



KOMO. Kwaliteit zoals beloofd.

**AD 1704-01
dated 19-05-2020**

**ASSESSMENT DIRECTIVE
FOR THE KOMO® ATTESTATION WITH PRODUCT CERTIFICATE
FINGER JOINTED TIMBER FOR LOAD BEARING APPLICATIONS**

Enacted by the SKH Body of Experts on 21-04-2020

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GENERAL INFORMATION ABOUT THIS PUBLICATION

This assessment directive has been drawn up in collaboration with the supervisory committee "Finger jointed timber for load bearing applications". This assessment directive has been adopted by the SKH Body of Experts in which interested parties in the field of this assessment directive are represented. This Body of Experts also supervises the implementation of certification and, if necessary, will revise this assessment directive. Where reference is made to "Body of Experts" or BoE in this assessment directive, this refers to the above-mentioned body.

This assessment directive will be used by certification bodies that have a licence agreement with the KOMO Foundation for this purpose, in conjunction with their applicable regulations. These regulations lay down the method used by the certification body for conducting:

- an assessment to obtain the attestation with product certificate;
- the external audits for an issued attestation with product certificate.

This assessment directive has been amended because some of the products under this AD have become subject to NEN-EN 15497 and because there was a need on the market to formulate more requirements for products not covered by NEN-EN 15497.

This assessment directive replaces assessment directive AD 1704-01 'Finger jointed timber for load bearing applications' dated 01-04-2004 and its amendment dated 01-09-2016

If a European harmonised technical specification applies to a construction product, the statements in the KOMO® attestation with product certification issued on the basis of this assessment directive may not be used to replace the CE marking on that building product and/or to replace the corresponding mandatory declaration of performance.

In case of arguments the Dutch version shall be consulted.

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1. INTRODUCTION, GENERAL PROVISIONS AND GENERAL REQUIREMENTS

1.2 General

The requirements for certification and attestation laid down in this assessment directive are used by the certification bodies which are duly accredited by the Council for Accreditation or which have submitted an application for accreditation and which have a licence agreement with the KOMO® Foundation for this purpose, when processing an application for or maintaining a KOMO® with attestation with product certificate for 'Finger jointed timber for load bearing applications'.

Based on the requirements in this assessment directive, an attestation with product certificate is issued for finger jointed timber for load bearing applications. This attestation with product certificate enables the certificate holder to demonstrate to its clients that an expert independent organisation supervises the production process of the certificate holder, the quality of the product and its quality assurance. Because of this it can be assumed that the product complies with Building Decree requirements, product requirements and quality requirements laid down in this assessment directive.

Alongside the requirements laid down in this assessment directive, the certification bodies lay down supplementary requirements, in the sense of general procedure requirements of certification, as determined in the general certification regulation of the body concerned.

Subject and scope

1.3 This assessment directive covers:

- Finger jointed coniferous timber for load bearing applications that is suitable for the manufacture of structures and can be used in combination with other building systems;
- Finger jointed deciduous timber for load bearing applications which is suitable for the manufacture of structures and can be used in combination with other building systems;
- Finger jointed modified timber for load bearing applications that is suitable for the manufacture of structures and can be used in combination with other building systems;
- Finger jointed combinations of deciduous wood-coniferous wood, modified wood-coniferous wood and composite bamboo-coniferous wood or laminated bamboo-coniferous wood for use as sheet piling or posts in hydraulic structures or as posts in ground contact.

1.4 Validity

From the binding declaration by SKH, KOMO® attestation with product certificate can be issued on the basis of this assessment directive. This assessment directive replaces AD 1704-01 dated 01-04 2004 and the corresponding amendment dated 01-09-2016. The attestation with product certificate issued on the basis of the replaced assessment directive and accompanying amendment sheet shall lose its validity 19-11-2021.

On the basis of the aforementioned previous version, new attestation with product certificates may be issued no later than 3 months before the current attestation with product certificate must be replaced.

The period of validity of the attestation with product certificate is unlimited. The period of validity can be limited (terminated) by:

- An amendment to this Assessment Directive;
- The failure of the certificate holder to meet its obligations.

