climatic zones
	5.3.2 Water tightness	6.3.2 Assessed to be acceptable
	5.3.3 Release of dangerous substances	6.3.3 Declaration of dangerous substances in accordance with European and national provisions
4	5.4.1 Slipperiness of floor finishes	6.4.1 Assessed to be acceptable or slip resistance of the flooring

5	5.5.1 Airborne sound insulation	6.5.1 Weighted apparent sound reduction index for separating walls and floors Weighted apparent sound reduction index for all other walls and floors Weighted apparent sound reduction index for external walls and roof
	5.5.2 Impact sound insulation	6.5.2 Weighted normalised impact sound pressure level for separating floors Weighted normalised impact sound pressure level for all other floors
	5.5.3 Sound absorption	6.5.3 Sound absorption coefficient of internal surfaces
6	5.6.1 Thermal resistance	6.6.1 Total thermal resistance R_t and corrected thermal transmittance U_c for: Exterior walls Windows and external doors Floors Internal walls Roof
	5.6.2 Air permeability	6.6.2 Measured air leakage of type tested buildings and/or components or Assessed to be acceptable in relation to energy loss, cold draughts (ER3), interstitial or surface condensation (ER3), and intended use
	5.6.3 Thermal inertia	6.6.3 Information on relevant data
	5.7.1 Resistance to deterioration	6.7.1 Assessed to be acceptable in relation to intended use and the effect on performance related to ER1 – ER6 - Possible conditions regarding maintenance
	5.7.2 Floor stiffness	6.7.2 Maximum deflections at serviceability limit state related to the load-bearing capacities declared under ER1 Stiffness against floor vibrations
	5.7.3 Settling of the construction	6.7.2 Amount of settling
	5.7.4 Identification	6.7.4 Values of appropriate identification parameters

** No performance determined being an option*

6.1 MECHANICAL RESISTANCE AND STABILITY

6.1.1 Mechanical resistance and stability

6.1.1.1 Declaration of structural capacities in general

The load-bearing performance of the main building parts shall be stated in the ETA as design load resistance at ultimate limit state. The load resistances shall be calculated according to EN 1995-1-1. Before EN 1995-1-1 is published the calculations shall be done on the basis of ENV 1995-1-1, using the boxed values for partial coefficients which are shown in this standard. Other values may also be used for the calculation of mechanical resistance, if the manufacturer wants to include declared values based on a different coefficient value laid down in specific national regulations, or characteristic values.

The structural capacities to be declared are specified in 6.1.2 and may preferably be given in the form of a table in the ETA.

The load-bearing performance of walls shall be given for specified wall heights as vertical design load capacity per unit length of the walls, and as horizontal design load capacity per unit area.

The load-carrying capacity of suspended floors and of roof structures with specified maximum spans may be given as net design imposed load resistances, and net design snow load and/or wind load resistance

as defined in ENV 1991-2-3 and ENV 1991-2-4. (The effect of the self-weight of the floor and roof structure shall be taken into account in order to declare the net load capacity).

6.1.2 Structural capacities to be declared

6.1.2.1 External walls

The following design resistances for external walls shall normally be declared:
Vertical resistance in kN/m for the long-term and the medium-term load duration classes, without combination with wind loads
Vertical resistance in kN/m for the medium-term load duration class, in combination with a minimum specified wind load (short-term) in kN/m² as defined in ENV 1991-2-4 (*EUROCODE 1: Basis of design and actions on structures - Part 2-4: Actions on structures - Wind actions)*
Horizontal resistance in kN/m² perpendicular to the wall surface for the short-term load duration class, without combination with vertical loads
Anchorage resistance of standard wall fixings to the substructure for short-term load duration class, when such fixings are part of the kit

6.1.2.2 Internal load-bearing walls

The following design resistance for internal walls shall normally be declared:
Vertical load resistance in kN/m for the long-term and the medium-term load duration classes

6.1.2.3 Suspended floors

The following design resistances for suspended floors shall normally be declared:
Maximum vertical imposed uniformly distributed load in kN/m² as defined in ENV 1991-2-1 (*EUROCODE 1: Basis of design and actions on structures - Part 2-1: Actions on structures - Densities, self-weight and imposed loads)*
Maximum vertical imposed concentrated load in kN as defined in ENV 1991-2-1 (*EUROCODE 1: Basis of design and actions on structures - Part 2-1: Actions on structures - Densities, self-weight and imposed loads)*
Horizontal diaphragm shear resistance in kN/m at ultimate limit state for short-term load duration

6.1.2.4 Roof structures

The following design resistances for roof structures shall normally be declared:

Maximum vertical snow load resistance in kN/m² according to ENV 1991-2-3 (*EUROCODE 1: Basis of design and actions on structures - Part 2-3: Actions on structures - Snow loads)*
Maximum vertical imposed concentrated load in kN as defined in ENV 1991-2-1 (*EUROCODE 1: Basis of design and actions on structures - Part 2-1: Actions on structures - Densities, self-weight and imposed loads)*
Maximum wind load resistance in kN/m² perpendicular to the roof surface according to ENV 1991-2-4.
Horizontal diaphragm shear resistance in kN/m at ultimate limit state for short-term load duration
Vertical and horizontal anchorage load resistances of standard roof structure fixings at ultimate limit state for short-term load duration, when such fixings are part of the kit

Note:
- Vertical load-bearing resistances for wall structures may include openings for windows and doors when the kit has standard openings with specified dimensions, and standard load-bearing components around the openings.
- Racking load resistance are normally declared only for wall sections without openings. The racking load shall normally also be declared on the basis that vertical uplift of walls are prevented by separate anchors designed for each individual work.
- Snow load and wind load resistances for roofs shall normally be declared separately. On request from the ETA holder the maximum snow load capacity in combination with a specified wind load action may also be declared.
- Densities and total mass necessary for the calculation of seismic forces shall also be declared when relevant for the intended use (geographical zones). Assessment of the seismic resistance of buildings is otherwise assumed to be possible to do on the basis of the declared racking resistance and diaphragm shear capacities for the kit, and also the anchorage capacities of fixings when relevant.

