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GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL

for

**INTERNAL PARTITION KITS
FOR USE AS
NON-LOADBEARING WALLS**

Amended December 2005

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FOREWORD

Background of the ETA Guideline

This Guideline has been drawn up by the EOTA Working Group 05.05/01 - *Internal Partition Kits for Use as Non-loadbearing Walls*.

The original WG consisted of members from nine EU-countries (Denmark (Convenor), Belgium, Finland, France, Germany, Netherlands, Italy, Portugal and the United Kingdom) and one European industrial organisation (EuroGypsum representing the European Confederation of Construction Products Manufacturers). At the last WG meeting the European Federation of Fibre-Cement Manufacturers was represented as well.

The scope of the revision of the Guideline was as follows:

- Updating of references concerning fire including extended application rules and mounting and fixing rules
- Updating of references concerning dangerous substances
- Updating of references concerning identification
- Updating of Attestation of conformity levels based on the revised mandate
- Introduction of additional regulatory requirements from Member States for glazed (non-opaque) partitions
- Amendment of descriptions of test and assessment methods on the basis of experience
- Introduction of a horizontal load on partitions acting as barriers in accordance with the recommendations of EN 1991-1-1
- General amendment of the ETAG in accordance with the ETAG Format

Due to the number and magnitude of amendments the working group has considered that it is preferable to elaborate a new revised Guideline rather than to elaborate what would be a very extensive progress file.

The revision of the Guideline was carried out by representatives from Denmark (Convenor), Austria, Belgium, Finland (by correspondence), France, Germany (by correspondence), Netherlands, Italy and United Kingdom.

The scope of the Guideline is the result of a distinction between EOTA- and CEN-involvement in the area of internal partitions. It was agreed that EOTA would deal with systems as described in the scope of this Guideline, whilst CEN would deal with partitions built on site of components generally available or manufactured on site.

The Guideline sets out the performance requirements for Internal Partition Kits for Use as Non-loadbearing Walls, the verification methods used to examine the various aspects of performance, the assessment criteria used to judge the performance for the intended use and the presumed conditions for the design and execution of the Internal Partition Kits in the works.

The general assessment approach of the Guideline is based on relevant existing knowledge and testing experience. Assessment criteria were chosen on the basis of an analysis of technical aspects related to the performance of partition systems made of traditional materials.

The UEAtc - *Directives Communes pour l'Agrément des Cloisons Légères* (UEAtc Common Directive for the Agrément of Light-Weight Partitions) has formed part of the basis for the Guideline, but as this Directive has not been revised since its publication in 1973, major alterations have been made. Also, where relevant, national technical specifications have been discussed and taken into account.

In the revision new test methods have not been developed, preference having been given to the use or amendment of existing test and calculation methods, especially EN and ISO methods. Concerning the verification of mechanical resistance and stability plus robustness and rigidity carried out as soft body load

tests (clause 5.4.1.1 and 5.7.1.1), the WG has discussed the possibility of adding the alternative of calculation methods but has decided to leave it out since suitable methods were not found.

The Guideline sets out the procedures to be followed when assessing the various properties of Internal Partition Kits. It must be noted, however, that the choice of properties to be assessed and the choice of classes and categories for each property is entirely that of the manufacturer.

As most member countries and the Interpretative Document on SAFETY IN CASE OF FIRE use classes to define fire resistance and reaction to fire, so too does the Guideline. Otherwise, classes are not used throughout the Guideline, but *Use Categories* are introduced when dealing with *Mechanical Resistance and Stability* and *Robustness and Rigidity*. All remaining product characteristics, in general are expressed as numerical values. This approach is in accordance with the philosophy of the CPD that The Essential Requirements deal with the building works and an ETA is a favourable technical assessment of a construction product for an intended use, i.e. incorporation in the works. The ETA deals only with the product and states classes or merely product characteristics to be used afterwards by the designer of the works.

List of reference documents

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 **Progress 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 ETA Guideline has been established in full compliance with the provisions of the Council Directive 89/106/EEC (CPD) and taking into account the following steps:

- issuing of the final mandate by the EC: 30-10-1997
- issuing of the final mandate by EFTA: 30-10-1997
- adoption of the Guideline by EOTA (Executive Commission): 03-09-98
- endorsement by the EC: SCC opinion of 9-10 December 1998
EC letter of 5 February 1999

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

ETA Guideline 003, Edition December 1998 is superseded.

1.2 STATUS OF ETA GUIDELINES

1.2.1 An ETA is one of two types of technical specifications in the sense of the EC Construction Products Directive (89/106/EEC). This means that Member States shall presume the approved products fit for their intended use, i.e. that 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.

1.2.2 An ETA Guideline is a basis for ETAs, i.e. a basis for technical assessment of the fitness for use of a product for an intended use. An ETA Guideline is not in itself a technical specification in the sense of the CPD.

ETA Guidelines express the common understanding of the approval bodies of the provisions of the EC Construction Products Directive and of the Interpretative Documents with regard to the products and uses concerned established within the framework of a mandate given by the EC Commission after consulting the EC Standing Committee for Construction.

1.2.3 ETA Guidelines are binding for the issuing of ETAs of the products concerned for an intended use when accepted by the EC Commission after consultation with the EC Standing Committee for Construction and published by the Member States in their official language or languages.

The applicability and the satisfaction of the ETA Guideline for a product and its intended use have to be assessed in a case by case evaluation and approval by an authorised approval body. Satisfaction of the provisions of an ETA Guideline (examinations, tests and evaluations) leads to a presumption of fitness for use only through this case by case evaluation.

Products which are outside the scope of an ETA Guideline may be considered where appropriate through the approval procedure without guidelines according to art. 9.2 of the CPD.

The requirements in ETA Guidelines are set out in terms of objectives and of relevant actions to be taken into account. ETA Guidelines specify values and characteristics, the conformity with which the presumption that the requirements set out are satisfied whenever the state of the art permits to do so. The ETA Guidelines may indicate alternative possibilities for the demonstration of the satisfaction of the requirements.

2 SCOPE

2.1 SCOPE

This Guideline relates to Internal Partition Kits for use as non-loadbearing walls:

- with or without fire separating capabilities and/or acoustic insulation and/or thermal insulation
- made of board or sheet materials supported by studs or other ancillary members; made of composite panels with or without supporting framework; made of fully or partially glazed constructions; made of homogeneous units; including fixings and accessories
- designed and erected in accordance with the ETA holder's design rules and installation guide and composed of components factory-produced as part of the kit either by the ETA-holder himself or by other manufacturers delivering to the specification of the ETA-holder, who is responsible for the kit.

2.2 USE CATEGORIES, PRODUCT FAMILIES, KITS

The primary function of a partition is to

- divide the interior of a building (a)

This includes the special cases where a partition

- separates areas with different floor levels (b) or
- is used as an independent lining for an external wall (c).

(Letters a, b and c refer to Figure 1 below).

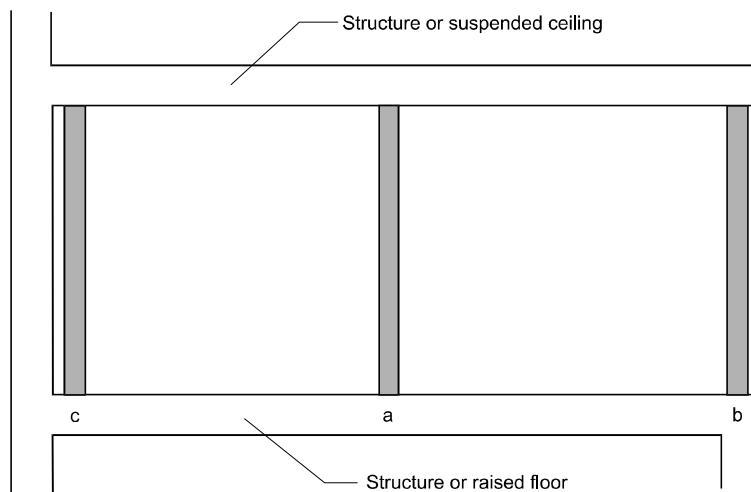


Figure 1 - Vertical section

Various characteristics may be added to a partition enabling it to perform other functions – in addition to its primary function of dividing – such as separating:

- fire compartments and/or
- areas between which there are requirements with respect to the transmission of sound and/or
- areas with different hygrothermal conditions

The intended use for a partition as specified in an ETA may vary within a range of many possibilities, from a simple partition with no additional characteristics to a partition with any combination of additional characteristics, for example a fire-compartment partition separating areas with different floor levels and with declared acoustic and hygrothermal properties.

It is entirely the choice of the manufacturer applying for an ETA, as to which properties will be assessed and declared in the ETA (including the choice of classes or categories for each property). The choice will depend on the intended use of the partition and the manufacturer's intended market, accounting for national variations in required classes or categories.

A partition may or may not include:

- a factory-made finish
- openings that allow the fitting of doors and other moving components. If the components to be installed in the openings form part of the system, this shall be apparent from the ETA. Unless otherwise stated in the ETA for the partition, the components to be installed in the openings shall be assessed on the basis of the requirements relevant for the components in question and their intended use.
- installations for gas, electricity, water or drainage. The assessment, however, will comprise only the fitness for use of the partition according to this document with the services installed, but not the performance or lawfulness of the services themselves.

The Guideline deals with immovable and relocatable partitions.

The following products are not included in this Guideline:

- sliding and folding partitions, such as partitions of hinged leaves which can be moved horizontally or vertically either manually or by, electrically or hydraulically powered installations
- partitions that are part of an integrated partition-suspended ceiling and/or partition-raised floor system
- screens, e.g. part height office type screens and cubicles, e.g. for toilets

2.3

ASSUMPTIONS

The state of the Art doesn't 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 products. 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.

List of main assumptions

The Guideline deals with partitions intended for use under the following conditions:

- structures capable of giving adequate support and adequate possibilities for fixing
- an average air temperature in the range from 5 °C to 35 °C with a minimum of 0 °C and a maximum of 50 °C
- an average daily air relative humidity in the range from 20 %RH to 75 %RH. Maximum air relative humidity only exceeding 85 %RH for short periods of time
- zones accessible to users with a certain level of incentive to exercise care. These zones are divided into four use categories as shown in Tables 6 and 11 of the Guideline.

In EN 1991-1-1:2002 – Eurocode 1: Basis of design and actions on structures – Part 2-1: Actions on structures – Densities, self-weight and imposed loads areas in residential, social, commercial and administration buildings are divided into five categories according to their specific uses as shown in Table 1.

The relationship between the use categories employed in this Guideline and the categories employed in Eurocode 1 is given in Table 2.

- zones where surface requirements with respect to hygiene, air quality, static electricity, etc are of the same nature and magnitude as those in dwellings, offices, schools, institutions, etc.

The following use conditions are outside the scope:

- exceptionally severe use (such as acts of vandalism)
- zones where very special or very high requirements for surfaces are found (such as in hospitals, medical and food industry, computer and telecommunications rooms, etc).

Table 1: Definition of area categories in Eurocode 1 *)

Category	Specific Use	Example
A	Areas for domestic and residential activities.	Rooms in residential buildings and houses; bedrooms and wards in hospitals; bedrooms in hotels and hostels kitchens and toilets.
B	Office areas.	
C	Areas where people may congregate (with the exception of areas defined under category A, B and D).	<p>C1: Areas with tables, etc., e.g. areas in schools, cafés, restaurants, dining halls, reading rooms, receptions.</p> <p>C2: Areas with fixed seats, e.g. areas in churches, theatres or cinemas, conference rooms, lecture halls, assembly halls, waiting rooms, railway waiting rooms.</p> <p>C3: Areas without obstacles for moving people, e.g. areas in museums, exhibition rooms, etc. and access areas in public and administration buildings, hotels, and railway station forecourts.</p>

		C4: Areas with possible physical activities, e.g. dance halls, gymnastic rooms, stages. C5: Areas susceptible to overcrowding, e.g. in buildings for public events like concert halls, sports halls including stands, terraces and access areas and railway platforms.
D	Shopping areas.	D1: Areas in general retail shops D2: Areas in department stores

*) The table is a copy of Table 6.1: Categories of building areas, in Eurocode 1.

Table 2: Relationship between use categories and area categories

Use category as specified in clauses 6.4.1 and 6.7.1 of the Guideline	Description	Area category as specified in Eurocode 1 EN 1991-1-1:2002
I	Zones accessible primarily to those with high incentive to exercise care. Small risk of accidents occurring and of misuse.	A, B
II	Zones accessible primarily to those with some incentive to exercise care. Some risk of accidents occurring and of misuse.	
III	Zones accessible primarily to those with little incentive to exercise care. Risk of accidents occurring and of misuse.	C1 – C4, D1 – D2
IV	Zones and risk as II and III In case of failure risk includes the fall to a floor at a lower level, cf. type b in Figure 1 in clause 2.2	C5 + A, B, C1 – C4, D1 – D2 where the partition has the function of a barrier.

Use category E, F and G in EN 1991-1-1 are not covered by this Guideline

3 **TERMINOLOGY**

3.1 COMMON TERMINOLOGY AND (see Annex A)

3.2 SPECIFIC TERMINOLOGY related to this Guideline

3.2.1. Non-loadbearing wall

Wall which does not transfer vertical forces from the works and whose contribution to the stability of the works is not taken into account.

3.2.2 Joint

Connection between two partition components

Connection between a partition component and a component of an adjacent system or

structure

3.2.3 Immoveable partition

Partition which is installed with no intention of later repositioning and in such a way that it can not be dismantled without being demolished.

3.2.4 Relocatable partition

Partition which is installed with a view to possible later repositioning. The partition, therefore, is capable of being dismantled and reinstalled without loss of properties and without substantial repair other than replacement of ancillary components such as seals and fixings. In general, the process itself requires a certain amount of skill and the use of tools.

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 internal partition kits and their intended uses. It is the manufacturer or producer who defines the internal partition kit for which he is seeking 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 internal partitions 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 kits or materials, or where there is a range of uses, the whole package of tests and assessment may be applicable.

(b) General lay out of this section

The assessment of the fitness of internal partition 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 internal partition kits and uses concerned, beginning with the Essential Requirements for works (CPD art. 11.2) and then listing the corresponding relevant characteristics of the internal partition kit.
- 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.
- Chapter 6 provides guidance on **the assessing and judging methods** to confirm fitness for the intended use of the internal partition kits.
- Chapter 7, **assumptions and recommendations** are only relevant in as far as they concern the basis upon which the assessment of the internal partition 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 internal partition 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 internal partition 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 internal partition kit for the intended use of 25 years, provided that the internal partition kit is subject to appropriate use and maintenance (cfr. ch. 7). 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 an internal partition kit cannot be interpreted as a guarantee given by the producer or the approval body. They should only be regarded as a means for the specifiers to choose the appropriate criteria for internal partition 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, products 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 internal partition kit must 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 must, 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 identifies the aspects of performance to be examined in order to satisfy the relevant Essential Requirements for Internal Partition Kits for use as non-loadbearing walls, by:

- expressing in more detail, and in terms applicable to the scope of the Guideline, the relevant Essential Requirements of the CPD (given concrete form in the Interpretative Documents and further specified in the mandate), for works or parts of the works, taking into account the durability and serviceability of the works
- applying them to the scope of the Guideline (product/system and intended use), and indicating the resulting relevant product characteristics and possible other aspects.

Each Essential Requirement is considered in turn.

When a product 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 to 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 internal partition kits. (cfr ETA-format par. II.2).

The relevant Essential Requirements, the relevant paragraphs of the corresponding IDs and the related requirements to product performance are indicated in Table 3.