In the event of (temporary or) no production processes being implemented, the validity may be (temporarily) suspended at the request of the certificate holder in the case of a shut-down of more than 12 months. A suspension of validity may be granted by the certification body for a maximum period of 1 year. A suspension may be extended by the certification body on the condition that the total duration of the suspension does not exceed 2 years.

However, in the case of a suspension period longer than 1 year, an additional periodical assessment must be carried out before the restart of the production processes to check whether the attestation with product certificate can be retained.

In the case of a suspension longer than 2 years, the Certification Body will have to withdraw the attestation with product certificate.

1.5 Relationship with the European Construction Products Regulation (CPR, EU 305/2011)

The harmonised European standard NEN-EN 15497 is applicable to some of the products that fall within the scope of this assessment directive. This concerns finger jointed timber with a rectangular cross-section for permanent structural use in buildings and bridges made of the species listed in section 5.2.2 of NEN-EN 15497¹.

¹ *Finger jointed timber made from other species or a combination of species is not covered by NEN-EN 15497.*

1.6 Requirements for conformity assessment bodies

Regarding the requirements of this assessment directive, the applicant (manufacturer/supplier) may, within the framework of external verification, provide reports from conformity assessment bodies to demonstrate compliance with the requirements of this assessment directive. It will have to be demonstrated that the relevant inspection, analysis, test and/or evaluation reports have been drawn up by a body that meets the applicable accreditation standard for the relevant subject, i.e.:

- NEN-EN-ISO/IEC 17020 for inspection bodies;
- NEN-EN-ISO/IEC 17021-1 for certification bodies certifying management systems;
- NEN-EN-ISO/IEC 17025 for laboratories;
- NEN-EN-ISO/IEC 17065 for certification bodies certifying products.

A body is deemed to comply with these criteria when an accreditation certificate for the relevant subject can be presented, issued by the Council for Accreditation (CfA) or another accreditation body accepted as a member of a multilateral agreement on mutual recognition and acceptance of accreditation drawn up within EA, IAF and ILAC; these agreements are referred to as EA-MLA, IAF-MLA and ILAC-MRA respectively. If no accreditation certificate can be submitted, the certification body itself will assess whether the accreditation criteria have been met.

1.7 Attestations with product certificate

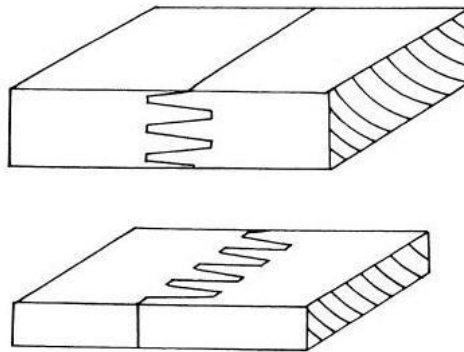
On the basis of this assessment directive, KOMO® attestations with product certificate are issued. The statements in these attestations with product certificate are based on chapters 4, 5 and 6 of this assessment directive.

The model attestation with product certificate applicable to this assessment directive is stated on the website of the KOMO® Foundation (www.komo.nl). The attestation with product certificate must correspond with this.

2. TERMS AND DEFINITIONS

For terms related to certification and CE marking, please refer to the website of the KOMO Foundation (www.komo.nl) and regulations of the certification body.

Flatwise bending strength	Bending strength perpendicular to the face of the timber.
Use class	see NEN-EN 335
Climate class	Classification showing the influence of moisture content and temperature on material properties.
Loose knot	Knot that, on the surface considered, is intergrown with the surrounding wood for less than $\frac{1}{4}$ of its cross-sectional perimeter.
Service class	See "Climate class"
Finger joint	Interlocking end joint formed by machining a number of similar, tapered, symmetrical fingers in the ends of timber members using a finger joint cutter and then bonded together



Wane	Natural rounding of the trunk still present on sawn and/or processed timber.
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Reference is made to NEN 5461 and Chapter 3 of NEN-EN 15497 for a description of the other definitions and designations of common terms included in the assessment directive.

3. ADMISSION ASSESSMENT AND PERIODIC ASSESSMENTS

For the purpose of granting the attestation with product certificate, the certification body carries out an admission assessment. After the attestation with -product certificate has been issued, the certification body carries out periodic assessments.