6.1.3 Structural analysis

Detailed structural analysis to verify the declared capacities mentioned in 6.1.2 shall always be available to the approval body and filed as part of the technical basis for the ETA.

6.1.4. Resistance against seismic actions

Load-bearing capacities of the main building parts and anchorage which is part of the kit, including racking resistance and horizontal diaphragm shear load capacity, is covered by 6.1.2. If a kit is to be put on the market in areas with seismic zones the masses of the building parts shall also be declared, as well as the specific characteristics of connections and factors for energy dissipation according to the methods of calculation given in 5.1.2.

6.2 SAFETY IN CASE OF FIRE

6.2.1 Reaction to fire

Reaction to fire of the surface materials which are part of the kit shall be declared in accordance with Euroclasses A_1 – F or A_{1FL} – F_{FL} as specified in prEN 13501-1 (*Fire classification of construction products and building elements – Part 1 – Classification using test data from reaction to fire tests),* on the basis on Commission Decision 2000/147/EC.

6.2.2 Resistance to fire

The following range of classifications in accordance with prEN 13501-2 (*Fire classification of construction products and building elements – Part 2 – Classification using data from resistance to fire tests (excluding products for use in ventilation systems)),* on the basis of Commission Decision 2000/367/EC, is normally applicable:

- REI 15 - REI 120 (RE 20 – RE 120) for load-bearing parts with fire separating function
- EI 15 - EI 120 (E 20 – E 120) for non-load-bearing parts with fire separating function
- R 15 – R 120 for load-bearing parts without fire separating function
- No performance determined

For load-bearing building components with a classified fire resistance, the characteristic load capacities which include the effect of fire exposure in accordance with ENV 1991-2-2 (*EUROCODE 1: Basis of design and actions on structures - Part 2-2: Actions on structures - Actions on structures exposed to fire)* shall be specified in addition to the capacities mentioned in 6.1.2.

6.2.3 External fire performance of roof coverings

Classification of external fire performance for roofing materials which are part of the kit shall be made according to CEN CR 1187 (*External fire exposure of roofs),* on the basis of Commission Decision 2000/671/EC

6.3 HYGIENE, HEALTH AND ENVIRONMENT

6.3.1 Vapour permeability and moisture resistance

The assessment shall be done with respect to both to interstitial and internal surface condensation.
The performance of the kit is stated in form of acceptable intended uses which are relevant to the design climatic conditions, e.g. types of buildings and geographical zones.

6.3.2 Water tightness

6.3.2.1 External envelope

The performance of the kit will normally have to be declared in qualitative terms in relation to the intended use like potential climatic zones, and with respect to durability aspects (see EC Guidance Paper F on Durability and the Construction Products Directive), as well as to the requirements mentioned in 4.3.2. When a kit is assessed to be inadequate in certain regions (for example in areas with exceptional amounts of driving rain or potential snow penetration), the limitations on the intended use shall be clearly stated in the ETA.

6.3.2.2 Internal surfaces

It shall be clearly indicated in the ETA which parts of the kit are classified as watertight surface areas.

6.3.3 Release of dangerous substances

The product/kit shall comply with all relevant European and national provisions applicable for the uses for which it is brought to the market. The attention of the applicant should be drawn on the fact that for other uses or other Member States of destination there may be other requirements which would have to be respected. For dangerous substances contained in the product but not covered by the ETA, the NPD option (no performance determined) is applicable

6.4 SAFETY IN USE

6.4.1 Slipperiness of floor finishes

When this performance is determined the slip resistance of floorings shall be declared according to the relevant standard for the specified flooring product.

6.5 PROTECTION AGAINST NOISE

6.5.1 Airborne sound insulation

Airborne sound insulation between rooms and of facades shall be given as:
Weighted apparent sound reduction index R'_W

6.5.2 Impact sound insulation

Impact noise level shall be given as:
Weighted normalised impact sound pressure level $L'_{n\,W}$ *(Band width 1/3 octave)*

Other designations for the sound insulation performance mentioned in EN ISO 717-1 (*Acoustics - Rating of sound insulation in buildings and of building element.)* may be added in the approval, in order to directly suite verification according to national building regulations based on such designations.

6.5.3 Sound absorption

When relevant, the sound absorption coefficient of internal surfaces shall be declared.

6.6 ENERGY ECONOMY AND HEAT RETENTION

6.6.1 Thermal resistance

Thermal resistance values for the main building parts in the kit shall be declared as the total thermal resistance R_t in m²K/W, including the surface resistances. The thermal resistance shall be an average value for the main building parts, including the effect of studs, joists, plates etc based on an average length in relation to one m² of the building part. Thermal resistance of windows and doors in the external envelope which are included in the kit shall be declared separately, also in the term m²K/W.

The corresponding thermal transmittance shall be specified as the corrected thermal transmittance $U_C = 1/R_t + \Delta U$, where the correction term ΔU is calculated according to EN ISO 6946 (*Building components and building elements - Thermal resistance and thermal transmittance- Calculation method)*.

When the kit comprises special thermal bridges the thermal transmittance which comes in addition to the ordinary thermal transmittance U_C shall be declared in the term W/mK. If relevant, potential surface condensation risk due to special thermal bridges shall be stated in the ETA (see clause 4.3.3).