Table 3: Relationship between ID paragraph for works, ID paragraph for product performance and ETAG paragraph on product performance

ER	Corresponding ID paragraph for works	Corresponding ID paragraph for product performance	ETAG paragraph on product performance *)
1	–	–	–
2	§ 4.2.3.3.1 Limitation of the generation of fire and smoke within the room of origin	§ 4.3.1.1 Products subject to reaction to fire requirements – walls	§ 4.2.1 Reaction to fire
	§ 4.2.3.4.2 b Limitation of spread of fire and smoke beyond the room of origin	§ 4.3.1.3.5.1 Products subject to resistance to fire requirements – partitions	§ 4.2.2 Fire resistance

3	§ 3.3.1.1 Air quality	§ 3.3.1.1.3.2 a Emission and release of pollutants	§ 4.3.1 Release of dangerous substances
	§ 3.3.1.2 Dampness	§ 3.3.1.2.3.2.e1 Walls, walling materials	§ 4.3.2 Water vapour permeability § 4.3.3 Water permeability
4	§ 3.3.1.2 Falling due to changes in level or sudden drops	§ 3.3.2.3 Mechanical resistance and stability	§ 4.4.1 Resistance to: – horizontal loads – eccentric loads
	§ 3.3.2.2 Geometry Presence of sharp or cutting edges Nature of surfaces Behaviour on impact	§ 3.3.2.3 Definition of geometry Mechanical resistance and stability	§ 4.4.2 Shatter properties Safety against personal injuries
5	§ 2.3.1 / § 2.3.2 Protection against airborne noise from outside of the works / between enclosed spaces	§ 4.3.2 Acoustic properties (according to 4.3.3)	§ 4.5.1 Airborne sound insulation
	§ 2.3.5 Protection against excessive reverberant noise	§ 4.3.2 Acoustic properties (according to 4.3.3)	§ 4.5.2 Sound absorption
6	4.2 Energy consumption limitation	Table 4.2 Component characteristics	§ 4.6.1 Thermal resistance
	4.2 Energy consumption limitation	Table 4.2 Component characteristics	§ 4.6.2 Thermal inertia
Aspects of durability and service-ability			§ 4.7.1 Robustness and rigidity § 4.7.2 Resistance to deterioration caused by – physical agents – chemical agents – biological agents

*) The product performances are identical with the performance characteristics given in the mandate.

4.1

MECHANICAL RESISTANCE AND STABILITY

Requirements with respect to the mechanical resistance and stability of *non-loadbearing* parts of the works are not included in this Essential Requirement but are treated under the Essential Requirement SAFETY IN USE (see clause 4.4.1).

4.2 SAFETY IN CASE OF FIRE

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.*

The following aspects of performance are relevant to this Essential Requirement for Internal Partition Kits:

4.2.1 Reaction to fire

The reaction to fire performance of the products and/or components of the partition kit shall be in accordance with laws, regulations and administrative provisions, applicable to the partition kit in its end use application. This performance shall be expressed in the form of a classification specified in accordance with the relevant EC decision and the appropriate CEN classification standards.

4.2.2 Fire resistance

The resistance to fire performance of the partition shall be in accordance with laws, regulations and administrative provisions, applicable to the kit in its end use application. This performance shall be expressed in the form of a classification specified in accordance with the relevant EC decision and the appropriate CEN classification standards.

4.3 HYGIENE, HEALTH AND THE ENVIRONMENT

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 gases*
- *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.*

The following aspects of performance are relevant to this Essential Requirement for Internal Partition Kits:

4.3.1 Release and/or content dangerous substances

Materials forming the partition kit shall 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).

4.3.2 Water vapour permeability

The partition shall be designed and installed in such a way that moisture transfer through the partition does not cause water vapour to condense within the partition or on its surface adversely affecting the properties of the partition.

4.3.3 Water permeability

Requirements regarding the water permeability (watertightness) of partitions are relevant only where partitions are used in environments where they are exposed directly to water, e.g. in bathrooms, washrooms, dairies and abattoirs. Such requirements relate to the performance of the covering system and shall be dealt with in separate technical specifications on the watertightness of wall coverings.

4.4 SAFETY IN USE

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 it does not present unacceptable risks of accidents in service or in operation such as slipping, falling, collision, burns, electrocution, injury from explosion.

The following aspects of performance are relevant to this Essential Requirement for Internal Partition Kits:

4.4.1 Resistance to horizontal and eccentric loads

The partition shall have sufficient mechanical resistance and stability to ensure that the safety of the occupants is not endangered.

This means that it shall have sufficient mechanical resistance and stability to withstand accidentally large static or dynamic loads, from the action of persons or objects, without full or partial collapse causing dangerous (sharp or cutting) fragments, giving risk of falling through, particularly at a change of level, or endangering the safety of other people.

The loads may be in the form of:

- impacts resulting from a person falling against the partition
- differential air pressure
- a large number of people leaning or pressing against the partition at the same time (crowd pressure)
- impacts resulting from the movement of heavy non-deformable objects such as pieces of furniture or equipment
- slamming of doors
- heavy objects such as furniture and sanitary or heating equipment.

4.4.2 Safety against personal injuries by contact

Partitions shall be designed and installed with due consideration to passive safety to prevent occupants from injury by the partition under normal conditions or to prevent unnecessary injuries being inflicted on a person who accidentally falls against the partition. The

characteristics of the partition affecting the level of risk include:

- Geometry
Windows opening into circulation spaces, positioning of doors, headroom.
- Existence of sharp or cutting edges
Joints, corners, trim details.
- Nature of surfaces
Surface texture.

4.5 PROTECTION AGAINST NOISE

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 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.

The following aspects of performance are relevant to this Essential Requirement for Internal Partition Kits:

4.5.1 Airborne sound insulation

Transmission of airborne sound across partitions shall be in accordance with laws, regulations and administrative provisions, applicable for the location where the product is incorporated in the works.

4.5.2 Sound absorption

Sound absorption is considered only in case of partitions with a factory-made finish.

The acoustic qualities of the surface of a partition shall meet any relevant requirements with respect to reverberation time.

4.6 ENERGY ECONOMY AND HEAT RETENTION

The Essential Requirement laid down in the COUNCIL DIRECTIVE 89/106/EEC is as follows:

The construction works and its heating 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.

The following aspects of performance are relevant to this Essential Requirement for Internal Partition Kits:

4.6.1 Thermal resistance

The thermal transmittance/resistance of the partition shall be in accordance with laws, regulations and administrative provisions, applicable for the location where the product is incorporated in the works.

If there is any discontinuity in assembled panels, then the effect of a thermal bridging shall be considered.

4.6.2 Thermal inertia

The thermal inertia of a partition shall be established in cases where this characteristic is

required to determine the energy consumption of the works (for heating and/or for cooling).

4.7 ASPECTS OF DURABILITY AND SERVICEABILITY

The following requirements relate to the Essential Requirements, but not to any individual Essential Requirement. As a consequence, failure to meet these requirements may result in one or more of the Essential Requirements no longer being met.

4.7.1 Robustness and rigidity

The partition shall have sufficient robustness and rigidity to maintain integrity and therefore ensure the continued fulfilment of relevant Essential Requirements.

This means that it shall have the sufficient robustness and rigidity to withstand static or dynamic loads from the action of people or objects without apparent damage, inconvenient deflection or impression of lack of stability.

The loads may be in the form of:

- impacts resulting from a person falling against the partition
- differential air pressure
- a large number of people leaning or pressing against the partition at the same time (crowd pressure)
- impacts resulting from the movement of light non-deformable objects such as pieces of furniture or cleaning tools.
- slamming of doors
- heavy objects, such as furniture and sanitary or heating equipment
- light objects, such as pictures, lamps or small pieces of furniture

In addition, partitions intended for ceramic tiling require greater rigidity to ensure that the covering remains intact.

4.7.2 Resistance to deterioration

To prevent reduction in mechanical or other properties, partition components and their possible finishes shall be protected against / resistant to deterioration caused by physical, chemical or biological agents. The agents include:

4.7.2.1 *Physical agents*

Hygrothermal conditions.

The partition, including its joints, shall not be adversely affected (e.g. deterioration, distortion, deformation) by the following conditions:

- Variations in temperature/humidity where the same changes occur on both sides of the partition at the same time. (Example: Office heating can be reduced or even switched off at night and during weekends or national holidays. Office temperatures can drop from up to 25 °C to around 5 °C with consequential increases in relative humidity.)
- Differences in temperature and/or relative humidity on one side of a partition compared to the other. (Example: Office at up to 25 °C located within an unheated warehouse, where the office temperature is maintained and the warehouse side varies from just above freezing, during winter, to 30 °C in summer.)
- Localised heating from heating panels or radiators located next to the partition.

4.7.2.2 *Chemical agents*

Water, carbon dioxide, oxygen (possible corrosion) and other normal chemical hazards likely to come into contact, for example cleaning materials (resistance to cleaning agents is considered only in the case of partitions or components with a factory made finish).

4.7.2.3 *Biological agents*

Fungi, bacteria, algae and insects.

The partition shall be designed and built in such a way that it does not encourage infestation by insects or vermin.

4.7.3 Identification

The products shall be precisely defined by reference to relevant characteristics.

5. METHODS OF VERIFICATION

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

The relevant Essential Requirements, the related requirements to product performances (as given in Chapter 4), the corresponding product characteristics to be assessed and the corresponding verification methods are indicated in Table 5.1.

Not all the requirements in the following section will be relevant to every product. A 'No performance determined' option is possible in some cases and it will be for the manufacturer to decide, taking account of their intended market and which options they wish to have assessed.

It is possible to use existing data from recognized laboratories with expertise in testing of internal partition kits and having an adequate quality system, which includes the calibration of testing equipment. 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'. It is the responsibility of the EOTA Technical Board to ensure that the intentions of the tests mentioned in this chapter are fulfilled.

Based on existing data and/or the claimed performance of the internal partition kit by the manufacturer, the approval body may decide that not all investigations mentioned in this chapter are necessary and the Approval Body has the discretion to develop a suitable programme for the assessment of internal partition kit taking account of the intended use and the claimed performance.

The relevant Essential Requirements, the related requirements to product performances (as given in chapter 4), the corresponding product characteristics to be assessed and the corresponding verification methods are given in Table 4.

Table 4: Relationship between ETAG paragraph on product performance, product characteristics and ETAG paragraph on verification method

ER	ETAG paragraph on product performance *)	Product characteristics	ETAG paragraph on verification method	Kit or component test
2	§ 4.2.1 Reaction to fire	Reaction to fire	§ 5.2.1 Testing of reaction to fire	Product/Component
	§ 4.2.2 Fire resistance	Resistance to fire	§ 5.2.2 Testing of fire resistance	Kit
3	§ 4.3.1 Release of – formaldehyde – asbestos (content) – penta-chlorophenol – other dangerous	Rate of release dangerous substances	§ 5.3.1 Test methods vary	Component

	substances			
	§ 4.3.2 Water vapour permeability	Water vapour permeability	§ 5.3.2 Testing of water vapour permeability	Component
	§ 4.3.3 Water permeability	Not relevant	§ 5.3.3 Not relevant	
4	§ 4.4.1 Resistance to : – horizontal loads – eccentric loads	Resistance to structural damage from: – soft body impact load – hard body impact load – eccentric vertical load – horizontal linear static load	§ 5.4.1 Testing of the specified product characteristics	Kit Component Kit Kit
	§ 4.4.2 Shatter properties Safety against personal injuries	Safety against personal injuries by contact: – no sharp or cutting edges – nature of surface	§ 5.4.2 General examination	Component/ kit
5	§ 4.5.1 Airborne sound insulation	Airborne sound insulation	§ 5.5.1 Testing of airborne sound insulation	Kit
	§ 4.5.2 Sound absorption	Sound absorption coefficient	§ 5.5.2 Testing of sound absorption coefficient	Component
6	§ 4.6.1 Thermal resistance	Thermal resistance	§ 5.6.1 Calculation or testing of thermal transmission	Kit (based on components)
	§ 4.6.2 Thermal inertia	Thermal inertia	§ 5.6.4 Information on relevant data	Kit (based on components)
Aspects of durability and serviceability	§ 4.7.1 Robustness and rigidity	Resistance to functional failure from: – soft body impact load – hard body impact load – eccentric vertical load – point loads Rigidity of partitions for ceramic tiling	§ 5.7.1 Testing of specified product characteristics	Kit Component Kit Kit Kit
	§ 4.7.2 Protection against deterioration caused by: – physical agents – chemical agents	Resistance to deterioration caused by: – physical agents – chemical agents – biological agents	§ 5.7.2 Evaluation of component specifications or testing of component resistance to: – physical agents – chemical agents	Component/ Kit

	- biological agents		- biological agents	
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*) The product performances are identical with the performance characteristics given in the mandate.

5.1 MECHANICAL RESISTANCE AND STABILITY

Requirements regarding the mechanical resistance and stability of *non-loadbearing* parts of the work is not included in this Essential Requirement but treated under the Essential Requirement SAFETY IN USE see clause 5.4.1.

5.2 SAFETY IN CASE OF FIRE

5.2.1 Reaction to fire

Dependant on the composition of the partition kit one or more of the following options will apply.

The individual kit components shall be tested, using the test method(s) relevant for the corresponding reaction to fire class, in order to be classified according to EN 13501-1:2002.

And/or

The product and/or individual kit components is considered to satisfy the requirements for performance Class A1 of the characteristic reaction to fire, in accordance with the provisions of EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that Decision.

And/or

The product and/or individual kit components is considered to satisfy the requirements for the relevant performance class of the characteristic reaction to fire in accordance with the relevant EC Decision without the need for testing on the basis of its conformity with the specification of the product detailed in that Decision and its intended end use application being covered by that Decision.

Concerning mounting and fixing rules and extended application rules for reaction to fire, see annex G.

5.2.2 Resistance to fire

The internal partition kit shall be tested, using the test method relevant for the corresponding fire resistance class, in order to be classified according to EN 13501-2.

Extended application rules for partitions, see Annex H.

5.3 HYGIENE, HEALTH AND THE ENVIRONMENT

5.3.1 Release and or content of dangerous substances

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.

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).

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 database, and will be transferred to the Commission services.

The information contained in this EOTA database 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.

The abovementioned test methods and provisions apply to the individual components of the kit.

5.3.2 Water vapour permeability

The risk of interstitial or internal surface condensation, including possible joints, shall be assessed by calculation on the basis of the water vapour resistance and the thermal conductivity of the materials comprising the partition kit, according to EN/ISO 13788, *Hygrothermal performance of building components and building elements - Estimation of internal surface temperature to avoid critical surface humidity and calculation of interstitial condensation*.

The water vapour resistance of the relevant layers shall be determined by reference to EN 12524, or by test reports. Testing of the water vapour resistance of materials is performed as described in EN 12572, *Hygrothermal performance of building materials and products – Determination of water vapour transmission properties*.

For thermal properties, see 5.6.

The abovementioned provisions apply to the relevant individual components of the kit.

5.3.3 Water permeability

Not relevant. (Covered by technical specifications on the watertightness or water resistance of wall coverings.)

5.4 SAFETY IN USE

5.4.1 Resistance to horizontal and eccentric loads

5.4.1.1 *Resistance to structural damage from soft body impact load – 50 kg bag*

Testing of partitions for resistance to impact from a large soft body is performed as described in ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures* and ISO/DIS 7893:1990, *Performance Standards in Building – Partitions made from Components – Impact Resistance Tests*, with amendments and modifications as described in Annexes C and D to this Guideline.

The abovementioned test applies to the assembled kit.