3.2 Start of the assessment

The applicant indicates the performance of its product/system for drawing up the KOMO® attestation with product certificate and provides the documents and substantiation required for this. Where applicable, it will provide the necessary data for the drawing up of the 'technical specification' as it will be included in the attestation with product certificate to be issued.

3.3 Admission assessment

The applicant of the attestation with product certificate indicates which products must be included in the attestation with product certificate to be issued. The applicant provides all relevant data of these products for the purpose of drawing up the product specification and the declaration about the product properties as they will be included in the attestation with product certificate.

For the purpose of granting the attestation with product certificate, the certification body will carry out an admission assessment in which:

- The certification body carries out a one-time assessment of the performance of the product in the application in accordance with chapter 4;
- The certification body assesses whether the applicant is able, by means of its quality system, to continuously guarantee that the products possess the characteristics or deliver the performances as laid down in chapters 4 and 5 in this AD. This includes assessment of the production process and the finished product;
- The certification body assesses whether the operational quality assurance system meets the requirements of chapter 6 of this BR;
- The certification body assesses the available processing instructions and application conditions.

Where applicable, it will be checked whether the documents provided with regard to the product and/or internal quality control and the results stated therein meet the requirements of this assessment directive.

Regarding the essential product characteristics, as included in the Annex ZA of the harmonised European standard, with the accompanying parts of the internal quality control, the certification body will assess whether the declarations comply with the requirements in this assessment directive.

Note:

Regarding the essential characteristics (as laid down in the declaration of performance drawn up within the framework of the European Construction Products Regulation) no assessment of the quality system and/or determination of product specification takes place for the purpose of the KOMO® attestation with product certificate, but the certification body will assess whether the declarations still comply with the requirements laid down in this assessment directive.

Regarding the essential characteristics, quality assurance is covered by Factory Production Control (FPC) as defined in the Annex ZA of the harmonised European standard(s).

A report shall be drawn up of the initial assessment, on the basis of which the attestation with product certificate may or may not be granted.

3.4 Periodic assessment

After the issue of the KOMO® attestation with product certificate, periodic assessments are carried out by the certification body as described in chapter 7 of this assessment directive.

4. APPLICATION REQUIREMENTS

4.1 Performance Requirements under the Building Decree

Connection table (new building)

Considered sections of the Building Decree	Sec	Art	Par	Any further references
General strength of the building structure	2.1	2.2 2.3 2.4 2.5c	1-2 1d	NEN-EN 1990 NEN-EN 1991-1-1/3/4 NEN-EN-1995-1-1 NEN-EN 1995-2
Strength during of fire (optional)	2.2	2.10 2.11	1-7 1-2	NEN-EN 1990 NEN-EN 1991-1-2 NEN-EN-1995-1-2
Limiting the development of fire and smoke (optional for section 2.69)	2.9	2.67 2.68 2.69	1-2 1-5 1-2	NEN-EN 13501-1

Notes:

- The above connection table shows the Buildings Decree requirements for "new building". Building components assembled with finger jointed timber for load bearing applications that meet the requirements for "new building" also meet the requirements for "rebuilding". From this point of view, the requirements for "rebuilding" have not been further elaborated.
- The relevant Building Decree articles and paragraphs are detailed below in accordance with the connection table for each Building Decree section.
- For the paragraphs relevant to a specific function in a section, the Building Decree must be consulted.

4.1.1 Technical building regulations for safety reasons

GENERAL STRENGTH OF THE BUILDING STRUCTURE; BUILDING DECREE-section. 2.1

4.1.1.1 Strength of building structure; Performance Requirements, Buildings Decree articles 2.2, 2.3, 2.4 and 2.5c

Building structures in which the finger jointed timber is used for load bearing applications shall be sufficiently strong with regard to the loads acting on it as applicable for the use in question, whereby at least the loads as defined in Building Decree section 2.2, Building Decree section 2.3, paragraphs 1-2, Building Decree section 2.4, paragraph 1d and Building Decree section 2.5c shall be taken into account.

Threshold value

A building structure in which the finger jointed timber for load bearing applications is used does not fail during the design lifetime with the fundamental load combinations and extraordinary load combinations as referred to in NEN-EN 1990.