6.6.2 Air permeability

Quantified national building regulations concerning airtightness are related to energy economy in the Member States, while there are no quantified requirements related to health and the effect on the indoor climate. Requirements on the overall airtightness are related to the completed building, and not to separate building parts.

Degree of airtightness will normally have to be declared by stating in qualitative terms that the kit will provide adequate airtightness in relation to the intended use, incl. climatic zones, taking into account both energy economy, heat retention and risk of cold draughts as mentioned in clause 4.6.2, and risk of condensation within the construction as mentioned in clause 4.3.1. When a kit is assessed to be inadequate in certain regions, the limitations on the intended use shall be clearly stated in the ETA.

6.6.3 Thermal inertia

The information on total mass per unit area of the main building parts, and on density, specific heat capacity and thermal resistance of relevant materials, shall be declared as a means for the designer to calculate the thermal inertia of the building.

6.7 ASPECTS OF DURABILITY, SERVICEABILITY AND IDENTIFICATION

6.7.1 Aspects of durability

Possible geographical limitations or climatic zones for the intended use shall be declared in the ETA if the evaluation of durability makes this relevant.

6.7.1.1 Durability of wood and wood based products

Wood and wood based products in log houses shall be assigned to the following hazard classes given in EN 335-1 (*Durability of wood and wood based products - Definition of hazard classes of biological attack – Part 1: General)*:

Hazard class 1: Structural members and other components situated on the inside of the wall and roof sheathing.
Hazard class 2: Roof sheathing and battens behind ventilated claddings.
Hazard class 3: External wall claddings, trims etc. continually exposed to the weather.

As stated in EN-335-2 (*Durability of wood and wood based products - Definition of hazard classes of biological attack – Part 2: Application to solid wood)* and EN-335–3 (*Durability of wood and wood based products - Definition of hazard classes of biological attack – Part 3: Application to wood-based panels)*, the risk of insect attack of susceptible wood used in construction depends on geographical regions of Europe. So, chemical treatment of wood and wood-based products may be required in some Member States, in order to prevent insect attack. Such treatment shall be declared in the ETA when the manufacturer opts for it.

6.7.1.2 Durability of the fasteners

The intended service class of the fasteners shall be given.

6.7.2 Floor stiffness

Suspended floors shall be calculated to have a minimum stiffness against vibration under traffic loads as specified in ENV 1995 1-1:1993 (*EUROCODE 5: Design of timber structures - Part 1-1: General rules and rules for buildings)*, clause 4.4.3, using the same boxed values for the structural stiffness design as shown in the code.

Maximum deflections at serviceability limit states which are applied in the verification of structural capacities related to ER 1 shall be declared in the ETA, when this is relevant for the serviceability or to meet possible national regulations. The deflections shall be given according to the rules in ENV 1995 1-1:1993 (*EUROCODE 5: Design of timber structures - Part 1-1: General rules and rules for buildings)*, cl. 4.3.

6.7.3 Settling of the construction

The expected settling shall be declared in mm/m .

6.7.4 Identification

The values of appropriate identification parameters shall be given in the ETA.

7 ASSUMPTIONS AND RECOMMENDATIONS UNDER WHICH THE FITNESS FOR USE OF THE PRODUCTS IS ASSESSED

This chapter sets out the assumptions and recommendations for design, installation and execution, packaging, transport and storage, use, maintenance and repair under which the assessment of the fitness for use according to the ETAG can be made (only when necessary and in so far as they have a bearing on the assessment or on the products).

7.1 DESIGN OF WORKS

7.1.1 Local building regulations

Normally a specification of relevant requirements concerning fire resistance and reaction to fire, sound insulation performance, thermal insulation performance and ventilation provisions shall be elaborated for each delivery as a basis for the production of a kit.

The design process (including the approval of detailed plans, applications for planning permissions, building permits, etc.) shall comply with the procedures foreseen in the Member States in which the building is to be built. An ETA for a log building kit does not amend this process in any way.

In some Member States, chemical treatment of wooden components is allowed or required. Such treatment shall be done in compliance with local provisions and the Biocides Directive.

7.1.2 Structural design

Manufacture of a kit for a particular application shall be made on the basis of a specific structural design for the building (the works) where the kit is to be used. The structural design shall confirm that the actions on the main building parts according to the structural requirements for the works do not exceed the load-bearing capacities of the kit. The structural design shall include specifications of any wind load anchors and other supplementary structural works when these are not a part of the kit, but are essential for the fitness in use of the kit in the works.

The settlement of the log building shall be taken into account in the whole design of the works. Special care shall be taken that the non-settling parts (stairs, water drain pipes, doors, columns, sanitary canalisation's, timber frame partitions) do not prevent the settlement of the settling parts.

7.1.3 Substructure

The maximum required tolerances of the substructure dimensions and levelling shall be assessed for the log building kit, and be specified in the ETA.

Requirements concerning damp proof membranes or other protection against moisture from the substructure shall be specified.

7.1.4 Ventilation

Buildings shall be assumed to have adequate ventilation rates in relation to the intended use.

7.2 PACKAGING, TRANSPORT AND STORAGE

A manual for the packaging, transport and storage of the building kit shall be available from the manufacturer. The manual shall in particular cover requirements concerning handling equipment and transportation systems, and means and requirements for protecting the kit from weather exposure and mechanical damage during transportation. Reference to the manual shall be made in the ETA.

7.3 EXECUTION OF WORKS

A general manual for the installation of the kit in the works shall be available from the manufacturer, and shall be assessed by the approval body. The manual shall cover all important aspects related to the site work, such as:

- erection techniques and necessary equipment
- temporary bracing
- completion of joints between kit components (structural fixing, weather sealing etc.)
- measures to be taken due settlement of log walls
- fixing of wind and any seismic anchorage to the substructure and between building parts
- additional materials and components applied on the site, and which are a precondition for the fitness in use of the kit
- protection against weather during erection

As a supplement to the general manual, a specific manual which contain special aspects related to each individual building project(e.g. special crane requirements, hoisting strap positions etc.) shall normally be required . Reference to the manual for installation of the kit shall be made in the ETA.