5.4.1.2 *Resistance to structural damage from hard body impact load – 1 kg steel ball*

Testing of partitions for resistance to impacts from a small hard body is performed as described in ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures* and ISO/DIS 7893:1990, *Performance Standards in Building – Partitions made from Components – Impact Resistance Tests*, with amendments and modifications as described in Annexes C and D to this Guideline.

The abovementioned test applies to the exposed surface of the kit, tested in the kit configuration.

For kits with several types of build-ups but with the same surface it is not necessary to perform the hard body impact test more than once.

5.4.1.3 *Resistance to structural damage from eccentric vertical load*

Testing of partitions for support of heavy eccentric vertical downward load is performed as described in ISO/DIS 8413:1990, *Performance Standards in Building – Partitions made from Components – Tests for Ability to withstand Suspended Static Loads*, with amendments and modifications as described in Annexes C and D to this Guideline.

The abovementioned test applies to the assembled kit.

5.4.1.4 *Resistance to horizontal linear static load*

Where relevant, testing of partitions for resistance to horizontal linear static loads is performed as described in ISO/DIS 12055, *Building construction – Guardrail systems and rails for buildings*, with amendments and modifications as described in Annex D.5 to this Guideline

Alternatively and where appropriate, the resistance to horizontal linear static load can be determined by calculation in accordance with EN 1991-1-1

The abovementioned test applies to the assembled kit.

5.4.2 Safety against personal injuries by contact

– Geometry:

The geometry of positioning of specific features is a function of the works and, therefore, cannot be dealt with by testing or assessment of the product specification.

– Existence of sharp or cutting edges:

For the assessment of the presence of sharp or cutting edges, no tests are necessary. The product specification, the product itself and trial installations shall be examined to confirm that sharp or cutting edges are not present at, for example, corners, protrusions, joints or trims.

– Nature of surfaces:

Assessment of the nature of the surface does not require testing. The product specification and the product shall be examined to determine the surface texture and its degree of risk of abrasion or cutting to people or people's clothing.

The abovementioned provisions apply to the component or the kit as relevant.

5.5 PROTECTION AGAINST NOISE

5.5.1 Airborne sound insulation

Testing of partitions for airborne sound insulation is performed in a laboratory as described in:

EN/ISO 140-3:1995, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 3: Laboratory measurements of airborne sound insulation of building elements.*

The abovementioned test applies to the assembled kit.

5.5.2 Sound absorption

Testing of the sound absorption coefficient of materials is performed as described in:

EN/ISO 354: 2003 *Acoustics – Measurement of sound absorption in a reverberation room*

The abovementioned test applies to the relevant components of the kit.

5.6 ENERGY ECONOMY AND HEAT RETENTION

5.6.1 Thermal resistance

Calculation of the thermal insulation characteristics is performed as described in:

EN/ISO 6946:1996, *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method.*

Testing of thermal resistance is performed as described in:

EN/ISO 8990:November 1995, *Thermal Insulation – Determination of steady-state thermal transmission properties – Calibrated and guarded hot box.*

prEN 12667:1996, *Building materials - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance.*

prEN 12939:1997, *Building materials - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance.*

EN/ISO 10211-1:1995, *Thermal bridges in building constructions – Part 1: Heat flows and surface temperatures – General calculation methods*

EN/ISO 10211-2:1995, *Thermal bridges in building constructions – Part 2: Heat flows and surface temperatures – General calculation of linear thermal bridges.*

The abovementioned tests apply to the assembled kit, based on the characteristics of the components constituting the kit.

5.6.2 Thermal inertia

To make it possible to calculate the thermal inertia of the partition, information on the following properties of the partition shall be given:

- total mass per unit area (in kg/m²)
- density of materials used (in kg/m³)
- heat capacity of materials used (in J/kg K)

- thermal transmittance of materials used (in $W/m^2 K$).

The abovementioned provisions apply to the assembled kit, based on the characteristics of the components constituting the kit.

5.7 ASPECTS OF DURABILITY AND SERVICEABILITY

5.7.1 Robustness and rigidity

5.7.1.1 *Resistance to functional failure from soft body impact load – 50 kg bag*

Testing of partitions for resistance to impact from a large soft body is performed as described in ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures* and ISO/DIS 7893:1990, *Performance Standards in Building – Partitions made from Components – Impact Resistance Tests*, with amendments and modifications as described in Annexes **C** and **D** to this Guideline.

The abovementioned test applies to the assembled kit.

5.7.1.2 *Resistance to functional failure from hard body impact load – 0.5 kg steel ball*

Testing of partitions for resistance to impact from small non-deformable objects is performed as described in ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures* and ISO/DIS 7893:1990, *Performance Standards in Building – Partitions made from Components – Impact Resistance Tests*, with amendments and modifications as described in Annexes **C** and **D** to this Guideline.

The abovementioned test applies to the exposed surface of the kit, tested in the kit configuration.

5.7.1.3 *Resistance to functional failure from eccentric vertical load*

Testing of partitions for support of heavy eccentric vertical downward load is performed as described in ISO/DIS 8413:1990, *Performance Standards in Building – Partitions made from Components – Tests for Ability to withstand Suspended Static Loads*, with amendments and modifications as described in Annexes **C** and **D** to this Guideline.

The abovementioned test applies to the assembled kit.

5.7.1.4 *Resistance to functional failure from point loads parallel or perpendicular to the surface*

Testing of partitions for resistance to point loads parallel or perpendicular to (away from) the surface of the partition is performed as described in ISO/DIS 8413:1990, *Performance Standards in Building – Partitions made from Components – Tests for Ability to withstand Suspended Static Loads*.

The abovementioned test applies to the assembled kit.

5.7.1.5 *Rigidity of partitions to be used as a substrate for ceramic tiling*

Testing of sufficient strength and rigidity of partitions to be used as a substrate for ceramic tiling is performed as described in Annex **E** to this Guideline. The test is carried out in place of the test described in clause 5.7.1.1, and not as a supplement to it.

The abovementioned test applies to the exposed surface of the kit, tested in the kit configuration.

5.7.2 Protection against deterioration

The below mentioned provisions and test methods apply to the relevant individual components of the kit

5.7.2.1 *Physical agents*

Hygrothermal conditions.

The product specification shall be examined and the materials used assessed for hygrothermal performance primarily in respect of movement.

Where materials of known composition and performance are used, an assessment can be made and no testing is required.

For partitions of complex composition or incorporating hygroscopic materials, a hygrothermal test (see below) may be carried out as follows: A test sample that fully represents the partition under consideration shall be submitted to the following hygrothermal conditions:

- an atmosphere of 20 °C – 25 °C on either side of the partition at 25 %RH – 30 %RH for 7 days, then the temperature is reduced to 5 °C for 7 days
- an atmosphere of 20 °C – 25 °C at 25 %RH – 30 %RH on one side and 0 °C – 5 °C at 85 %RH – 95 %RH on the other for a period of 28 days
- for the effects of radiation, the partition shall be subjected on one of the faces to a localised radiation allowing the temperature of the exposed parts to be brought to maximum 50 °C ± 5 °C for 6 hours.

After each test, the deflection of the partition is measured.

5.7.2.2 *Chemical agents*

- corrosion

The possible test methods for corrosion depend on the materials used in the kit, e.g.

EN 13523-8 2002: Coil coated metals - Test methods - Resistance to salt spray

- cleaning agents

The product specification shall be examined to determine the nature of the surfaces.

Where materials of known composition and performance are used, an assessment can be made and no testing is required.

Where materials of unknown composition and performance are used, or where the manufacturer makes specific claims, or where the location of the partition is such that cleaning is an important requirement, tests shall be conducted in accordance with EN 423: 1993, *Resilient floor coverings – Determination of the effect of stains* to check the reaction of the partition to substances it is likely to encounter in service.

5.7.2.3 *Biological agents*

The product specification shall be examined and the materials used assessed to determine whether the protection against fungi, bacteria, algae and insects is appropriate for the

intended use and whether they will provide food value or contain voids suitable for habitation by vermin. The possible test methods depend on the materials used in the kit

5.7.3 Identification

The identification parameters shall be chosen appropriately, so that they give a clear understanding of the properties of the product, e.g.

- Fingerprinting (infrared, gas chromatography, etc)
- Formulation (chemical constitution, recipes, composition of raw materials, amounts, components specified by characteristics, compliance with other specifications eg. ENs or by weight, volume, percentage, etc)
- Manufacturing process parameters (temperature, pressure, time ... product/production codes)
- Testing of physical characteristics - data (geometry, density, mechanical strength, etc)
- Calculations, detailing, drawings

Whichever method(s) is/are used it is necessary to recognise practical tolerances in relation to results/data collected.

6. ASSESSING AND JUDGING
the fitness for use of products for an intended use

Chapter 6 details the performance requirements to be met by an Internal Partition Kit (chapter 4) 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, using the verification methods (chapter 5).

Each performance requirement to be met for a given intended use, in general is assessed in terms of classes, use categories or numerical values. In general, the ETA shall either indicate the result of these assessments or state “No performance determined” (for countries/regions /buildings where no requirements given in laws, regulations and administrative provisions are applicable). This statement does not mean that the partition performs badly, but merely that this specific performance property has not been tested and assessed.

The possible ways of expressing the results of the assessment of the mandatory performance requirements are given in Table 5.

Table 5: Relationship between product performance to be assessed and expressions of classification, categorization and declaration

ER	ETAG paragraph on product performance to be assessed	Class Use category Numeric value
2	§ 6.2.1 Reaction to fire	Euroclasses A1 – F
	§ 6.2.2 Fire resistance	Classification No performance determined
3	§ 6.3.1 Release of dangerous substances	Declaration No performance determined
	§ 6.3.2 Water vapour permeability	Water vapour resistance of materials No performance determined
	§ 6.3.3 Water permeability	Not relevant
4	§ 6.4.1 Resistance to horizontal and eccentric loads – Resistance to dynamic loads – Resistance to eccentric vertical loads – Resistance to horizontal linear static loads	Use category I, II, III or IV Loading use category A or B No performance determined Characteristic value No performance determined
	§ 6.4.2 Safety against personal injury by contact	Description No performance determined
	§ 6.5.1	Single number rating

5	Airborne sound insulation	No performance determined
	§ 6.5.2 Sound absorption	Single number rating No performance determined
6	§ 6.6.1 Thermal resistance	R-value No performance determined
	§ 6.6.2 Thermal inertia	Information on relevant data No performance determined
Aspects of durability and serviceability	§ 6.7.1 Robustness and rigidity	
	– Resistance to dynamic loads	Use category I, II, III or IV
	– Resistance to eccentric vertical loads	Loading category A or B No performance determined
	– Resistance to point loads	Acceptable No performance determined
	– Rigidity of partitions for ceramic tiling	Pass/fail No performance determined
	§ 6.7.2 Resistance to deterioration caused by:	
	– physical agents	Acceptable
	– chemical agents	Acceptable
	– biological agents	Acceptable

6.1 MECHANICAL RESISTANCE AND STABILITY

As partitions are non-loadbearing parts of the work, they are not required to meet this Essential Requirement.

6.2 SAFETY IN CASE OF FIRE

6.2.1 Reaction to fire

The product and/or the kit components shall be classified according to EN 13501-1:2002.

6.2.2 Fire resistance

The assembled kit shall be classified according to EN 13501-2.

6.3 HYGIENE, HEALTH AND THE ENVIRONMENT

6.3.1 Release and/or content 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

6.3.2 Water vapour permeability

The product specifications shall be examined and performance in respect of exposure to moisture assessed on the basis of known material properties, design details and the intended use. Where properties such as water vapour permeability are not known, they shall be determined by testing.

It shall be established that condensation in the partition as a result of water vapour diffusion will not occur or will occur only to an extent where damage is not caused during the condensation period and the partition will dry out again during the evaporation period.

6.3.3 Water permeability

No performance determined. (Covered by technical specifications on the watertightness or water resistance of wall coverings.)

6.4 SAFETY IN USE

6.4.1 Resistance to horizontal and eccentric loads

This assessment addresses the Essential Requirement for SAFETY IN USE and Aspects of durability and serviceability (clause 6.7.1). Several aspects of performance are assessed, from which an overall assessment of the robustness of the system can be drawn.

The categories given in Table 6 have been adopted to correspond to various degrees of exposure in use. They do not include an allowance for exceptionally severe use, such as acts of vandalism.

Table 7 gives two use categories of loading.

It is acceptable that the partition includes areas, above the normal zone of impacts from people, that have reduced performance levels (Table 6).

When tested in accordance with the corresponding test methods given in clauses 5.4.1.1 – 5.4.1.3 partitions shall be able to comply with the requirements given in Tables 8 to 10 in clauses 6.4.1.1 – 6.4.1.3.

Compliance with the requirements may be claimed only for partitions equal to or less than the height of the sample tested.

Table 6: Definition of use categories – Structural damage – Dynamic loads

Use category	Description	Structural damage test	
		Glazed partitions*)	Opaque partitions*)
I	Zones accessible primarily to those with high incentive to exercise care. Small risk of accidents occurring and of misuse.	Height ≤ 1,5 m Soft body 1 x 100 Nm	Height ≤ 1,5 m Soft body 1 x 100 Nm Hard body 10 Nm****)
		Height > 1,5 m -	Height > 1,5 m -
II	Zones accessible primarily to those with some incentive to exercise care. Some risk of accidents occurring and of misuse.	Height ≤ 1,5 m Soft body 1 x 200 Nm Hard body: Sill height: < sill height 10 Nm > sill height -	Height ≤ 1,5 m Soft body 1 x 200 Nm Hard body 10 Nm
		Height > 1,5 m -	Height > 1,5 m -
III	Zones readily accessible to public and others with little incentive to exercise care. Risk of accidents occurring and of misuse.	Height ≤ 1,5 m Soft body 1 x 300 Nm Hard body 10 Nm	Height ≤ 1,5 m Soft body 1 x 300 Nm Hard body 10 Nm
		Height > 1,5 m Hard body 10 Nm	Height > 1,5 m Hard body 10 Nm
IV**)	a) Zones and risk as II and III. In case of failure, risk includes the fall to a floor at a lower level, cf. type b in Figure 1 in clause 2.2	Height ≤ 1,5 m Soft body 1 x 400 Nm Hard body 10 Nm	Height ≤ 1,5 m Soft body 1 x 400 Nm Hard body 10 Nm
		Height > 1,5 m Hard body 10 Nm	Height > 1,5 m Hard body 10 Nm
	b) Zones and risk as II and III. In case of failure, risk includes the fall to a floor at a lower level, cf. type b in Figure 1 in clause 2.2	Height ≤ 1,5 m Soft body 1 x 500 Nm Hard body 10 Nm	Height ≤ 1,5 m Soft body 1 x 500 Nm Hard body 10 Nm
		Height > 1,5 m Hard body 10 Nm	Height > 1,5 m Hard body 10 Nm

c	<p>Zones and risk as II and III.</p> <p>In case of failure, risk includes the fall to a floor at a lower level, cf. type b in Figure 1 in clause 2.2</p>	<p>Height \leq sill height</p> <p>Soft body 1 x 900 Nm^{***}) Hard body 10 Nm</p> <p>Height > sill height</p> <p>Hard body 10 Nm</p>	
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*) For opaque partitions the height of 1.5 m corresponds to the region where human impacts are likely to occur in buildings. However, for some types of buildings, such as gymnasia and warehouses, greater heights may be considered. For glazed partitions the height corresponds to the sill height

***) For this use category the manufacturer has the option to ask for the assessment of the fitness for use of his product at a soft body energy level for structural damage of 400 Nm, 500 Nm or 900 Nm depending on the regulatory requirements of the countries where he wishes to market his product.