Determination method

An assessment shall be made as to whether the declared (method of calculating the) performance of finger jointed timber for load bearing applications and load combinations determined in accordance with the Eurocodes listed in table 1.

Table 1

Construction type	Loads in accordance with	Performance determined in accordance with
Timber structure	NEN-EN 1990 and NEN-EN 1991-1-1/3/4	NEN-EN 1995-1-1 and NEN-EN 1995-2

Admission assessment

The certification body assesses whether the stated method of determining the performance with regard to the strength of finger-jointed timber for load bearing applications applied in building sections meets the requirements stated in the Building Decree.

KOMO® attestation with product certificate

The KOMO® attestation part indicates the conditions under which building components composed of finger-jointed timber for load bearing applications meet the requirements for the building component set out in the Building Decree with regard to the general strength of the building structure.

STRENGTH IN THE EVENT OF FIRE; BB-section 2.2

4.1.1.2 Strength of building structure in case of fire; Performance requirements, Building Decree sections 2.10 and 2.11

In the event of fire, a building to be constructed should be easily vacated and examined for a reasonable period of time, without the risk of collapse. In so far as regulations have been designated for a usage function in table 2.9 of the Building Decree, this requirement is fulfilled for that function by applying those provisions as indicated in Building Decree section 2.10, paragraphs 1-7 and Building Decree section 2.11(1-2)

Threshold value

The threshold value for the duration of the fire resistance with regard to failure shall be at least 60 minutes or 30 minutes for a building structure in which the finger jointed timber for load bearing applications is used (if no floor of a residential area is higher than 7 m above measuring level and the permanent fire load of the fire compartment determined in accordance with NEN 6090 does not exceed 500 MJ/m²).

Determination method

An assessment shall be made as to whether the declared (method of calculating) performance of finger jointed timber used in load bearing applications used in building components has been determined in accordance with the Eurocodes listed in table 2.

Table 2

Construction type	Loads in accordance with	Performance determined in accordance with
Timber structure	NEN-EN 1990 and NEN-EN 1991-1-2	NEN-EN 1995-1-2

Admission assessment

The certification body shall assess whether the stated method of determining the performance with regard to the duration of fire resistance with regard to failure of finger loaded timber for load bearing applications applied in building components complies with the requirements stated in the Building Decree.

KOMO® attest-with-product certificate

The KOMO® attestation part can indicate under which conditions building components composed of finger jointed timber for load bearing applications meet the requirements stated in the Buildings Decree with regard to the fire resistance of the building structure.

LIMITING THE DEVELOPMENT OF FIRE AND SMOKE; Building Decree section 2.9

4.1.1.3 Inner surface; Building Decree section 2.67

One side of a structural component adjacent to the interior air shall be such that fire and smoke cannot develop quickly. In so far as regulations have been designated for a function in table 2.66 of the Building Decree, this requirement is met for that function by applying those regulations and the provisions as indicated in Building Decree section 2.67, paragraphs 1-2.

Threshold value

Finger jointed timber for load bearing applications shall have a minimum fire class D and a minimum smoke class s2.

Determination method

The fire class and smoke class are determined in accordance with NEN-EN 13501-1.

Note:

If applicable, table 2 of NEN-EN 15497 can be used to determine the fire class and smoke class. Based on the conditions set out in this table it can be demonstrated that the threshold value is met.

Admission assessment

The certification body assesses whether the performance with regard to the fire and smoke class of the finger jointed timber for load bearing applications adjacent to the interior air, meets the requirements stated in the Building Decree and which conditions apply.

KOMO® attestation with product certificate

The KOMO® attestation part indicates the conditions under which components composed of finger jointed timber for load bearing applications meet the requirements stated in the Building Decree on the side adjacent to the interior air with regard to the fire and smoke class.

4.1.1.4 Outer surface; Building Decree section 2.68

One side of a construction component that is adjacent to the outside air shall be such that fire cannot develop quickly. In so far as regulations have been designated for a function in table 2.66 of the Building Decree, this requirement is met for that function by applying those regulations and the provisions as indicated in Building Decree section 2.68(1) to (5).