The completed building (the works) shall comply with the building regulations (regulations on the works) applicable in the Member States in which the building is to be constructed. The procedures foreseen in the Member State for demonstrating compliance with the building regulations shall also be followed by the entity held responsible for this act. An ETA for a log building kit does not amend this process in any way.

7.4 MAINTENANCE

It is normally assumed that a log building kit needs certain regular maintenance in order to retain its performance and to obtain the estimated working life. The type and frequency of such maintenance shall be specified in a manual, and shall be part of the assessment of the kit.

SECTION THREE :
ATTESTATION AND EVALUATION OF CONFORMITY

8 ATTESTATION AND EVALUATION OF CONFORMITY

8.1 EC DECISION

The system of attestation of conformity specified by the Commission Decision 1999/455/EC Annex 3 is **System 1** described in Council Directive (89/106/EEC) Annex III and is detailed as follows:

a. tasks for the manufacturer / ETA holder
- factory production control;
- further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;

b. tasks for the approved body
- initial type-testing of the log building kit;
- initial inspection of factory and of factory production control;
- continuous surveillance, assessment and approval of factory production control;
- certification of the conformity of the log building kit

8.2 RESPONSIBILITIES

8.2.1 Tasks for the manufacturer / ETA holder

8.2.1.1 Factory production control (All systems of AC)

All technical information concerning components delivered by other manufacturers, e.g. specifications of components, installation procedures, etc. have to be formally confirmed by the ETA holder. The ETA holder shall keep available an updated list of the manufacturers of such components which contribute to the fulfilment of essential requirements. Copies of this list shall be submitted to the Approved Body and the Approval Body.

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system shall ensure that the log building kit is in conformity with the ETA.
The production control system for log building kits shall include the following:

- relevant design specifications mentioned in 7.1, including adequate drawings and written instructions
- type, quality and dimensions of all materials and components incorporated in the kit
- positions of structural members in prefabricated elements as being those specified in the ETA
- positions and installation of structural fasteners
- overall dimensions of prefabricated elements, incl. declared tolerances
- installation of thermal and acoustic insulation material
- installation of sheathings, claddings, linings and air- and vapour-control layers
- surface treatments and coverings
- markings for correct position and installation in the works, and special handling devices like hoisting straps for prefabricated elements when relevant
- packaging and transport protection
- installation of windows and door assemblies in external wall panels
- installation of external roof coverings

The production control system shall specify how the control measures are carried out, and at which frequencies.

Manufacturers having an FPC system which complies with EN ISO 9001/2 and which addresses the requirements of an ETA are recognised as satisfying the FPC requirements of the Directive.

The characteristics of incoming material and components which comply with a harmonised European technical specification, having met the corresponding AC-procedures shall be considered satisfactory and need, except in justified doubt, no further checking. All materials shall be in accordance with the

requirements of the ETA or the corresponding specifications of the ETA holder. Where harmonised technical specifications are not available materials and components according to specifications valid in place of use shall be used, provided that their use is compatible with the results of the approval tests or calculations. Otherwise the specifications shall be given in the ETA.

8.2.1.2 Testing of samples taken at the factory

The tests shall only be carried out on the final product or samples which are representative of the final product.

Testing of samples by the manufacturer is normally not required for log building kits other than visual controls and controls of dimensions etc. mentioned in 8.2.1.1. However, if glued joints are used in structural applications the control system shall include adequate control of a glue laboratory, climatic conditions applicable to the types of glue that are used, and a test plan for such joints.

8.2.1.3 Declaration of Conformity
When all the criteria of the Conformity Attestation are satisfied the manufacturer shall make a Declaration of Conformity.

8.2.2 Tasks for the manufacturer or the approved body

8.2.2.1 Initial type testing

Approval tests will have been conducted by the approval body or under its responsibility (which may include a proportion conducted by a laboratory or by the manufacturer, witnessed by the approval body) in accordance with section 5 of this ETAG. The approval body will have assessed the results of these tests in accordance with section 6 of this ETAG, as part of the ETA issuing procedure.

These tests shall be used for the purposes of Initial Type Testing. In this respect approval bodies shall be able to have open arrangements with relevant approved bodies to avoid duplication, respecting each others responsibilities.

This work shall be validated by the approved body for Certificate of Conformity purposes (system 1).

8.2.3 Tasks for the approved body

8.2.3.1 Audit testing

Not relevant for log building kits.

8.2.3.2 Assessment of the factory production control system - initial inspection and continuous surveillance

Assessment of the factory production control system is the responsibility of the approved body.

An assessment shall be carried out of each production unit to demonstrate that the factory production control is in conformity with the ETA and any subsidiary information. This assessment shall be based on an initial inspection of the factory, taking into account all the relevant provisions mentioned in clause 8.2.1.1. The relevant production units shall be specified in the ETA.

The factory production control shall include that the relevant design specifications for the production do exist, e.g. structural designs and manuals for installation as mentioned in chap. 7.

Subsequently continuous surveillance of factory production control is necessary to ensure continuing conformity with the ETA.

It is recommended that surveillance inspections are conducted at least twice a year, although this may be reduced to once a year in special cases e.g. if the manufacturer has proven good product quality over a long period of time.

8.2.3.3 Certification

The approved body shall issue Certification of Conformity of the log building kit (System 1).