****) When the height of the glazed element is less than the sill height, the impact can be reduced to 700 Nm.

*****) Corresponding to 1 kg steel ball

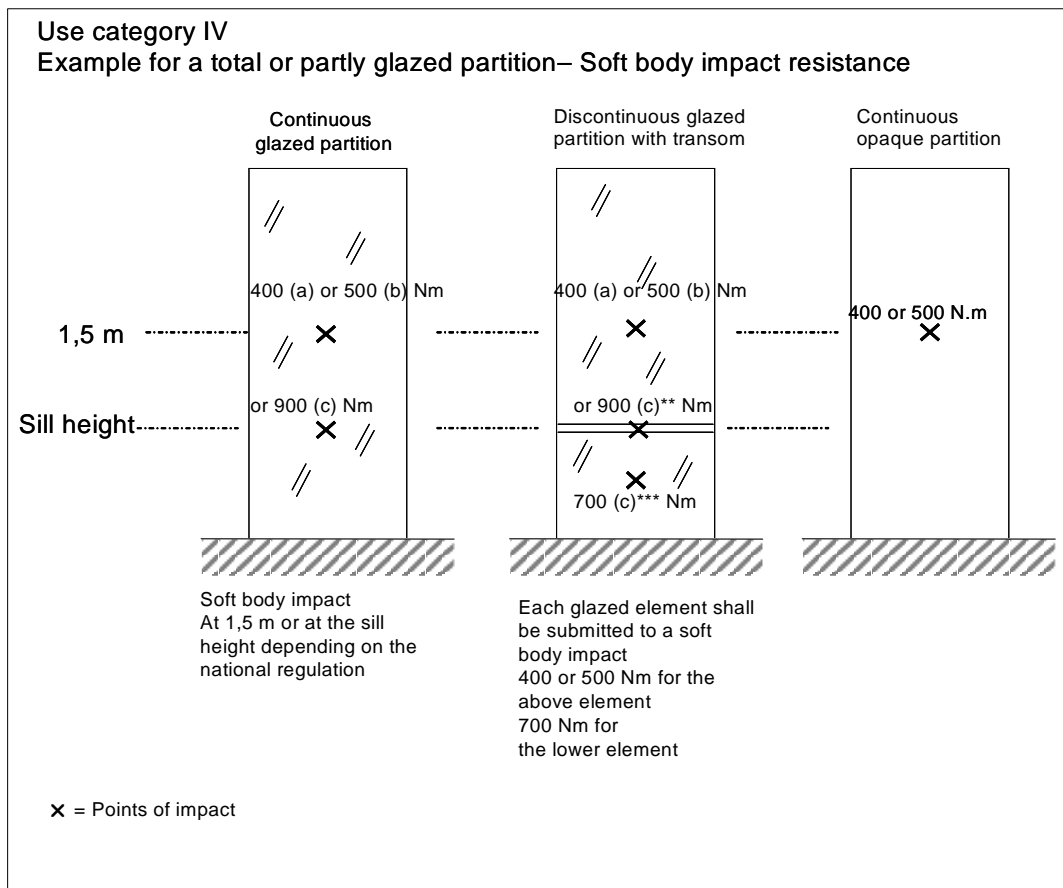


Table 7: Definition of loading use categories – Structural damage – Eccentric vertical loads

Loading category	Description	Structural damage test
A	Heavy objects such as wash basins, small bookshelves	1000 N, 24 hour load
B	Very heavy objects such as boilers, large bookshelves	4000 N, 24 hour load

6.4.1.1 *Resistance to structural damage from soft body impact load – 50 kg bag*

The soft body impact load represents the action from a person accidentally falling against the partition.

Experience from a number of laboratories working in this field shows that the action from differential air pressure and from slamming of doors may usually be considered satisfactory if the partition resists the soft body impact load test.

Table 8: Assessment criteria for large soft body impact test

Use category	Structural damage test criteria	
I	Loads and number of impacts from table 6	No penetration*) No collapse No other dangerous failure
II		
III		
IV		

*) No penetration of all the skins of the surface of the kit and no falling debris on the reverse side of impact.

6.4.1.2 *Resistance to structural damage from hard body impact load – 1 kg steel ball*

The hard body impact load with the 1 kg steel ball represents the action from heavy non-deformable objects, such as pieces of furniture or equipment, accidentally hitting the partition when being moved.

Table 9: Assessment criteria for small hard body impact test

Use category	Structural damage test criteria	
I – IV	1 x 10 Nm on the weakest point	No complete penetration*) No other dangerous failure

*) No penetration of all the skins of the surface of the kit and no falling debris on the reverse side of impact.

6.4.1.3 *Resistance to structural damage from eccentric vertical load*

The eccentric vertical load represents the action from heavy objects, such as bookshelves or sanitary or heating equipment, supported primarily by the partition. Partitions may be modified locally to fulfil the requirements provided the modifications form part of the system and are fully described.

For partitions designed not to have a loadbearing capacity other than for ordinary

decorations, such as picture frames, this requirement is not relevant and clause 6.7.1.4 shall be used.

Table 10: Assessment criteria for eccentric vertical load test

Loading category	Structural damage test criteria	
A	1000 N during 24 hours at 0.3 m from surface of wall on brackets 0.5 m apart each fixed at two points 0.15 m apart on a vertical line	The increase of deflection during testing shall stabilize in a manner indicating that failure is unlikely to occur after some additional time No collapse No other dangerous failure
B	4000 N during 24 hours at 0.3 m from surface of wall on brackets 1.0 m apart each fixed at two points 0.6 m apart on a vertical line	

6.4.1.4 *Resistance to horizontal linear static loads*

Resistance to a horizontal uniformly distributed load may be required when the partition kit acts as a barrier providing protection for building users against accidental falls, see clause 2.2 case (b) of this Guideline.

The load at which serviceability is compromised or at a maximum of 25 mm deflection is reported

The load at failure or at a maximum of 40 mm deflection and the equivalent characteristic resistance [kN/m] to a horizontal uniformly distributed load including the recommended load factor shall be reported, ref. chapter 7 of ISO/DIS 12055, or no performance determined shall be indicated.

Alternatively, the result of the calculation shall be indicated

6.4.2 Safety against personal injuries by contact

The nature of surface shall be described in qualitative terms with regard to the potential risk of abrasion.

6.5 PROTECTION AGAINST NOISE

6.5.1 Airborne sound insulation

The measured airborne sound insulation is expressed as a single number rating, $R_w(C; C_{tr})$, in accordance with:

EN ISO 717-1:1996, Acoustics – Rating of sound insulation of buildings and of building elements – Part 1: Airborne sound insulation.

6.5.2 Sound absorption

Sound absorption is considered only in case of partitions with a factory made finish.

The measured acoustic absorption is expressed as a single number rating in accordance

with:

EN ISO 11654: 1997, *Acoustics – Sound absorbers for use in buildings – Rating of sound absorption*.

6.6 ENERGY ECONOMY AND HEAT RETENTION

6.6.1 Thermal resistance

The calculated or measured value of the thermal resistance (R-value) in m² K/W is given.

The effect of any areas of thermal bridging shall be included as a weighted area resultant for the total system based on its R-value.

6.6.2 Thermal inertia

The information given on the total mass per unit area, the density of materials, the heat capacity of materials and the thermal transmittance of materials is given as a means for the designer of a building to calculate the contribution of the partition to the thermal inertia of the works.

6.7 ASPECTS OF DURABILITY AND SERVICEABILITY

6.7.1 Robustness and rigidity

This assessment addresses the Essential Requirement for SAFETY IN USE (clause 6.4.1) and Aspects of durability and serviceability. Several aspects of performance are assessed, from which an overall assessment of the robustness of the system can be drawn

The categories given in Table 11 have been adopted to correspond to various degrees of exposure in use. They do not include an allowance for exceptionally severe use, such as acts of vandalism. Table 11 applies to both opaque and glazed partitions and to combinations.

Table 12 gives two use categories for loading.

It is acceptable that the partition includes areas, above the normal zone of impacts from people, that have reduced performance levels (Table 11).

When tested in accordance with the corresponding test methods given in clauses 5.7.1.1 – 5.7.1.4 partitions shall be able to comply with the loads and damages and/or deflections given in Tables 13 to 17 in clauses 6.7.1.1 – 6.7.1.4. The term “No functional failure” in the tables means that possible damage shall be judged as easily repairable and that it shall not adversely affect the fulfilment of relevant Essential Requirements.

Compliance with the requirements may be claimed only for partitions equal to or less than the height of the sample tested.

Table 11: Definition of use categories – Functional failure – Dynamic loads

Use category	Description	Height *)	Functional failure test
I	Zones accessible primarily to those with high incentive to exercise care. Small risk of accidents occurring and of misuse.	Up to 1.5 m above pedestrian level	Soft body 3 x 60 Nm Hard body (0.5 kg) 2.5 Nm**)
		Over 1.5 m above pedestrian level	–
II	Zones accessible primarily to those with some incentive to exercise care. Some risk of accidents occurring and of misuse.	Up to 1.5 m above pedestrian level	Soft body 3 x 120 Nm Hard body (0.5 kg) 2.5 Nm
		Over 1.5 m above pedestrian level	Hard body (0.5 kg) 2.5 Nm
III	Zones readily accessible to public and others with little incentive to exercise care. Risk of accidents occurring and of misuse.	Up to 1.5 m above pedestrian level	Soft body 3 x 120 Nm Hard body (0.5 kg) 6 Nm***)
		Over 1.5 m above pedestrian level	Hard body (0.5 kg) 6 Nm***)
IV	Zones and risk as II and III In case of failure risk includes the fall to a floor at a lower level, cf. type c in Figure 1 in clause 2.2	Up to 1.5 m above pedestrian level	Soft body 3 x 120 Nm Hard body (0.5 kg) 6 Nm***)
		Over 1.5 m above pedestrian level	Hard body (0.5 kg) 6 Nm***)

*) The height of 1.5 m corresponds to the region where human impacts are likely to occur in buildings. However, for some types of buildings, such as gymnasia and warehouses, greater heights may be considered.

***) For glazed partitions the hard body impact is only required below the sill.

***) For studwork “easy to replace” as glazed studwork the hard body impact (0,5 kg) is only 2,5 Nm.

Table 12: Definition of use categories – Functional failure – Eccentric vertical loads

Loading category	Description	Functional failure test criteria
A	Heavy objects such as wash basins, small bookshelves	500 N short-term load
B	Very heavy objects such as boilers, large bookshelves	2000 N short-term load

6.7.1.1 *Resistance to functional failure from soft body impact load – 50 kg bag*

The soft body impact load represents the action from a person accidentally falling against the partition.

Experience from a number of laboratories working in this field shows that the action from differential air pressure, the action from a large number of people leaning or pressing against the partition (crowd pressure) and the action from slamming of doors may usually be considered satisfactory if the partition resists the soft body impact load test.

Table 13: Assessment criteria for large soft body impact test

Use category	Functional failure test criteria	
I	3 x 60 Nm	Maximum deflection during impact to be reported No functional failure*) Maximum residual deflection after 3 impacts 5 mm The increase of deflection during testing shall stabilize Opening of door still possible
II	3 x 120 Nm	
III		
IV		

*) The surface of the kit may not be damaged, however, impact marks are allowed

6.7.1.2 *Resistance to functional failure from hard body impact load – 0.5 kg steel ball*

The hard body impact load with the 0.5 kg steel ball represents the action from light non-deformable objects such as pieces of furniture or cleaning tools accidentally hitting the partition when being moved.

Table 14: Assessment criteria for small hard body impact test

Use category	Functional failure test criteria	
I	1 x 2,5 Nm*)	Indentation marks to be reported, e.g. range of diameters No functional failure**)
II	1 x 2,5 Nm*)	
III	1 x 6 Nm*)	

IV	1 x 6 Nm*)
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*) In 10 different positions

**) The surface of the kit may not be damaged, however, impact marks are allowed

6.7.1.3 Resistance to functional failure from eccentric vertical load

The eccentric vertical load represents the action from heavy objects such as bookshelves or sanitary or heating equipment, supported primarily by the partition. Partitions may be modified locally to fulfil the requirements provided the modifications form part of the system and are fully described.

For partitions not designed to have a loadbearing capacity, other than for ordinary decorations such as pictures, this requirement is not relevant and clause 6.7.1.4 shall be used.

Table 15: Assessment criteria for eccentric vertical load test

Loading category	Functional failure test criteria	
A	500 N at 0.3 m from surface of wall on brackets 0.5 m apart each fixed at two points 0.15 m apart on a vertical line	Maximum deflection: 1/500 of height or 5 mm No functional failure
B	2000 N at 0.3 m from surface of wall on brackets 1.0 m apart each fixed at two points 0.6 m apart on a vertical line	

6.7.1.4 Resistance to functional failure from point load parallel or perpendicular to surface

The point loads represent the action from light objects, such as picture frames or small household appliances hanging from the partition.

Table 16: Assessment criteria for point vertical load test

Functional failure test criteria	
100 N (perpendicular*)	No pull-out No functional failure
250 N (parallel*)	

*) Note: This is opposite to ISO/DIS 8413:1990

6.7.1.5 Rigidity of partitions to be used as a substrate for ceramic tiling

Partitions to be used as a substrate for ceramic tiling shall comply with the requirements given in Table 17 when tested with a 50 kg soft body impact load in accordance with clause 5.7.1.5 in order to ensure that the rigidity of the partition is sufficient for the tiling to remain undamaged. The assessment is carried out in place of the assessment described in clause

6.7.1.1, and not as a supplement to it. A partition passing the test described in clause 5.7.1.5 is deemed to satisfy the test described in clause 5.7.1.1.

Table 17: Assessment criteria for large soft body impact load test

	Test criteria			
Partitions for tiling	3 x 120 Nm	Max. deflection during impact 30 mm Max. residual deflection 2 mm No damages	1 x 240 Nm	After all 4 impacts: Rate of increase in residual deflection stabilised No damages

6.7.2 Resistance to deterioration

6.7.2.1 *Physical agents*

Hygrothermal conditions.

The difference in atmospheric conditions in the test described in clause 5.7.2.1 represents those likely to occur due to different uses of partitions and the effect of adjacent spaces with different conditions separated by the partition. Under any of these conditions, the deflection of the partition shall not exceed the lesser of 1/500 of the height of the partition or 5 mm.

Deflections due to the following hygrothermal conditions:

- temporary (as in temperature and humidity increases in bathrooms or kitchens)
- exceptional (as in heavy frost)
- localised (as in radiation from the sun or heating)

will not exceed the lesser of 1/500 of the height of the partition or 5 mm.

When tested in accordance with clause 5.7.2.1 relating to the effects of radiation, the partition shall be checked to ensure that the properties of the partition have not been impaired (e.g. loss of adhesion, fracture, residual deflection).

6.7.2.2 *Chemical agents*

- Corrosion of steel components:

The product specification shall be examined to determine whether the protection against corrosion is appropriate for the intended use.

Components made of steel sheet having a corrosion protection which at least corresponds to class Z275 as defined in EN 10326:2004 – *Continuously hot-dip coated strip and sheets of structural steels – Technical delivery conditions* are considered to fulfil the requirements.

- Cleaning agents:

The assessment of surfaces of materials of known composition and of known performance shall be given in qualitative terms.

6.7.2.3 *Biological agents*

The result of the assessment is examined and preventive measures or limitations in use determined. The partition's susceptibility to infestation by insects and vermin is described.

- The conditions for attack by biological agents of components made of wood or wood-based panels, in general may be regarded as in hazard class 1 as defined in EN 335-1: 1992 – *Durability of wood and wood based products – Definition of hazard classes of biological attack – Part 1: General*. This means that no treatment of such components is necessary. Certain wood or wood-based components, e.g. when fitted in independent linings for exterior walls, may be exposed to conditions as in hazard class 2 and, therefore, should be treated accordingly.