Threshold value

Finger jointed timber for load bearing applications shall at least be classified under fire class D.

Determination method

The fire class is determined in accordance with NEN-EN 13501-1.

Note:

If applicable, table 2 of NEN-EN 15497 can be used to determine the fire class and smoke class. Based on the conditions set out in this table, it can be demonstrated that the threshold value is met.

Admission assessment

The certification body shall assess whether the performance with regard to the fire class of the finger jointed timber for load bearing applications, which is adjacent to the outside air, complies with the fire class requirements stated in the Building Decree and which conditions apply.

KOMO® attest-with-product certificate

The KOMO® attest part indicates the conditions under which components composed of finger-jointed timber for load bearing applications meet the requirements stated in the Buildings Decrees on the side adjacent to the outdoor air with regard to the fire class.

4.1.1.5 Walkable area; Buildings Decree Article 2.69 (optional)

The top of a floor, staircase or ramp that is intended for persons and which borders on the indoor air shall be such that fire and smoke cannot develop quickly. Insofar as regulations have been designated for a use in Buildings Decree table 2.66, this requirement is fulfilled for that use by applying those provisions and the provisions as indicated in Building Decree section 2.69, paragraphs 1-2.

Threshold value

Finger jointed timber for load bearing applications shall meet at least fire class D_{fl} and smoke class s1_{fl}.

Determination method

The fire class and smoke class are determined in accordance with NEN-EN 13501-1.

Note:

If applicable, table 2 of NEN-EN 15497 can be used to determine the fire class and smoke class. Based on the conditions set out in this table it can be demonstrated that the threshold value is fulfilled.



Admission assessment

The certification body assesses whether the performance with regard to the fire and smoke class of the finger jointed timber for load bearing applications, of the top of floors, stairs or ramps intended for persons that are adjacent to the interior air comply with the requirements stated in the Building Decree with regard to the fire and smoke class and which conditions apply.

KOMO® attestation with product certificate

The KOMO® attestation part can indicate under which conditions floors, stairs or ramps composed of finger jointed timber for load bearing applications intended for persons meet the requirements set out in the Buildings Decree on the upper side adjacent to the interior air with regard to the fire and smoke class.

4.2 Performance requirements from the Soil Quality Decree

Based on this assessment directive, no requirements have been set for the end result of the Soil Quality Decree.

4.3 Other performance requirements in the application

Based on this assessment directive, no other requirements have been set for the end result with regard to the performance in the application.

5. REQUIREMENTS FOR PRODUCT SPECIFICATION

5.1 Finger jointed timber CE-compliant

Finger jointed timber with rectangular cross-section for permanent, structural use in buildings and bridges made of the species mentioned in section 5.2.2 of NEN-EN 15497 shall be provided with CE marking and a Declaration of Performance in accordance with NEN-EN 15497.

5.1.1 Timber requirements

In addition to the requirements laid down in NEN-EN 15497, the finger jointed timber shall be free of:

- loose knots or knot holes > 15 mm;
- wane > 5 mm;
- bow or spring > 5 mm per 2 m length;
- twist > 1 mm per 25 mm width per 2 m length;
- do not less than 30 cm from the finger joint (blue stain is permitted).

5.2 Finger jointed timber other species

Finger jointed timber for load bearing applications shall comply with chapter 5 of NEN-EN 15497 with the exception of chapter 5.2.2. Finger jointed timber shall consist of only one species throughout. In accordance with Annex C "type testing" of NEN-EN 15497, it shall be demonstrated for each combination of species/adhesive/finger joint machine that the finger joint meets the requirements.

When used in climate class 3:

- §G.4.4 of NEN-EN 15497 does not apply.
- **for the approval test:**
- The characteristic bending strength of each combination of species/adhesive/finger joint machine must be determined in accordance with NEN-EN 408. At least 15 specimens flatwise should be tested after 3 weeks of ageing and at least 15 specimens flatwise, without ageing.
- The characteristic flatwise bending strength of the finger joint after ageing shall be at least 1.25 times the declared characteristic bending strength of the finger joint.
- The correction factor for the bending strength without ageing with respect to the bending strength after ageing is determined for the purpose of production control.