8.3 DOCUMENTATION

The approval body issuing the ETA shall supply the information detailed below. The information given below together with the requirements given in EC guidance paper B will:

EITHER
generally form the basis on which the factory production control (FPC) is assessed by the approved body (System 1)

OR
generally form the basis of FPC.
This information shall initially be prepared or collected by the approval body and shall be agreed with the manufacturer. The following gives guidance on the type of information required:

1. The ETA
See section four of this guideline. The nature of any additional (confidential) information shall be declared in the ETA

2. Basic manufacturing process
The basic manufacturing process shall be described in sufficient detail to support the proposed FPC methods. Items listed in 8.2.1.1 shall normally be included.

3. Product and material specifications
These may include:
- structural design criteria
- construction details (including manufacturing tolerances and drawings of standard construction details)
- specifications and declarations of incoming (raw) materials and components
- references to European and/or international standards or appropriate specifications
- manufacturer's data sheets.

4. *Test* plan (as a part of FPC)
The manufacturer and the approval body issuing the ETA shall agree an FPC test plan.

An agreed FPC test plan is necessary as current standards relating to quality management systems (Guidance Paper B, EN 29002, etc.), do not ensure that the product specification remains unchanged and they cannot address the technical validity of the type or frequency of checks/tests.

The validity of the type and frequency of checks/tests conducted during production and on the final log building kit shall be considered. This will include the checks conducted during manufacture on properties that cannot be inspected at a later stage and for checks on the final log building kit. These will normally include:
- material properties
- dimensions of component parts

Where materials/components are not manufactured and tested by the supplier in accordance with agreed methods, then where appropriate they shall be subject to suitable checks/tests by the manufacturer before acceptance.

5. Prescribed test plan (testing of samples at factory – (**System 1**)
The manufacturer and the approval body issuing the ETA shall agree a prescribed test plan.

8.4 CE MARKING AND INFORMATION

The ETA shall indicate the information to accompany the CE marking and the placement of CE marking and the accompanying information (the kit/components itself/themselves, an attached label, the packaging, or the accompanying commercial documents).

According to the CE Guidance Paper D (10 December 1998) on CE marking, the required information to accompany the symbol "CE" is:

- identification number of the notified body (AC system 1)

- the name or identifying mark of the producer
- indication to clarify the intended use
- a statement regarding any chemical treatment
- the last two digits of the year in which the marking was affixed
- number of the EC certificate of conformity (AC System 1)
- indications to identify the characteristics of the log building kit on the basis of the technical specification.
- The last point can be interpreted in the context of log building kits as follows:
- number of the ETA (valid as indications to identify the characteristics of the log building kit and the characteristics where the “no performance determined” approach is used).
- the characteristics in Table 3 of the specific log building kit

SECTION FOUR :ETA CONTENT

9 THE ETA CONTENT

9.1 THE ETA-CONTENT.

The ETA content shall be in accordance with the Commission Decision 97/571/EC, dated 22 July 1997.

9.1.1 Specification of materials

The materials and components which constitute the log building kit shall be adequately identified. The specifications of materials and components shall as far as possible provide maximum flexibility to choose alternative products for a kit, without affecting the declared performances or the fitness for the intended use. Hence the specifications shall as far as possible be made by references either to:

- a product standard, or
- an ETA, or
- material properties or performance specifications given directly in the ETA for the kit.
- If this is not possible, the materials shall be specified by their brand name and type, class etc., identifying the manufacturer (Table 7).
-

Table 4: Examples of material specifications:

Material/Component	Reference to product specifications such as:	
Structural timber	Solid wood, strength classes Glued lam. Timber, strength classes Laminated veneer lumber (LVL)	EN 338 EN 1194 Brand name with relevant approval
Prefabricated structural timber components	Trussed rafters	EN 1059
Cladding and lining	Relevant product standards	
Plasterboards	prEN 520 or relevant product standards	
Wood-based panels	prEN ABC or relevant industrial product standards	
Thermal insulation	Mineral wool Others	EN 13163 Type and brand name, relevant product standards
Water vapour and wind barriers	Type and brand name, and/or relevant product standards	
Roofing materials	Type and brand name, and/or relevant product standards	
Roof sarking	Type and brand name, and/or relevant product standards	
Mechanical fasteners	Timber connectors Punched metal plates Metal ties etc.	EN 912 Relevant approvals EN 10147
Structural glues	Type and brand name, and/or relevant approvals	

9.1.2 Drawings

The ETA document shall include section drawings of the building parts. The purpose of the drawings is to illustrate the general built-up of the kit; i.e. structural system and load-bearing components, insulation layers, claddings etc. Material specifications may also be shown directly in these drawings of the kit.

In addition the kit shall also be described by a set of construction details as specified in 9.1.7. These drawings shall be a formal part of the approval, but are presented in a supporting document and not in the ETA itself.

If required by the manufacturer it shall be allowed to keep some design details confidential by using neutral parts in the drawings, provided that the approval body does not find this in contradiction to necessary information related to the correct application of the kit and the evaluation of conformity performed by the approved body.

9.1.3 Product characteristics

The performances of the log building kit related to the requirements and methods of verification and assessment mentioned in chap. 4, 5 and 6 shall be clearly stated. When a kit includes optional designs like a set of standard dimensions (thermal insulation thicknesses, load-bearing members etc.) it may be convenient to express the characteristics in table form (Table 5).

In section II.2 “characteristics of products and methods of verification “ the ETA shall include the following note:

“In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.”

9.1.4 Erection details

The ETA shall include particular preconditions linked to the erection details of the log system, which the approval body finds to be of special importance. This may be requirements related to the substructure, completion of element joints on site, wind load anchors, roof bracing etc., see also 7.3.

Reference to the manufacturers erection manual shall be made.

9.1.5 Estimated working life

The minimum estimated working life of the log frame and the parts of the exterior envelope shall be stated.