6.7.3

IDENTIFICATION OF THE PRODUCT

The results of the identification tests shall be declared.

7. **ASSUMPTIONS AND RECOMMENDATIONS** **under which the fitness for use of the products is assessed**

Chapter 7 sets out the preconditions for design, execution, maintenance and repair which are a presumption for the assessment of the fitness for use according to the Guideline (only when necessary and where they have a bearing on the assessment or on the products).

The issued European Technical Approvals shall state these conditions, where relevant.

7.1 DESIGN AND EXECUTION OF WORKS

The conditions for design and execution of the partition into the works shall be taken from the manufacturer's installation guide. The quality and sufficiency of this installation guide shall be assessed, in particular concerning the aspects on the following check list:

Design of joints between partition and main structure:

- permissible deflections of the adjacent structural parts
- when appropriate, special fixings for seismic conditions;
in case of dynamic actions such as those occurring in case of earthquake, the designer has to prevent the possibility of a structural contribution of the partition, by inserting relevant joints between the partition and the frame, so that displacement of the frame can occur without interference of the partition. In case of absence of those joints, the designer shall take account of the possible contribution in accordance with national or local regulations.

Dimensional stability:

- relationship between the deflection per unit height and the hygrothermal conditions across the partition

Reduction of the risk of surface and interstitial condensation in the works:

- heating
- ventilation
- vapour control layer

Thermal resistance:

- cold bridges

Sound insulation:

- air paths through gaps, cracks, holes
- flanking transmission
- type of fixings

Infestation:

- sealing of voids
- closure of small apertures

It shall be stated in the ETA that the installation guide forms part of the ETA and thus always shall accompany the delivered system components. The ETA may take over the essential parts of the installation guide.

The assessment of the fitness of use for relocatable partitions is based upon the assumption

that in the process of dismantling and reassembly, the claimed characteristics are unaffected. This assumption may need to be verified.

7.2

MAINTENANCE AND REPAIR

The assessment of the fitness for use is based on the assumption that abrasions and minor impact damage are inevitable and shall be capable of easy repair without causing adverse effects.

Section Three: ATTESTATION OF CONFORMITY (AC)

8 EVALUATION OF CONFORMITY

8.1 EC DECISION

The systems of attestation of conformity specified by the European Commission in mandate Construct 98/213/EC, Annex 3 as amended, are as follows:

System 1 for partitions

- with Euroclasses A1*, A2*, B* or, C* concerning Reaction to fire, and for materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification

System 3 for partitions

- with Euroclasses A1**, A2**, B**, C**, D, E concerning Reaction to fire, and for materials not covered by system 1

- with any Fire resistance class

- for uses subject to regulations on dangerous substances

- with Safety in use category IV

System 4 for all other partitions, including partitions with Reaction to fire classes A1*** (without testing according to EC Decision 96/603/EC) to E*** and F.

* Products/materials for which a clearly identified stage in the production, results in an improvement of the reaction to fire classification; (e.g. an addition of fire retardants or a limiting of organic material).

** Products/materials not covered by footnote (*)

*** Products/materials of class A1 that according to Decision 96/603/EC, amended by EC Decision 200/605/EC, do not require to be tested for reaction to fire.

The systems are described in Council Directive (89 /106/EEC) Annex III, 2(i), 2(ii) Second possibility and 2(ii) Third possibility, respectively, and are detailed as follows:

System 1

(a) **Tasks for the manufacturer**

- 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 product
- initial inspection of the factory and of factory production control
- continuous surveillance, assessment and approval of factory production control.

System 3

(a) **Tasks for the manufacturer**

- factory production control
- initial type testing of the product by an approved laboratory

System 4

(a) **Tasks for the manufacturer**

- factory production control
- initial type testing.

8.2 RESPONSIBILITIES

8.2.1 Tasks for the manufacturer

8.2.1.1 *Factory production control*

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 product is in conformity with the ETA.

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

8.2.1.2 *Testing of samples taken at the factory*

Both large and small companies produce these products and there is a wide variation in the materials used. Therefore a precise test plan can only be set up on a case by case basis.

In general it is not necessary to conduct tests on complete partitions. Indirect methods will normally be sufficient, e.g. control of raw materials, manufacturing processes and properties of components.

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.

System 1: this work shall be validated by the approved body for Certificate of Conformity purposes.

System 3: this work shall be validated by an approved laboratory for Declaration of Conformity purposes by the manufacturer.

System 4: this work should be taken over by the manufacturer for Declaration of Conformity purposes.

8.2.3 Tasks for the approved body (System 1)

8.2.3.1 *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 must 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.

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

It is recommended that surveillance inspections be conducted at least twice per year.

8.2.3.2 *Certification of Conformity*

The approved body shall issue Certification of Conformity of the product.

8.3 DOCUMENTATION

In order to help the approved body make an evaluation of conformity the approval body issuing the ETA shall supply the information detailed below. This information together with the requirements given in EC Guidance Paper B will:

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

System 3 and System 4: 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 9 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.

Components for partitions are normally manufactured using conventional techniques. Any critical process or treatment of the components affecting performance shall be highlighted.

(3) Product and materials specifications

These may include:

detailed drawings (including manufacturing tolerances)

incoming (raw) materials specifications and declarations
references to European and/or international standards or appropriate specifications
manufacturer's data sheets.

(4) Test plan

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 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 product 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 product. 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 must be subject to suitable checks/tests by the manufacturer before acceptance.

(5) Prescribed test plan (**System 1**)

The manufacturer and the approval body issuing the ETA shall agree a prescribed test plan.

The characteristic to be addressed as described in the mandate is Reaction to fire. This will be controlled at least twice per year by analysis/measurement of the relevant characteristics for the components of the kit from the following list:

composition
dimensions
physical properties
mechanical properties
construction.

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 on CE marking, the required information to accompany the symbol "CE" is:

- identification number of the notified body (**System 1**)
- name or identifying mark of the producer
- last two digits of the year in which the marking was affixed
- number of the EC certificate of conformity (**System 1**)
- number of the ETA (valid as indications to identify the characteristics of the partition kit and the characteristics where the "no performance determined" approach is used)
- ETAG no. 003.

Section Four: ETA CONTENT

9 THE ETA CONTENT

9.1 THE ETA CONTENT

9.1.1 Model ETA

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

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.

9.1.2 Checklist for the issuing body

The technical part of the ETA shall contain information on the following items, in the order and with reference to the relevant 5 Essential Requirements. For each of the listed items, the ETA shall either give the mentioned indication/classification/statement/description or state that the verification/assessment of this item has not been carried out. The items are here given with reference to the relevant clause of this guideline:

- Indication of the assumed working life (Section Two, introduction)
- Classification of the components of the kit with respect to reaction to fire, including test method used (Clause 6.2.1)
- Classification of partition with respect to fire resistance, including test method used (Clause 6.2.2)
- Statement on the presence and concentration/emission rate/etc. of formaldehyde, asbestos, pentachlorophenol, other dangerous substances or statement on no presence of dangerous materials (Clause 6.3.1)
- Indication of water vapour permeability of materials (Clause 6.3.2)
- Statement that condensation in the partition as a result of water vapour diffusion will not occur or will occur only to an extent where damage is not caused during the condensation period and the partition will dry out again during the evaporation period (Clause 6.3.2)
- Statement on the most severe use application for structural damage and functional failure for impact loads for which the system has been assessed (use category n^o, including description) and the test methods used including the energies of the impact test regime performed to verify the above statement (Clause 6.4.1.1, 6.4.1.2, 6.7.1.1 and 6.7.1.2)
- Information on the maximum deflection during impact in the test of resistance to functional failure from soft body impact load, with an indication of the height of the test specimen and the energy level used (Clause 6.7.1.1)

- Statement on the most severe use application for structural damage and functional failure for eccentric vertical loads for which the system has been assessed (loading use category a or b, including description) and the test methods used (Clause 6.4.1.3 and 6.7.1.3)
- Indication of possible reinforcements to improve resistance against eccentric vertical load (Clause 6.4.1.3)
- Indication of the equivalent characteristic resistance to horizontal static linear load, including the recommended load factor and deflections at 25 mm and 40 mm (Clause 6.4.1.4)
- Description of the nature of the surface (Clause 6.4.2)
- Indication of measured airborne sound insulation, including the test method used (Clause 6.5.1)
- Indication of measured sound absorption coefficient, including the test method used (Clause 6.5.2)
- Indication of calculated or measured thermal resistance, including the calculation or test method used (Clause 6.6.1)
- Indication of relevant properties for the calculation of the contribution to the thermal inertia of the works (Clause 6.6.2)
- Indication of result from point load resistance test, including test method (Clause 6.7.1.4)
- Indication of results from rigidity test, including test method (Clause 6.7.1.5)
- Indication of resistance to hygrothermal conditions, including test method, if used (Clause 6.7.2.1)
- Indication of resistance to corrosion (Clause 6.7.2.2)
- Indication of resistance to cleaning, including test method, if used (Clause 6.7.2.2)
- Indication of resistance to biological agents (Clause 6.7.2.3).

9.2 ADDITIONAL INFORMATION

It shall be stated in the ETA if the manufacturer's installation guide forms part of the ETA, see clause 7.1 of this Guideline.

Similarly, it shall be stated in the ETA whether or not any additional (possibly confidential) information shall be supplied to the approved body for the evaluation of conformity, see clause 8.3 of this Guideline.

If doors are included in the kit, the available width and height shall be stated.
If the kit includes large areas of transparent glazing, the means by which it is marked to avoid persons colliding with it shall be stated.

Annex A

(Definitions, clarifications and abbreviations)

1. WORKS AND PRODUCTS

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).

1.2. 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 and components of prefabricated systems or installations)

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.

1.4. Intended use (ID 1.3.4)

Role(s) that the product is intended to play in the fulfillment of the essential requirements.

(N.B. This definition covers only the intended use as far as relevant for the CPD)

1.5. Execution (ETAG-format)

Used in this document to cover all types of incorporation techniques such as installation, assembling, incorporation, etc.

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.

2. PERFORMANCES

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)

2.2. Serviceability (of works)

Ability of the works to fulfill 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).

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).

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.

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".

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.

3. ETAG - FORMAT

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.

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.).

This 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".

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.

4. WORKING LIFE

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.

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.

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.

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.

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.

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.

5. CONFORMITY

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.

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.

6. APPROVAL AND APPROVED BODIES

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. 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 standard
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

List of reference documents

Sorted by numbers

Number	Title
Commission Decision	96/603/EC
EN 120: 1994	Wood based panels – Determination of formaldehyde content – Extraction method called the perforator method
EN/ISO 140-3: 1995	Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements
EN 300: 1997	Oriented Strand Boards (OSB) – Definitions, Classification and Specifications
EN 312-1: 1997	Particleboards – Specifications – Part 1: General Requirements for all Board Types
EN 335-1: 1992	Durability of wood and wood-based products - Definition of hazard classes of biological attack - Part 1: General
EN ISO 354: 2003	Acoustics – Measurement of sound absorption in a reverberation room
EN 423: 2002	Resilient floor coverings – Determination of the effect of stains
EN 622-5: 1997	Fibreboards – Specifications – Part 5: Requirements for Dry Process Boards (MDF)
EN 636-3: 1997	Plywood – Specifications – Part 3: Requirements for Plywood for Use in Exterior Conditions
EN 636-2: 1997	Plywood – Specifications – Part 2: Requirements for Plywood for Use in Humid Conditions
EN 636-1: 1997	Plywood – Specifications – Part 1: Requirements for Plywood for Use in Dry Conditions
EN/ISO 717-3: 1997	Wood-based panels – Determination of formaldehyde release – Part 3: Formaldehyde release by the flask method
EN/ISO 717-2/AC: 2002	Wood-based panels – Determination of formaldehyde release – Part 2: Formaldehyde release by the gas analysis method
EN/ISO 717-1: 1996	Acoustics – Rating of sound insulation in buildings and of building elements. Part 1 – Airborne sound insulation
EN 1991-1-1: 2002	Eurocode 1: Basis of design and actions on structures – Part 2-1: Actions on structures – Densities, self-weight and imposed loads
EN/ISO 6946: 1997	Building components and building elements - Thermal resistance and thermal transmittance - Calculation method
ISO 7892: 1988	Vertical Building Components - Impact resistance - Impact Bodies and General Test Procedures
ISO/DIS 7893: 1990	Performance Standards in Building - Partitions made from Components - Impact resistance tests
ISO/DIS 8413: 1990	Performance Standards in Building - Partitions made from Components - Tests for Ability to withstand Suspended Static Loads
EN/ISO 8990: 1997	Thermal insulation - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Calibrated and guarded hot box
EN/ISO 9001: 2000	Quality Management Systems – Requirements
EN/ISO 10211-2: 1995	Thermal bridges in building constructions – Part 2: Heat flows and surface

	temperatures – General calculation of linear thermal bridges
EN/ISO 10211-1: 1995	Thermal bridges in building constructions – Part 1: Heat flows and surface temperatures – General calculation methods
EN 10326:2004	Continuously hot-dip coated strip and sheets of structural steel – Technical delivery conditions
EN ISO 11654: 1997	Acoustics – Sound absorbers for use in buildings – Rating of sound absorption
ISO/DIS 12055	Building construction – Guardrail systems and rails for buildings
EN 12086:1999	Thermal performance of buildings and building components – Determination of water vapour transmission properties
EN 12524: 2001	Building materials and products. Hygrothermal properties. Tabulated design values
EN/ISO 12572: 2001	Hygrothermal performance of building materials and products – Determination of water vapour transmission properties
EN 12667: 2001	Building materials - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance
EN 12939: 2001	Building materials - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance
EN 13501-2	Fire resistance - Building Elements – Classification
EN 13501-1: 2002	Reaction to fire – Classification
EN/ISO 13788: 2001	Hygrothermal performance of building components and building elements - Estimation of internal surface temperature to avoid critical surface humidity and calculation of interstitial condensation
EN 13823: 2002	Building products excluding floorings exposed to the thermal attack by a Single Burning Item
EN 13986: 2002	Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking

Annex C

C INTERNAL PARTITION KITS – RESISTANCE TO IMPACT LOADS AND SUSPENDED VERTICAL LOADS – GENERAL

C.1 General

The testing shall be carried out on sample partitions representative of those to be supplied and/or erected in practice fitted into an appropriate test rig. Whenever possible the installation of the test sample shall be carried out by the sponsor of the test.

The test methods used are ISO methods but certain elements are modified or amended.

Unless otherwise stated in the test methods, loads and forces shall be accurate to within $\pm 2\%$, dimensions to within $\pm 1\%$, temperatures to within $\pm 5^\circ\text{C}$ and relative air humidities to within $\pm 5\%$ of the stated values.

C.2 Partition sample

The selection of the sample needs careful consideration to ensure that it fully represents the partition kit. Normally, the sample shall be a production partition fabricated in strict accordance with the manufacturer's drawings, specifications and installation instructions.

As a general rule, the highest partition in the range should be tested as this will tend to be the weakest and, therefore, will allow partitions of a lesser height to be assessed as being at least as good. However, several specimens may need to be tested to gain information about the full range of options available for a given system, for example full height and partial glazing, changes to member size throughout the range, thicknesses, detailing at junctions and corners and inclusion of all necessary features. The number and position of discrete fixings between panels and discrete members shall also be considered.