Ageing

Samples with a finger joint in the middle should be planed or sawn before ageing up to a dimension of 100 x 200 x 2000 mm (h x w x l)¹. Samples should be aged by repeating the following cycle 31 times.

- Spray with water 15 ± 2°C for 8 hours;
- Irradiate for 8 hours to an even surface temperature of 75 ± 5°C².

¹ If this dimension is not available, the maximum dimension applied in practice should be tested.

² Measured on a reference surface with colour RAL 7016

5.2.1 Timber requirements

The timber must be graded in accordance with NEN-EN 14081-1 and must be free of:

- loose knots or knot holes;
- infestation or decay;
- wane;
- sapwood.

Borer holes (pin-holes/shot-holes) are only permitted more than 30 cm away from the finger joint and must comply with table 1 of SKH publication 99-05.

If applied in climate class 3, at or above the waterline, the timber shall have at least durability class 2 for fungi in accordance with NEN-EN 350.

Note: Transitional timber in Azobé has durability class 3 and can therefore not be used in climate class 3, at or above the waterline.

5.2.2 Production requirements

For production, Annex G of NEN-EN 15497 applies.

If during the initial test it has been demonstrated that the finger joint complies with a timber moisture content higher than 18%, chapter G.4.4 does not apply. The timber moisture percentage must not exceed the timber moisture percentage in the initial test +5% and shall comply with the instructions of the adhesive supplier.

5.2.3 Adhesive

Adhesives must meet AD 2338 requirements. Only type I adhesive in accordance with EN 301 is permitted.

5.3 Finger jointed modified timber

Finger jointed modified timber for load bearing applications shall comply with chapter 5 of NEN-EN 15497 with the exception of chapter 5.2.2. Finger jointed modified timber shall consist of only one species throughout. If applied in climate class 3, §G.4.4 of NEN-EN 15497 is not applicable.

In accordance with Annex C "type testing" of NEN-EN 15497, it shall be demonstrated for each combination of species/adhesive/finger jointing machine that the finger joint meets the requirements.

When used in climate class 3:

- §G.4.4 of NEN-EN 15497 does not apply.
as part of the admission assessment:
- The characteristic bending strength of each combination of species/adhesive/finger jointing machine must be determined in accordance with NEN-EN 408. At least 15 specimens flatwise should be tested after 3 weeks of ageing and at least 15 specimens flatwise, without ageing.
- The characteristic flatwise bending strength of the finger joint after ageing shall be at least 1,25 times the declared characteristic bending strength of the finger joint.
- The correction factor for the bending strength without ageing compared to the bending strength after ageing is determined for the purpose of production control.

Ageing

Samples with a finger joint in the middle should be planed or sawn before ageing up to a dimension of 100 x 200 x 2000 mm (h x w x l)¹. Samples should be aged by repeating the following cycle 31 times .

- Spray with water 15 ± 2°C for 8 hours;
- Irradiate for 8 hours to an even surface temperature of 75 ± 5°C².

¹ If this dimension is not available then the maximum dimension applied in practice should be tested.

² Measured on a reference surface with the colour RAL 7016.

5.3.1 Modified timber requirements

The timber shall comply with AD 0605 requirements.

The timber shall be visually strength graded according to a grading standard that meets the requirements laid down in annex A of NEN-EN 14081-1. The bending strength, elasticity modules and density shall be determined in accordance with NEN-EN 384.

The timber must be free of:

- loose knots or knot holes;
- infestation or decay;
- wane;
- sapwood >1/3 x timber thickness.

If applied in climate class 3, at or above the waterline, the timber shall have at least durability class 2 for fungi in accordance with NEN-EN 350.

5.3.2 Production requirements

For production, Annex G of NEN-EN 15497 applies.

If during the initial test it has been demonstrated that the finger joint complies with a timber moisture content higher than 18%, chapter G.4.4 does not apply. The timber moisture percentage must not exceed the timber moisture percentage in the initial test +5% and shall comply with the instructions of the adhesive supplier.

5.3.3 Adhesive

The adhesives must meet with AD 2338 requirements. Only adhesive type I in accordance with NEN-EN 301 is permitted.