The following text may be added in the ETA:

"An “assumed intended working life” means that it is expected that, when an assessment following the ETAG-provisions is made, and when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the essential requirements.

The indications given as to the working life of a log building kit cannot be interpreted as a guarantee given by the producer or the approval body. They shall only be regarded as a means for the specifiers to choose the appropriate criteria for log building kits in relation to the expected, economically reasonable working life of the works (based upon ID. par. 5.2.2)."

9.1.6 Maintenance

Basic maintenance which is necessary to obtain the minimum estimated working life of the log building kit shall be specified, see also 7.4.

9.1.7 Supporting documents

A set of drawings showing the essential construction details of the kit shall form a supporting document as a formal part of the ETA. The purpose of this document is to provide the necessary detailed description of the log building kit, including the assembly details on site and the conditions for the installation of the kit in the works. The current version of this document shall at all times be kept by the approval body and the approved inspection body.

The set of construction details shall describe the general design of the building kit, including joints between main building parts and joints related to integrated components. The detail drawings shall form the necessary documentation for assessing all the performance requirements specified in chapter 4, including weather resistance and air permeability.

Only the most essential construction details, which are directly related to the main building parts, and which are the pre-designed standard details for the kit, shall be included. Annex C shows a checklist of the details normally required.

9.2 ADDITIONAL INFORMATION

It shall be stated in the ETA whether or not any additional (possibly confidential) information shall be supplied to the approved body for the attestation of conformity.

Annex A: COMMON TERMINOLOGY (definitions, clarifications, abbreviations)

A.1 WORKS AND PRODUCTS

A.1.1 Construction works (and parts of works) (often simply referred to as "works") (ID 1.3.1)
Everything that is constructed or results from construction operations and is fixed to the ground.
(This covers both building and civil engineering works, and both structural and non structural elements).

A1.2 Construction products (often simply referred to as "products") (ID 1.3.2)
Products which are produced for incorporation in a permanent manner in the works and placed as such on the market.
(The term includes materials, elements, components of prefabricated systems or installations)

A.1.3 Incorporation (of products in works) (ID 1.3.2)
Incorporation of a product in a permanent manner in the works means that:
its removal reduces the performance capabilities of the works, and
that the dismantling or the replacement of the product are operations which involve construction activities.

A.1.4 Intended use (ID 1.3.4)
Role(s) that the product is intended to play in the fulfilment of the essential requirements.
(N.B. This definition covers only the intended use as far as relevant for the CPD)

A.1.5 Execution (ETAG-format)
Used in this document to cover all types of incorporation techniques such as installation, assembling, incorporation, etc.

A.1.6 System (EOTA/TB guidance)
Part of the works realised by
- particular combination of a set of defined products, and
- particular design methods for the system, and/or
- particular execution procedures.

A.2 PERFORMANCES

A.2.1 Fitness for intended use (of products) (CPD 2.1)
Means that the products have such characteristics that the works in which they are intended to be incorporated, assembled, applied or installed, can, if properly designed and built, satisfy the essential requirements.
(N.B. This definition covers only the intended fitness for intended use as far as relevant for the CPD)

A.2.2 Serviceability (of works)
Ability of the works to fulfil their intended use and in particular the essential requirements relevant for this use.
The products must be suitable for construction works which (as a whole and in their separate parts) are fit for their intended use, subject to normal maintenance, be satisfied for an economically reasonable working life. The requirements generally concern actions which are foreseeable (CPD Annex I, Preamble).

A.2.3. Essential requirements (for works)
Requirements applicable to works, which may influence the technical characteristics of a product, and are set out in terms of objectives in the CPD, Annex I (CPD, art. 3.1).

A.2.4 Performance (of works, parts of works or products) (ID 1.3.7)
The quantitative expression (value, grade, class or level) of the behaviour of the works, parts of works or of the products, for an action to which it is subject or which it generates under the intended service conditions (works or parts of works) or intended use conditions (products).

As far as practicable the characteristics of products, or groups of products, should be described in measurable performance terms in the technical specifications and guidelines for ETA. Methods of calculation, measurement, testing (where possible), evaluation of site experience and verification, together with compliance criteria shall be given either in the relevant technical specifications or in references called up in such specifications.

A.2.5 Actions (on works or parts of the works) (ID 1.3.6)
Service conditions of the works which may affect the compliance of the works with the essential requirements of the Directive and which are brought about by agents (mechanical, chemical, biological, thermal or electro-magnetic) acting on the works or parts of the works.
Interactions between various products within a work are considered as "actions".

A.2.6 Classes or levels (for essential requirements and for related product performances) (ID 1.2.1)
A classification of product performance(s) expressed as a range of requirement levels of the works, determined in the ID's or according to the procedure provided for in art. 20.2a of the CPD.

A.3 ETAG - FORMAT

A.3.1 Requirements (for works) (ETAG-format 4.)
Expression and application, in more detail and in terms applicable to the scope of the guideline, of the relevant requirements of the CPD (given concrete form in the ID's and further specified in the mandate, for works or parts of the works, taking into account the durability and serviceability of the works.

A.3.2 Methods of verification (for products) (ETAG-format 5.)
Verification methods used to determine the performance of the products in relation to the requirements for the works (calculations, tests, engineering knowledge, evaluation of site experience, etc.).

These verification methods are related only to the assessment of, and for judging the fitness for use. Verification methods for particular designs of works are called here "project testing", for identification of products are called "identification testing", for surveillance of execution or executed works are called "surveillance testing", and for attestation of conformity are called "AC-testing".

A.3.3 Specifications (for products) (ETAG-format 6.)
Transposition of the requirements into precise and measurable (as far as possible and proportional to the importance of the risk) or qualitative terms, related to the products and their intended use.