The principles of the sample are described in ISO draft standard ISO/DIS 7893:1990. The sample shall be a straight run of partition (see Figure 1) and should fully reflect the partition system including all necessary fittings and fixings complete with joints at the top, bottom, end and intermediate positions. The partition sample should include all integral components, such as glazing, which may have a detrimental effect on the performance levels achieved. If the test sample does not include a door-set belonging to the partition system, a type of door-set commonly used in the type of partition system being tested should be fitted in the opening. The door-set should be installed as shown in Figure 2. The door opens towards the observer.

The total length of the sample shall be at least 4.5 m. It shall include at least 3.0 m of straight partition, an opening at least 800 mm wide for fixing a doorset and at least 600 mm of partition flanking the other side of the opening (see Figure 1). For modular partition systems, standard modules shall be used, even if the above dimensions are exceeded. The 3 m of straight partition shall consist of at least three modules.

The test rig should allow for the fixing of a corner piece or corner element to the free end of the sample for the possible testing of corner trim details, cf. Annex D2.

The height of the sample shall be that set by the manufacturer. **The test rig for testing internal partitions for ceramic tiling shall be at least 2600 mm high.**

In case of variations of the basically same kit, additional tests can be performed on smaller test samples.

The way in which components are fixed to each other shall reproduce actual conditions of use, particularly with respect to the nature, type and position of the fixings and the distance between them.

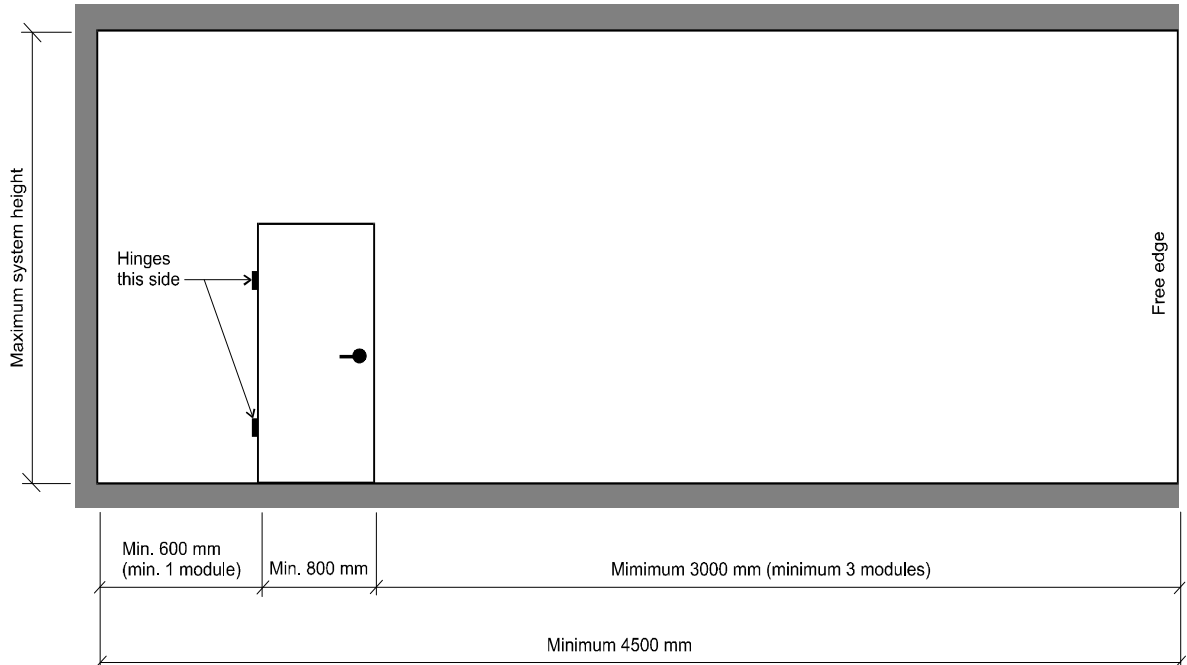


Figure 2 - Partition sample dimensions

C.3 Conditioning

The sample conditioning shall be recorded. The conditioning period shall be agreed between the sponsor and the test authority.

C.4 Sequence of tests

Testing to determine a class **can for example** follow the sequence given below.

- C.4.1 Hard body impact load – 0.5 kg steel ball – Functional failure test
- C.4.2 Eccentric vertical load – Functional failure test
- C.4.3 Soft body impact load – 50 kg bag – Functional failure test
- C.4.4 Eccentric vertical load – Structural damage test
- C.4.5 Hard body impact load – 1 kg steel ball – Structural damage test
- C.4.6 Soft body impact load – 50 kg bag – Structural damage test.

For partitions to be used as a substrate for ceramic tiling, test C.5.3 in the test sequence is replaced by the test described in Annex E.

Annex D

D INTERNAL PARTITION KITS – RESISTANCE TO IMPACT LOADS, SUSPENDED VERTICAL LOADS AND HORIZONTAL LINEAR STATIC LOADS– TEST METHODS

D.1 Hard body impact load – 0.5 kg steel ball

ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures* and ISO/DIS 7893:1990, *Performance Standards in Building – Partitions made from Components – Impact Resistance Tests*.

ISO/DIS 7893:1990 is subject to the modifications to sample construction shown in Annex C.

The load shall be applied at least ten times, each time in a new position, at various heights in areas considered to be weak.

The diameter of any indentation shall be reported. Note shall be made of any damage caused.

D.2 Hard body impact load – 1 kg steel ball

ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures* and ISO/DIS 7893:1990, *Performance Standards in Building – Partitions made from Components – Impact Resistance Tests*.

ISO/DIS 7893:1990 is subject to the modifications to sample construction shown in Annex C including the weight of the impact body.

The impact may need to be repeated at various points on the same element if the weakest point is not obvious.

When testing corner details mounted at the free end of the partition sample, it may become necessary to support (fix) it.

The diameter of any indentation shall be reported. Note shall be made of any damage caused.

D.3 Soft body impact load – 50 kg bag

D.3.1 **General**

The soft body impact load – 50 kg bag is used for the determination of the following properties of the internal partition:

- Resistance to functional failure from a soft body impact load – 50 kg bag;
- Resistance to structural damage from a soft body impact load – 50 kg bag;
- Rigidity of partitions to be used as substrate for ceramic tiling (this item is being covered by Annex E).

The test procedure to be followed is according «ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures*»

The test is carried out according «ISO/DIS 7893:1990, *Performance Standards in Building-Partitions made from Components-Impact Resistance Tests*», taking into account the amendments and modifications described in this annex.

General condition during the test.

The door should remain closed during the impact resistance test.

D.3.2 General Resistance to functional failure from soft impact load – 50 kg bag.

For the determination of the resistance of the internal partition to functional failure load the frontal displacement is to be measured.

For this reason a deflection transmitter shall be fixed to the back of the test sample immediately opposite the point of impact.

D.3.2.1 Points of impact.

The points of impact to be used in the test are depending on the composition of the partition.

D.3.2.1.1 Non homogenous partitions

Non homogenous partitions according this guideline are characterized by a frame construction, using horizontal and/or vertical elements such as studs.

The area of impact is not as shown in Figure 3 of ISO/DIS 7893:1990.

The points of impact shall be chosen along a straight line at a height (H_3) of 1.5 m above the ground unless this interferes with a horizontal member in the frame construction of the partition sample. In this case it may vary between 1.2 m and 1.7 m from the ground depending on what results in the greater distance from the underlying frame construction.

The functional failure impacts are carried out both on studs and between studs, each by applying a series of 3 impacts at the same point of impact. (in case of partitions to be used as substrate for ceramic tiling: 3 impacts of 120 Nm and 1 impact of 240 Nm, see annex E).

Additionally one series is carried out with the centre of impact at 150 mm from door opening.

The maximum deflection during each impact and the residual deflection after each impact shall be reported. The residual deflection shall be measured five minutes after the impact. Note shall be made of any damage caused and of the operating condition of the door.

D.3.2.1.2 Homogenous partitions.

As homogenous partitions according this guideline are considered all other partitions that are not covered by D.3.2.1.1.

The area of impact is not as shown in Figure 3 of ISO/DIS 7893:1990.

The points of impact shall be chosen along a straight line at a height (H_2) of 1.5 m above the ground

The functional failure impacts are carried at least on two different points of impact, each by applying a series of 3 impacts at the same point of impact. (in case of partitions to be used as substrate for ceramic tiling: 3 impacts of 120 Nm and 1 impact of 240 Nm).

Additionally one series is carried out with the centre of impact at 150 mm from door opening.

The maximum deflection during each impact and the residual deflection after each impact shall be reported. The residual deflection shall be measured five minutes after the impact. Note shall be made of any damage caused and of the operating condition of the door.

D.3.3 Resistance to structural damage from soft body impact load – 50 kg bag.

Both non homogenous partitions and homogenous partitions

The structural damage impact is carried out at a new point and this should be the weakest part of the partition system. The point of impact shall be chosen along a straight line at a height (H_2) of 1.5 m above the ground.

The impact may need to be repeated if the weakest point is not obvious.

Note shall be made of any damage caused (penetration, collapse or other dangerous failure).

D.4 Eccentric vertical load

Draft ISO 8413:1990, *Performance Standards in Building – Partitions made from Components Tests for Ability to withstand Suspended Static Loads*.

Loading Category A is as in clause 7.2 of the standard.

Loading Category B is as in clause 7.2 of the standard but the fixing points are 1 m apart, each fixed at 2 positions 0.6 m apart on vertical lines.

The fixings are located in the middle of the test specimen, unless otherwise specified by the manufacturer.

Loads shall be applied and removed at a rate of approximately 2000 N/min. When the relevant load level for functional failure load (i.e. 500 N or 2000 N) have been reached, the measurement is taken and the load is then removed. The load shall not remain between application and removal. Structural damage loads (i.e. 1000 N or 4000 N) shall remain for 24 hours between application and removal. Measurements are taken at sufficient intervals.

The maximum deflection under load and the residual deflection shall be reported. Note shall be made of any damage caused.

As an alternative, eccentric vertical loads according to specific requirements related to the loads to be applied in practice may be carried out. This may require different fixing centres and loads and should be carried out at the request of the manufacturer.

D.5 Horizontal static linear load

ISO/DIS 12055 Building and construction – Guardrail systems and rails for building, application of horizontal static uniformly distributed load, subject to the following modifications.

Of annex A only chapter A.1 – A.10 are relevant.

A.6.3 Specimen description:

The sample shall be a straight run of partition and should fully reflect the partition system including all necessary fittings and fixings complete with joints at the top, bottom and intermediate positions. The ends (free edges) shall be free. The partition sample should include all integral components, such as glazing, which may have a detrimental effect on the performance levels achieved.

The total length of the sample shall be at least 2 m. For modular partition systems, standard modules shall be used, even if the above dimension is exceeded. The 2 m of straight partition shall consist of at least two modules.

The height of the sample shall be that set by the manufacturer.

A.8 Failure analysis

The equivalent to a characteristic resistance to horizontal linear static load of the kit is calculated by dividing the maximum load (failure or deflection 40 mm) reached in the test by a load factor of 2 - 5 (the factor depends on failure mode and/or material and shall be recommended by the approval body).

A.10.2 Procedure

The load shall be applied over the full length of the sample and at a height of 1,1 m or – if

the kit is equipped with an integral member, e.g. transom, frame – at the height of the guardrail.

The load at which serviceability is compromised or at a maximum of 25 mm deflection is reported

The load at failure or at a maximum of 40 mm deflection is reported and used in the failure analysis

The test is carried out once.

Annex E

E INTERNAL PARTITION KITS TO BE USED AS A SUBSTRATE FOR CERAMIC TILING

E.1 Partition Sample

The sample shall be as described in annex C

The sample shall be a straight run of partition. The length of the sample shall be at least 3000 mm and at least 3 modules. The height of the sample shall be that set by the manufacturer but not less than 2600 mm. The sample shall be without fitting of the ceramic tiling.

E.2 Conditioning

The sample conditioning shall be recorded. The conditioning period shall be agreed between the manufacturer and the testing laboratory.

E.3 Apparatus

The load shall be applied by means of a 50 kg soft body in accordance with ISO 7892:1988, *Vertical Building Components – Impact Resistance – Impact Bodies and General Test Procedures*.

The deflection transmitter shall be fixed to the back of the test sample as close to the point of impact as necessary for accurately measuring the movement of the surface behind the point of impact. For partitions of panels on a frame structure this means to the back of front panel(s), if necessary through an opening in the panel(s) on the back of the partition sample.

E.4 Test

The centre of impact shall be halfway between two studs horizontally and at half height of the partition sample above the ground vertically. If this interferes with horizontal members in the frame construction, it shall be lowered to a height that produces the greatest distance to the underlying frame construction, but not less than 1200 mm above ground.

The centre of impact shall remain the same for all four impacts.

The maximum deflection during each impact and the residual deflection after each impact shall be reported. Note shall be made of any damage caused.

Annex F

F **Internal Partition Kits – Test Reports**

F.1 Test report

The test report shall include the information required for the particular test and the following particulars:

- a number and date of this ETA Guideline and the title of the test.
- b name and address of the test organisation
- c name and address of the sponsor of the test and/or the producer of the system
- d name or brief descriptive title of the partition system
- e test reference letter and a cross reference to other tests carried out as part of a sequence of tests and the order in which these tests were carried out either prior to or subsequent to the individual tests
- f dates of construction and tests
- g dimensions and details of the partition sample, including modifications for the heavyweight anchorage tests that remain during other tests, method of fixing to the rig and fully detailed specifications and drawings
- h description with diagram of the test rig and apparatus together with calibration certificates
- i range of temperature and relative humidity in the laboratory during the installation, conditioning and testing and the period of conditioning.

F.2 Summary of test results

When more than one requirement has been tested, the test results shall be summarised showing whether the individual requirements tested passed a particular performance level.

If a use category, satisfying the requirements described in clauses 6.4.1 and 6.7.1 of the Guideline, has been achieved this shall be given in the summary of test results.

Annex G

EN 13823: Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item

Mounting and fixing provisions

NOTE: Any new extended application rule has to be validated by the GNB Fire sector Group and included in the ETAG progress file

G.1 Terminology

Module:

A sample of the kit fully reflecting all components (e.g. board, frame, insulation, fasteners etc.) in the kit cut to fit the size of the test rig.

Extended application:

The outcome of a process (involving the application of defined rules that may incorporate calculation procedures) that predicts, for a variation of a product property and/or its intended use application(s), a test result on the basis of one or more tests to the same test standard.

G.2 Mounting and fixing in accordance with EN 13823

G.2.1 Dimensions of the test rig

The test rig consists of a corner with a long (1,0 m) and a short (0,5 m) wing. The long wing consists of 2 modules, with one vertical and one horizontal module-to-module joint in between. All modules shall be tested vertically. The dimensions of the specimens shall be:

	Assembly dimensions (mm – nominally)	
	Length	Height
Short wing	495	1500
Long wing (see figure G1)	200 + t	1500
	800 - t	1500
Where t = thickness of the kit		

G.2.2 Test specimen

The internal partition kit shall be mounted and fixed according to EN 13823.

The test specimen shall fully represent all the envisaged components in the end use condition as specified by the applicant. The external surface of the kit used in the test assembly shall always include all facings and/or coatings that are applied to the product, as placed on the market. Each facing and/or coating shall be considered but extended application rules shall apply, using regrouping in families.

Influences of different colours of facings or coatings can be determined by performing tests on a light, on a dark and on a colour in the middle of the range.

The assembly including corner and joint details shall be as specified by the applicant and in accordance the end use conditions. Where several corner and jointing materials/profiles are foreseen, possible extended application rules may apply.

Where the kit consists of boards on a frame, the largest frame thickness (perpendicular to the face) envisaged shall be used in the test. Test performed on timber framework also apply for metal framework. Where the applicant claims a better performance with a metal frame or where the applicant does not use timber framework, the test can also be performed with the most onerous (related to dimensions and thickness of the profiles) type of metal framework.

Where relevant, the insulation material used shall be as specified by the applicant and represent end use conditions.

The type and dimensions of materials and products used, the dimensions and location of possible fixings etc shall be recorded in the test report.

The manner in which the product is tested, and the number of different tests conducted, has a direct consequence upon the scope of the applicability of the classification(s) to potential variations in product properties and the range of end use conditions that may be adopted in practice (see also clause G.3).

G.2.3 Mounting and fixing of the test assembly

In accordance with EN 13823, the distance between the backing board and the internal partition kit sample shall be 40 mm or greater, the air gap being created by using local spacers at top and bottom. The frame between the backing board and the specimen shall be open to allow ventilation into the gap.

The assembly may be prepared, and fixed together, away from the test chamber. The complete assembly can then be transported to the chamber.

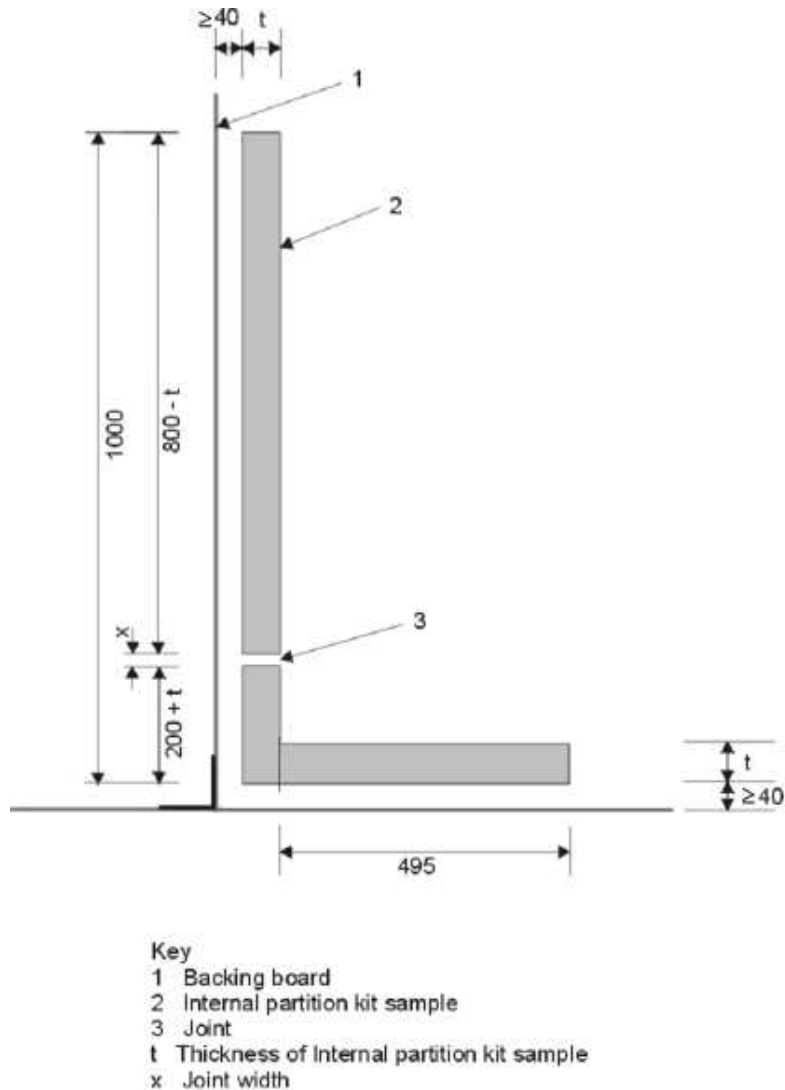


Figure G.1:

G3. End Use Application

When determining the testing programme all potential variations in product properties and in its potential end-use condition need to be considered. For this type of construction product, the following provides guidance on the potential end-use application rules that may apply dependant on the testing programme undertaken.

G3.1 Influence in thickness of the lining boards

If the reaction to fire classification of the partition is given as Class B, s1-d0 or worse then the influence of increased thickness of the lining boards shall be determined as well as the influence of the use of multi-layer boards. Tests shall be conducted, as a minimum, on the lining boards at the two extremes of the thickness range. If the range falls within the same classification then that classification shall apply to all thicknesses within that range.

If the lining board is classified A1 or A2-s1,d0, only the thinnest board shall be tested. If the lining boards have been subject to separate classification, then the permissible end use conditions appropriate to the board(s) themselves shall apply. Otherwise the thickness of lining boards shall be restricted to that used in the test.

G3.2 Influence of air space and substrate

Provided that the overall thickness of the partition is greater than 150mm the influence of the dimensions

of any air gap behind the specimen may be disregarded. Otherwise, the distance (Xmm) between the partition and the substrate used in the EN 13823 test provides the minimum distance at which the partition must be positioned from any underlying materials or adjacent constructions when used in practice.

The material forming the opposite face of the air space behind the partition in the EN 13823 test determines the type of element in front of which the partition can be used.

If the partition was tested in front of particleboard, the partition can be used in front of any wood structure or any A2 or A1 product. If the partition was tested in front of gypsum plasterboard the partition can be used only in front of any A2 or A1 product. If the partition was tested in front of calcium silicate board the partition can be used only in front of any A2 or A1 product except plasterboard (for further guidance see EN 13238).

G3.3 Influence of insulation product

If the partition incorporates an insulation material that is of Class A2 or lower then the influence of any changes in thickness or density of the insulation on the performance of the partition shall be determined. Extended application rules shall apply. If the insulation material is of Class A1, then the density and thickness may be increased without influence on the scope of the classification of the partition, as long as the insulation material is class A1.

If mineral wool is used as insulation material, it should be the standard mineral wool as indicated in EN 13238. The result is then applicable to all insulation products of class A1.

If the lining boards have been subject to separate classification, then the permissible end use conditions appropriate to the presence of insulation materials behind the boards shall apply.

G3.4 Influence of surface finishes and colour

The classification of the partition will be influenced by the presence and nature of any applied surface finish, e.g. paint or wall-covering. Possible extended application rules shall apply, e.g. by grouping facings/coatings into families. Any classification scope appropriate to the surface finish may be appropriate to the partition, provided that the partition constructional detail (primarily the nature of the lining boards and insulation product) is covered by the scope of classification for the surface finish.

To determine the influence of colour, the set of 3 specimens for the test shall comprise the darkest, lightest and mid range colours (3 specimens in total). If these yield the same classification (in accordance with EN 13501-1), that classification will apply to all colours provided the value of each fire test parameter, achieved for each individual test, is at least 10% less than the criteria for that classification.

G3.5 Influence of joints

The influence of joints may be dealt with using extended application rules.

Where a national regulation exists, a separate additional classification shall be provided for any material included as a jointing material or cover strip. This may not be required to have the same classification as the partition surface itself, dependent upon the national requirements.

G3.6 General note

If different classifications are obtained when investigating the influence of variation in product properties or end use application, additional testing shall be conducted to redefine the product family to which any single classification applies.

Annex H

H Resistance to fire – extended application rules

GROUP OF NOTIFIED BODIES - FIRE SECTOR GROUP

RULES FOR EXTENDED APPLICATION OF TEST RESULTS OF FIRE RESISTING ELEMENTS

Part 1 - General requirements for extended application

1. Scope

This document and the rules contained within its Parts have been developed by the Group of Notified Bodies - Fire Sector Group in response to a request for the European Fire Regulators Group to facilitate extended application in advance of the extended application standards being produced by CEN TC127.

Notified Bodies will use these rules to increase the scope of products that can be CE marked above what is defined in the relevant European Technical Specification or to widen the family of products for which CE marking is claimed.

The products currently covered in the annexes are:

Part 2 Partitions

Part 3 Glazed screens

Part 4 Penetration seals

Part 5 Pedestrian doors and shutters (timber and steel)

2. Extended application

CEN TC 127 has defined extended application as:

“The outcome of a process (involving the application of defined rules that may incorporate calculation procedures) that predicts, for a variation of a product property and/or its intended end use application(s), a test result on the basis of one or more test results to the same test standard.”

The methodology adopted in the prediction of fire resistance performance is based on universally accepted rules, some of which incorporate calculation methods and some of which may be ‘agreed expert opinion’ based on ‘common technical appreciation between experts’. The basis of development of the rule varies according to the different philosophies employed for different elements.

Consequently, in order to reduce the likelihood of disagreement between Notified Bodies and to increase the acceptability of an extended application, any judgement outside the rules or agreed expert opinion cannot be considered as part of extended application.

3. General requirements

3.1 Supporting information

3.1.1 Primary Information

In order to undertake any extended application, suitable test evidence shall be supplied. Primary test evidence shall satisfy the following conditions:

- It shall have been generated by a body notified under the Construction Products Directive as capable of testing or certifying such materials/products against the relevant standards.

- It shall have been generated from full tests carried out solely to European standards

3.1.2 Secondary information

Secondary evidence e.g. indicative tests to ENs, or full tests to existing national standards may also be used in support of EXAP in certain cases. The acceptability of using indicative tests is given in the relevant section and varies according to the different philosophies employed for different elements. General principles for the use of existing national tests are given in GNB-FSG document N 159. The default condition is to use only data produced by tests to European standards.

3.2 Permitted changes

3.2.1 General

The changes permitted in 3.2.2 and 3.3.3 are applicable without the need for justification. However, where the general principle cannot be applied e.g. for a particular product or product property, the restriction will be specified.

3.2.2 Interpolation

Interpolation between two measured fire performance parameters for a given range of a product property is permitted for all product properties where the relationship between the two measured fire performance parameters is linear. For non-linear relationships interpolation is not allowed.

3.2.3 Extrapolation

Extrapolation of any measured fire performance parameter is permissible for all product properties in either direction where the relationship between the two measured fire performance parameters is linear. For non-linear relationships extrapolation is not allowed.

3.2.4 Multiple changes

The number of changes that can be made using these rules varies according to the complexity of the rule and the type of construction being considered. For some constructions and some rules, multiple simple changes can be undertaken without any detailed consideration. However, for other types of construction and/or for more onerous changes, then sometimes only one change can be made. If more than one change is required then a further evaluation will be needed e.g. by a calculation. Some examples taken from the current annex on partitions are given below.

An example of multiple simple changes that can be carried out without further evaluation would be to increase the dimensions of a stud (width, thickness, but not length) in a partition up to 4 metres high, whilst also adding mineral wool insulation. These two changes do not interact to reduce the fire resistance of a partition and so both can be carried out.

An example of multiple changes that would require further evaluation would be to increase the thickness of the facings of the partition by up to 50% and to change the shape (cross section) of the stud. The ability of the modified studs to support the extra weight of the faces would need to be considered and a calculation method is provided in the annex on partitions for this purpose.

The extent to which each type of construction can have single or multiple changes applied is given in the appropriate annex for that product.

4. Procedure for undertaking extended application

The following steps must be followed:

- Collate the evidence from the various sources outlined in 3.1
- Apply the rule(s) from the appropriate annex
- Use linear interpolation/extrapolation as appropriate/required
- Report the extended application according to the requirements of section 5 below.

5. Contents of the extended application report

- Name and address of the Notified Body that is undertaking the extended application
- Name and address of the applicant and details of the extended application request
- Date, reference number and the testing laboratory for each test considered
- Calculations used in the evaluation process
- Drawings and specifications of the product variations approved
- Statement to indicate that the extended application has been carried out in accordance with these rules
- Specific rule(s) from the appropriate annex used to confer the extended application

GROUP OF NOTIFIED BODIES - FIRE SECTOR GROUP

RULES FOR EXTENDED APPLICATION OF FIRE RESISTING ELEMENTS

Part 2 – Rules for Partitions

1. Scope

This Part contains the extended application rules applicable to partitions of the stud and sheet type whereby a lightweight metal framework is covered with a layer(s) of board material on each face. Gypsum plasterboard is most commonly used for this purpose, but this annex is not limited to plasterboard faced partitions.

Partitions made from complete discrete units that are fixed together are outside the scope of this document.

Glazed screens consisting of a framework of timber or metal filled with panes of glass are also outside the scope of this document. These are covered in Part 3.

If the partition being considered includes glazed panels, then the rules for partitions given in this annex are applicable only to the partition part of the construction. Rules for extending the application of the glazed part of the construction are given in Part 3.

Reference should be made to the Fire Sector Group document: Rules for Extended Application of Test Results of Fire Resisting Elements which should be read in conjunction with this annex.

2. Permitted changes

2.1 General

The types of changes permitted given in the Fire Sector Group document: Rules for Extended Application of Test Results of Fire Resisting Elements are also applicable to partitions.

2.2 Multiple changes

The number of changes that can be made using the rules in this annex vary according to the complexity of the rule and the number of modifications being considered. The rules given below have been divided into two types: 'simple' and 'complex'.

For the 'simple' rules (no shading) multiple changes can be undertaken. It is possible to make one, some or all the changes without any without any detailed consideration or calculation.

For the 'complex' rules (shaded grey) then a calculation method needs to be applied. If more than one change is required, then the calculation method must be applied to the partition after all the proposed changes have been made.

Where the required changes include a mixture of 'simple' and 'complex' rules, then the calculation method must also be applied after all the proposed changes have been made.

Note: A new calculation method has recently been submitted from CTICM. TG-5 needs to decide to use this new method, the existing method or allow both to be used. The method is not yet included in this document.

3. Rules

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
CHANGES IN COMPONENTS				
Increase in size of stud section	Full EN test of partition with stud on which EXAP is based	Rule	The dimensions of the section of a stud (vertical member) may be increased without limitation	Increase in size allowed automatically
Change in shape of stud section	Full EN test of partition with stud on which EXAP is based including extra temperature measurements as required by the calculation method	Rule incorporating calculation method	The shape of the section of a stud (vertical member) may be changed provided that the new section is shown by calculation method to be as strong as the stud tested	Change in shape or size shall neither result in any decrease in bending stiffness nor in any increase in thermal induced bowing. Calculation method is applied at elevated temperatures.
Increase in thickness of board/facings	Full EN test of partition with board on which EXAP is based	Rule	<p>The thickness of the facings of a partition with non-metallic faces may be increased by up to 50% provided the length of the fixings for the facings (boards) are increased pro-rata. Maximum height of partition restricted to 3m. Metallic facings excluded.</p> <p><i>Existing national test data may be used to justify increases in excess of those given above and metallic faces</i></p>	<p>Consideration may be needed on ability of partition framework to support extra load of thicker facings – hence limit of 50% thickness increase and 3m height. Metallic facings excluded due to increased propensity to induce bowing.</p> <p><i>Existing national test data must demonstrate that changes have no detrimental effect.</i></p>

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
CHANGES IN COMPONENTS				
Inclusion of mineral wool insulation (up to 4m height)	Full EN test on partition without insulation	Rule	Partitions tested without mineral wool insulation infill may have mineral wool added without restriction.	Height limited to height tested (normally 3m)
Inclusion of mineral wool insulation (>4m height)	Full EN test on partition without insulation	Rule incorporating calculation method (to be agreed)	Partitions tested without mineral wool insulation infill may have mineral wool added provided they satisfy the requirements of the calculation method given at the end of this document	Calculation shall address stiffness, self weight and bowing of partition at elevated temperatures
Inclusion of mineral wool insulation (>4m height)	Full EN test on partition without insulation	Rule	<i>Existing national test data may be used to justify mineral wool infill for heights in excess of 4m up to height tested.</i>	<i>Existing national test data must demonstrate that inclusion of mineral wool has no detrimental effect.</i>
INCREASE IN HEIGHT				
Increase in height (above 4m)	Full EN test of partition system	Rule incorporating calculation method (to be agreed)	Partitions may have their height increased above 4m provided they satisfy the requirements of the calculation method given at the end of this document	Calculation shall address: <ul style="list-style-type: none"> • stiffness, self weight & bowing of partition at elevated temperature • possible increased bowing due to restraint of thermal elongation
Increase in height (above 4m)	Full EN test of partition system	Rule	<i>Existing national test data may be used to justify heights increases in excess of 4m up to height tested.</i>	<i>Existing national test data must demonstrate that increase in height over 4m has no detrimental effect.</i>

Calculation method for evaluating partitions with increases in height above 4,000 mm and components

The methodology given below allows the maximum height of a stud and sheet partition system to be established based on data taken from a test fully in accordance with EN 1364-1:1999. The test data required must be taken from a test, which falls within the direct field of application of the proposed construction. Before commencing the exercise the assessing authority should ensure that the partition meets the direct field of application lateral deflection requirements during a 3000mm high test. Data taken from a test conducted below 3000mm is not allowed.