The satisfaction of the specifications is deemed to satisfy the fitness for use of the products concerned. Specifications may also be formulated with regard to the verification of particular designs, for identification of products, for surveillance of execution or executed works and for attestation of conformity, when relevant.

A.4 WORKING LIFE

A.4.1 Working life (of works or parts of the works) (ID 1.3.5(1)
The period of time during which the performance will be maintained at a level compatible with the fulfilment of the essential requirements.

A.4.2 Working life (of products)
Period of time during which the performances of the product are maintained - under the corresponding service conditions - at a level compatible with the intended use conditions.

A.4.3 Economically reasonable working life: (ID 1.3.5(2)
Working life which takes into account all relevant aspects, such as costs of design, construction and use, costs arising from hindrance of use, risks and consequences of failure of the works during its working life and cost of insurance covering these risks, planned partial renewal, costs of inspections, maintenance, care and repair, costs of operation and administration, of disposal and environmental aspects.

A.4.4 Maintenance (of works) (ID 1.3.3(1)
A set of preventive and other measures which are applied to the works in order to enable the works to fulfil all its functions during its working life. These measures include cleaning, servicing, repainting, repairing, replacing parts of the works where needed, etc.

A.4.5 Normal maintenance (of works) (ID 1.3.3(2)
Maintenance, normally including inspections, which occurs at a time when the cost of the intervention which has to be made is not disproportionate to the value of the part of the work concerned, consequential costs (e.g. exploitation) being taken into account.

A.4.6 Durability (of products)
Ability of the product to contribute to the working life of the work by maintaining its performances, under the corresponding service conditions, at a level compatible with the fulfilment of the essential requirements by the works.

A.5 CONFORMITY

A.5.1 Attestation of conformity (of products)
Provisions and procedures as laid down in the CPD and fixed according to the directive, aiming to ensure that, with acceptable probability, the specified performance of the product is achieved by the ongoing production.

A.5.2 Identification (of a product)
Product characteristics and methods for their verification, allowing to compare a given product with the one that is described in the technical specification.

A.6. APPROVAL AND APPROVED BODIES

A.6.1. Approval Body

Body notified in accordance with Article 10 of the CPD, by an EU Member State or by an EFTA State (contracting party to the EEA Agreement), to issue European Technical Approvals in (a) specific construction product area(s). All such bodies are required to be members of the European Organisation for Technical Approvals (EOTA), set up in accordance with Annex II.2 of the CPD.6.2.

A.6.2 Approved Body(*)

Body nominated in accordance with Article 18 of the CPD, by an EU Member State or by an EFTA State (contracting party to the EEA Agreement) , to perform specific tasks in the framework of the Attestation of Conformity decision for specific construction products (certification, inspection or testing). All such bodies are automatically members of the Group of Notified Bodies.

(*) also known as Notified Body

ABBREVIATIONS

Concerning the Construction products directive:

AC:	Attestation of conformity
CEC:	Commission of the European Communities
CEN:	Comité européen de normalisation - European Committee for Standardization
CPD:	Construction products directive
EC:	European communities
EFTA:	European free trade association
EN:	European standards
FPC:	Factory production control
ID:	Interpretative documents of the CPD
ISO:	International standardisation organisation
SCC:	Standing committee for construction of the EC

Concerning approval:

EOTA:	European organisation for technical approvals
ETA:	European technical approval
ETAG:	European technical approval guideline
TB:	EOTA-Technical board
UEAtc:	Union européenne pour l'agrément technique - European Union of Agrément

General:

TC:	Technical committee
WG:	Working group

Annex B: REFERENCE DOCUMENTS

	General
The Council Directive 89/106/EEC	*Approximation of laws, regulations and administrative provisions of the Member states relating to construction products.*
(pr)EN 13501-2:1999	*Fire classification of construction products and building elements - Part 2 - Classification using data from resistance to fire tests (excluding products for use in ventilation systems)*
	Verification of loadbearing capacity
EN 380	*Timber structures - Test methods - General principles for static load testing*
prEN 1990	*EUROCODE - Basis of structural design*
ENV 1991-1:1994	*EUROCODE 1; Basis of design and actions on structures - Part 1: Basis of design*
ENV 1991-2-1:1995	*EUROCODE 1: Basis of design and actions on structures - Part 2-1: Actions on structures - Densities, self-weight and imposed loads*
ENV 1991-2-3:1995	*EUROCODE 1: Basis of design and actions on structures - Part 2-3: Actions on structures - Snow loads*
ENV 1991-2-4:1995	*EUROCODE 1: Basis of design and actions on structures - Part 2-4: Actions on structures - Wind actions*
ENV 1995-1-1:1993	*EUROCODE 5; Design of timber structures - Part 1-1: General rules and rules for buildings*
ENV 1998-1-3:1995	*EUROCODE 8; Design provisions for earthquake resistance of structures - Part 1-3: General rules - Specific rules for various materials and elements*
EN 380:1993	*Timber structures - Test methods - General principles for static load testing*
	Verification of fire resistance and reaction to fire
ENV 1991-2-2:1995	*EUROCODE 1: Basis of design and actions on structures - Part 2-2: Actions on structures - Actions on structures exposed to fire*
ENV 1995-1-2:1994	*EUROCODE 5: Design of timber structures - Part 1-2: General rules - Structural fire design*
PrEN 13501-1	*Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*
PrEN 13501-2	*Fire classification of construction products and building elements - Part 2: Classification using data from resistance to fire tests (excluding products for use in ventilation systems)*
CEN CR 1187:2001	*Test methods for external fire exposure of roofs*
	Verification of water vapour permeability and moisture resistance
EN 12524	*Building materials and products - Energy related properties - Tabulated design values*
PrEN 12572	*Building materials – Determination of Water Vapour Transmission Properties*
PrEN 13788	*Hygrothermal performance of building components and building elements – Estimation of internal surface temperatures to avoid critical surface humidity and calculation of interstitial condensation (ISO/DIS 13788:1997)*
	Verification of watertightness
PrEN 1027	*Windows and doors - Water tightness - Test method*
PrEN 12155	*Curtain walling - Water tightness - Laboratory test under static pressure*
PrEN 12865-1	*Hygrothermal performance of buildings - Determination of resistance to driving rain under pulsating air pressure - Part 1: External wall systems*
NT BUILD 058	*Walls in bathrooms: Watertightness and resistance to water and moisture, Edition 3 1998*
NT BUILD 230	*Bathroom floors: Watertightness, Edition 2 1995*
NT BUILD 448	*Wall coverings and bushings for water pipes and taps in bathrooms, Watertightness, Edition 1996*