Step 1

Calculate weight ω of wall per square metre i.e. $\text{kg/m}^2 \times 9,81$, and select a test height L mm.

It is essential to start with a low height such as 4000mm and work upwards in 1000mm increments. Once the partition becomes unstable reduce the increments to 100mm until the critical height is found for the duration in question.

Step 2

Obtain stud thickness t mm, stud spacing m mm, stud depth d mm, flange width f_w mm (Note 2). The yield stress σ should be taken as the value appropriate to the quality of steel being used e.g. 210, 280 or 350 N/mm^2

The Young's modulus E is assumed to be 205000 N/mm^2 .

Step 2

Obtain hot flange temperature T_h in deg C and cold flange temperature T_c at the time at which the stability is to be checked. (Note 3)

Step 3

Calculate the following terms:

$$k_h = 1 - T_h / 800$$

$$k_c = 1 - T_c / 800$$

$$k = k_c - k_h$$

Step 4

Calculate the neutral axis y_n from the cold end:

$$y_n = \frac{f_w \cdot (k_h \cdot d + k_c \cdot t/2) + d^2 \cdot (k/6 + k_h/2)}{(k_h + k_c) \cdot (f_w + d/2)}$$

Step 5

Calculate $e = d - y_n$

and calculate the second moment of area of the stud I_h at elevated temperature:

$$I_h = t \cdot (f_w \cdot (k_h \cdot e^2 + k_c \cdot y_n^2) + e^3 \cdot (k_h/3 + k \cdot e/(12 \cdot d)) + y_n^3 \cdot (k_c/3 - k \cdot y_n/(12 \cdot d)))$$

Step 6

Calculate the Euler height under the above conditions:

$$L_e = ((2 \cdot \pi^2 \cdot E \cdot I_h \cdot 10^6) / (\omega \cdot m))^{0.3333}$$

Step 7

Check that height L is a lower value than the Euler height L_e .

If it is not lower then the partition will be unstable regardless of any thermal bow. Otherwise proceed to step 8.

Step 8

Calculate the moment capacity M_s of the stud at elevated temperature:

$$M_s = t \cdot (f_w \cdot (k_h \cdot e + k_c \cdot y_n) + e^2 \cdot (k_h / 2 + k \cdot e / (6 \cdot d)) + y_n^2 \cdot (k_c / 2 - k \cdot y_n / (6 \cdot d))) \cdot \sigma$$

Step 9

Calculate the moment capacity M_c of the stud frame per metre width:

$$M_c = M_s \cdot 1000/m$$

Step 10

Calculate the load P_e :

$$P_e = \pi^2 \cdot E \cdot I_h \cdot 1000 / (L^2 \cdot m)$$

Step 11

Calculate the thermal bow b :

$$b = ((14 \times 10^{-6}) \cdot L^2 \cdot (T_h - T_c)) / (8 \cdot d)$$

Step 12

Calculate the total weight P per metre width:

$$P = \omega \cdot L / 1000$$

Step 13

Calculate the additional bow b_e due to self weight from

$$b_e = b / (2.P_e/P - 1)$$

Step 14

calculate the term:

$$\alpha = 2 \cdot \tan^{-1} (2 \cdot (b + b_e) / L) \text{ (in radians)}$$

Step 15

Calculate the moment M produced by the self weight acting eccentrically:

$$M = (\omega \cdot L^2 \cdot \alpha \cdot (1 - \cos \alpha)) / (4 \cdot 1000 \cdot \sin^2 \alpha)$$

Step 16

Now compare the moment M with the moment capacity M_c .

If M is greater than M_c then the wall will be unstable and collapse.

If the wall is stable return to step 1 and increment the test height repeat this process until the maximum fire rated height is established to the nearest 100mm.

Note 1: Wall comprising metal C or I-studs lined each side with plasterboard. Plasterboard assumed to provide no extra stiffness to wall but its full weight to act downwards at all times. Wall assumed to be free at each side edge and with unrestrained head.

Note 2: Where the flange has a turn down this is included in f_w and where an I-stud has a double thickness due to folding, this is included in f_w .

Note 3: Temperature information can be obtained from a normal fire resistance test and should be available at every minute during the test. The calculation will need to be done at all time increments in case conditions exist whereby stability failure occurs. A number of studs will need thermocouples attached the data should be used from the most onerous stud position it is not correct to average this data. In the calculation, hot flange temperature T_h must be assigned a value of no greater than 800 deg C since metal strength is effectively zero above this value. If information is available on metal temperatures then this model assumes a linear temperature distribution across the web and the data must be persuaded to fit the model.

Design Aspects of Fire Rated Partitions within Buildings

There are various design aspects which must be considered such as the total movement due to the bow and the movement at the head of the partition.

Dealing with the total bow first, this can be calculated by adding the result from Steps 11 and 13 i.e. the thermal bow and the self-weight induced bow.

The extent of the head movement depends on the net result of the vertical upward expansion due to temperature and the drop caused by the thermal bow.

The thermal expansion coefficient of steel is approximately 14×10^{-6} (between 100 and 700 degC) and therefore the upwards expansion at the head y_u mm of the partition is:

$$y_u = (14 \times 10^{-6}) \cdot L \cdot T_s$$

T_s = stud average temperature in deg C (above ambient)

If the cladding material does not protect the steel studs adequately, then quite large expansion at the head is possible and clearly therefore, it is best not to allow the metal to get too hot!

This upward deflection however could be reduced by the effect of thermal bowing (and self weight) of the partition and when a large bow is expected then the head detail might need to accommodate the partition dropping at the head and yet still be adequately restrained laterally.

The head drop y_d mm caused by the bow is:

$$y_d = L \cdot (\alpha - \sin \alpha) / \sin \alpha$$

where $\alpha = 2 \cdot \tan^{-1} ((2 \cdot b_t) / L)$ (in radians)
and b_t = the total bow in mm (addition of Steps 11 and 13)

The resulting net movement at the head is $y_u - y_d$.

The assessment must evaluate the extent of the head drop if any so that the partition designer can adapt the partition design to accommodate the anticipated head drop.

As with the maximum height calculation the head drop is required to be calculated for every 1 minute of the test. It is likely that the maximum head drop will occur prior to the duration of interest.

Calculation Check

To aid assessors who are preparing spreadsheets to conduct the calculations the following verification data has been provided for the partition height calculation.

Input data:

σ	350
ω	400
L	8000
t	0,5
m	600
d	146
f_w	39
T_h	700
T_c	200

Output data:

k_h	0,125
k_c	0,75
k	0,625
y_n	43,589
e	102,109
I_h	105057,513
L_e	12088,103

M_s	673658,153
M_c	1122763,588
P_e	5535,404
b	383,562
P	3200
b_e	155,943
α	0,268
M	873638,358

Wall is stable since $M_c > M$

GROUP OF NOTIFIED BODIES - FIRE SECTOR GROUP

RULES FOR EXTENDED APPLICATION OF FIRE RESISTING ELEMENTS

Part 3 – Rules for glazed screens

1. Scope

This Part contains the extended application rules applicable to glazed screens consisting of a framework of timber or metal filled with panes of glass.

Where a glazed screen is part of a partition, then the rules given in this annex are applicable only to the glazed part of the construction. Rules for extending the application of the partition part of the construction are given in Part 2.

Reference should be made to the Fire Sector Group document: Rules for Extended Application of Test Results of Fire Resisting Elements which should be read in conjunction with this Part.

2. Permitted changes

2.1 General

The types of changes permitted given in the Fire Sector Group document: Rules for Extended Application of Test Results of Fire Resisting Elements are also applicable to glazed screens.

2.2 Multiple changes

The number of changes that can be made using the rules in this annex vary according to the complexity of the rule and the number of modifications being considered.

For glazed screens, the rules are all simple and do not require further evaluation e.g. by calculation. Consequently, multiple changes can be undertaken in one extended application.

However, for the rules concerned with aspect ratio and pane size, the effect of applying them together is too onerous and consequently this needs to be limited. The limitation is given in 2.3 and to caution Notified Bodies, the relevant rules in clause 3 subject to the limitation are shaded in grey.

2.3 Limitation on aspect ratio v. pane size

For ≤ 30 minute applications, the rules for pane size variations can be applied **in addition** to the rules for adverse changes in aspect ratio.

For > 30 minute applications, **either** the rules for pane size increases can be applied **or** the rules for adverse changes in aspect ratio can be applied.

3. Rules

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
ASPECT RATIO				
(\leq 30 Mins insulating and non-insulating glasses)	Full EN test of system on which EXAP is based	Rule	The aspect ratio may be varied without restriction	
(> 30 Mins non-insulating glasses)	Full EN test of system on which EXAP is based	Rule	<p>The aspect ratio may be varied without restriction provided that the limitations for sizes of panes and the longest dimension of panes are not exceeded</p> <p><i>Existing national test data may be used to justify increasing the longest dimension above that tested (but retaining the pane area limitation)</i></p>	<p><i>Existing national test data must demonstrate that increasing the longest dimension above that tested has no detrimental effect.</i></p>
(>30 Mins insulating glasses)	Full EN test of system on which EXAP is based	Rule	The aspect ratio may be varied without restriction provided that the limitations for sizes of panes are not exceeded	

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
PANE SIZE				
Timber frames insulating & non-insulating	Full EN test of system on which EXAP is based	Rule	The areas of panes may be increased by up to 25% according to the time of overrun e.g. 10% overrun allows 10% increase in pane size. (Overrun is length of time over the achieved classification period).	There must be test evidence that demonstrates ability of transoms to support extra weight of larger panes <i>The test evidence that demonstrates ability of transoms to support extra weight of larger panes may be EN or existing national test data.</i>
Steel frames insulating & non-insulating	Full EN test of system on which EXAP is based	Rule	The areas of panes may be increased by up to 25% according to the time of overrun e.g. 10% overrun allows 10% increase in pane size. (Overrun is length of time over the achieved classification period).	As timber frames.
<p>Note: For ≤ 30 minute applications, the rules for pane size variations can be applied in addition to the rules for adverse changes in aspect ratio. For > 30 minute applications, either the rules for pane size increases can be applied or the rules for adverse changes in aspect ratio can be applied, but not both.</p>				
ORIENTATION				
Angle of installation	Full EN test of system on which EXAP is based	Rule	The result of a test may be applied to an identical system oriented at $\pm 15^\circ$ from angle tested provided that there was 15% overrun of integrity (all criteria) in the test <i>Existing national test data may be used to justify increasing the angle from that tested under the EN</i>	<i>Existing national test data must demonstrate that increasing the angle above 15° has no detrimental effect.</i>

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
ASYMMETRY				
Validity of result on both sides with test from one side only	Full EN test of system when tested from the worst side	Rule	The result of a test on an asymmetrical glazed screen tested from one side only is applicable to both sides if it was tested from worst side	<p>Worst side equals:</p> <ul style="list-style-type: none"> • glazing beads on fire side • double glazed units with fire glass on exposed face <p>NB glasses designed to provide greater fire resistance from one side can only be used in that side</p> <p><u>Existing national test data may be used to determine the worst side if not covered above.</u></p>
DIMENSIONS OF SCREEN				
Increase of height	Full EN test of system	Rule	Height may be increased pro-rata with percentage time of overrun e.g. 10% overrun allows 10% increase in height	<p>Original EN screen must be tested at 3m high.</p> <p>Increases in screen height may be accommodated by increases in pane sizes. However, these shall be limited by the rules for pane size and aspect ratio.</p>

Extension of width	Full EN test of system	Rule	Unlimited extension of width is permitted	Only permissible provided one vertical edge tested unfixed and unrestrained
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ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
NUMBER OF PANES				
Increase in number of panes	Full EN test of system	Rule	The number of panes may be increased.	The test specimen shall incorporate shared mullions/transoms as appropriate.
Decrease in number of panes	Full EN test of system	Rule	The number of panes may be decreased.	The pane area shall not exceed maximum allowable under these rules. The aspect ratio shall not be more onerous than that allowed under these rules.
EDGE COVER				
Change in edge cover	Full EN test of system	Rule	Edge cover may be increased for all glasses except edge sensitive types. Edge cover can never be decreased	TG-5 to decide on what constituted edge sensitive e.g. modified toughened soda-lime glasses. <u>Existing national test data may be used to determine which glasses are edge sensitive.</u>

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
REBATE DETAILS				
Variations in glazing bead	Full EN test of system	Rule	Centres of fixings may be decreased, but not increased	
Pinned V. screw fixed timber glazing beads	Full EN test of system with pinned on glazing beads	Rule	A test on glazing beads that are pinned (nailed) in position covers an end-use where the glazing bead are screwed in position.	<ul style="list-style-type: none"> • converse does not apply • angle of fixings cannot change by more than 10° • extent of fixing 'crossover' cannot be reduced <p><u>Existing national test data may be used to justify >10° change in angle.</u></p>
Stud located V. screw fixed steel glazing beads	Full EN test of system with stud located glazing beads	Rule	A test on steel glazing beads that are stud located (clip-on type) covers an end-use where the glazing beads are screwed in position.	Permitted provided there is no: <ul style="list-style-type: none"> • weakening of retention • decrease of any shielding effect • increased exposure to radiant heat
FRAMING/SUPPORTING CONSTRUCTION				
Changes to supporting construction/fixing of frames	Full EN test of system	Rule	The result is applicable to any supporting construction of at least the same fire resistance as that tested The fixings used to fix the glazed screen may be varied	The maximum fixing centres shall not be exceeded and the minimum number of fixings cannot be reduced

ITEM TO BE CHANGED	SUPPORTING EVIDENCE REQUIRED	TYPE OF EXAP TO BE UNDERTAKEN	RULE OR CALCULATION METHOD TO PERFORM EXTENDED APPLICATION	LIMITATIONS/ COMMENTS
GLAZING MATERIALS				
Glazing materials with different glasses	Full EN test of system plus test evidence of new glass and/or glazing material to be incorporated	Rule	Substitution of glazing materials (including the glass) is permitted providing the limitations given in the limitations/comments section adjacent are adhered to.	<ul style="list-style-type: none"> • Separate tests required for each type of non-insulating glass • Tests on monolithic wired glass cover toughened borosilicate glass but not vice-versa • Tests on modified toughened glasses validate use with toughened borosilicate and ceramic glass but not vice-versa • Insulated glasses are limited to the thickness tested if there is only one test • Linear interpolation is permitted between different thicknesses of insulating glasses of the same type • separate tests will be needed to include doors