	Verification of release of dangerous substances
WI 00112138	*Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking, 2000*
EN 120:1992	*Wood based panels - Determination of formaldehyde content - Extraction method called the perforator method.*
	Verification of sound insulation performance
ISO 140	*Acoustics - Measurement of sound insulation in buildings and of building elements*
EN ISO 354	*Acoustics – Measurement of sound absorption in reverberation room*
ISO 717 (EN 20717)	*Parts 1 and 2; Acoustics - Rating of sound insulation in buildings and of building elements*
PrEN ISO 12354	*Parts 1 and 2, Building acoustics - Estimation of acoustic performance of buildings from the performance of products*
	Verification of thermal insulation
EN ISO 6946:1996	*Building components and building elements - Thermal resistance and thermal transmittance - Calculation method*
EN 12524	*Building materials and products - Energy related properties - Tabulated design values*
PrEN 10077-1	*Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 1: Simplified method*
EN ISO 10211 – 1:1995	*Thermal bridges in building constructions - Heat flows and surface temperatures - Part 1: General calculation methods*
PrEN ISO 10211 – 2	*Thermal bridges in building constructions - Heat flows and surface temperatures - Part 2: Calculation in linear thermal bridges*
ISO/DIS 10456	*Thermal insulation - Building materials and components - Determination of declared values and design thermal values*
ISO 8990	*Thermal insulation - Determination of steady-state thermal transmission - Calibrated and guarded hot box*
PrEN ISO 14653	*Thermal bridges in building construction - Heat flows and surface temperatures –General calculation method*
	Verification of air permeability
ISO 9972	*Thermal insulation - Determination of building airtightness - Fan pressurization method*
PrEN 1026	*Windows and doors - Air permeability - Test method*
PrEN 12114	*External walls of buildings - Air permeability - Test method*
	Verification of durability of wood products
EN 335-1:1992	*Durability of wood and wood based products - Definition of hazard classes of biological attack – Part 1: General*
EN 335-2:1992	*Durability of wood and wood based products - Definition of hazard classes of biological attack – Part 2: Application to solid wood*
EN 335-3:1995	*Durability of wood and wood based products - Definition of hazard classes of biological attack – Part 3: Application to wood-based panels*
EN 351-1:1995	*Durability of wood and wood based products - Preservative-treated solid wood - Part 1: Classification of preservative penetration and retention*
EN 350-2:1994	*Durability of wood and wood based products - Natural durability of solid wood - Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*
EN 460:1994	*Durability of wood and wood-based products – Natural durability of solid wood - Guide to the durability requirements for wood to be used in hazard classes*
EN 599-1:1996	*Durability of wood and wood-based products – Performance of preventive wood preservatives as determined by biological tests - Part 1: Specification according to hazard class*
EN 599-2:1995	*Durability of wood and wood-based products – Performance of preventive wood preservatives as determined by biological tests - Part 2: Classification and labelling*

Annex C: CHECKLIST FOR PRINCIPAL CONSTRUCTION DETAILS

Exterior walls

1. Vertical cross section of the walls with all layers
2. Horizontal cross section of the walls with all layers
3. Typical view of structural frame with positions of logs, additional studs, and openings
4. System for wall ties and uplift anchors
5. Horizontal cross section of joints between prefabricated elements, including corner joints
6. Vertical cross section of joint between exterior wall and foundation/ground floor
7. Vertical cross section of joints between exterior wall and suspended floors
8. Vertical cross section of joints between ext. wall and roof, both at gables and facades
9. Basic design of joints between wall and windows/doors

Internal walls

1. Horizontal cross section of the walls with all layers
2. Typical view of structural frame with positions of logs, additional studs, and openings
3. Vertical cross section of joint between wall and foundation/ground floor
4. Vertical cross section of joints between wall and suspended floors

Separating walls between house units

1. Horizontal cross section of the walls with all layers
2. Typical view of the structural frame with positions of logs, studs and sheathing
3. Horizontal cross section of joints between prefabricated elements
4. Vertical cross section of joint between wall and foundation/ground floor
5. Vertical cross section of joints between wall and suspended floors
6. Vertical cross section of joints between wall and roof structure
7. Position of fire stops in voids between double wall leafs

Suspended floors

1. Vertical cross section of the floors with all layers
2. Horizontal plan of structural system with positions of joists, blockings etc.
3. Structural system for floor openings
4. Detail of possible structural joist splices
5. Vertical cross section of element joints, if any
6. Vertical cross section of support details on foundations and walls

Roofs

1. Vertical cross section of complete roof structure with all layers
2. Plan of structural system with positions of rafters and possible intermediate supports
3. Structural system for openings to attics
4. Basic design of joints around ducts, pipes, chimneys etc. penetrating the roof
5. Vertical cross section of support details at exterior walls and possible intermediate supports
6. Vertical cross section of element joints
7. Basic design of joints between roof and roof windows