5.4 Finger jointed combinations of coniferous-deciduous timber, coniferous-modified timber and coniferous-composite bamboo or coniferous-laminated bamboo.

Finger jointed combinations of coniferous-deciduous timber, coniferous-modified timber and coniferous-composite bamboo or coniferous-laminated bamboo for load bearing applications shall comply with chapter 5 of NEN-EN 15497 except for §5.2.2 and §G.4.4.

as part of the admission assessment:

For hydraulic engineering applications:

- The characteristic bending strength flatwise of each combination of species/adhesive/finger jointing machine must be determined in accordance with NEN-EN 408. At least 15 specimens shall be tested after immersion in water at $20 \pm 5^\circ\text{C}$ for 4 weeks and at least 15 specimens shall be air dry without immersion.
- The correction factor for the bending strength without immersion with respect to the bending strength after immersion is determined for the purpose of production control.

For hydraulic engineering applications such as sheet piling and piles for bank protection:

- The characteristic flatwise bending strength of the finger joint after immersion shall be at least 90% of the declared characteristic bending strength of the finger jointed product.

For other hydraulic piles:

- The characteristic flatwise bending strength of the finger joint after immersion shall be at least 113% of the declared characteristic bending strength of the finger-jointed product.

For non-hydraulic applications in ground contact:

- The characteristic bending strength of each combination of species/adhesive/finger jointing machine must be determined in accordance with NEN-EN 408. At least 15 specimens flatwise should be tested after 3 weeks of ageing and at least 15 specimens flatwise, without ageing.
- The characteristic flatwise bending strength of the finger joint after ageing shall be at least 1.25 times the declared characteristic bending strength of the finger jointed product.
- The correction factor for the bending strength without ageing compared to the bending strength after ageing is determined for the purpose of production control.

Ageing

Samples with a finger joint in the middle should be planed or sawn before ageing up to a dimension of $100 \times 200 \times 2000 \text{ mm}$ ($h \times w \times l$)¹. Samples should be aged by repeating the following cycle 31 times.

- Spray with water $15 \pm 2^\circ\text{C}$ for 8 hours;
- irradiate for 8 hours to an even surface temperature of $75 \pm 5^\circ\text{C}$ ².

¹ If this dimension is not available, the maximum dimension applied in practice should be tested.

² Measured on a reference surface with colour RAL 7016.

5.4.1 Coniferous timber requirements

The timber shall be strength graded in accordance with NEN-EN 14081-1 and shall be free of:

- loose or broken tassels > 15 mm;
- wane > 5 mm;
- bow or spring > 5 mm per 2 m length;
- twist > 1 mm per 25 mm width per 2 m length;
- knots less than 30 cm away from the finger joint (blue stain is permitted).

If applied in climate class 3, except below the waterline, the timber shall have at least durability class 2 for fungi in accordance with NEN-EN 350. This can also be obtained by means of preservation in accordance with AD 0601 requirements.

5.4.2 Deciduous timber requirements

The timber shall be strength graded in accordance with NEN-EN 14081-1 and shall be free of:

- loose knots or knot holes;
- infestation or decay;
- wane;
- sapwood

Borer holes (pin-holes/shot-holes) are only permitted more than 30 cm away from the finger joint and must comply with table 1 of SKH publication 99-05.

The timber shall have at least durability class 2 for fungi in accordance with NEN-EN 350.

Note: Transitional timber in Azobé has durability class 3 and can therefore not be used in climate class 3, at or above the waterline.

5.4.3 Modified timber requirements

The timber must meet the AD 0605 requirements.

The timber shall be visually strength graded according to a grading standard that meets the requirements set out in annex A of NEN-EN 14081-1. The bending strength, elasticity modules and density shall be determined in accordance with NEN-EN 384.

The timber must be free of:

- loose knots or knot holes > 15 mm;
- infestation or decay;
- wane;
- fissures >1/3 x timber thickness.

The timber shall have at least durability class 2 for fungi in accordance with NEN-EN 350.

5.4.4 Composite bamboo or laminated bamboo requirements

The composite or laminated bamboo shall comply with AD 1708 and BGS-005 requirements for use class 4. The bending strength, elasticity modules and density shall be determined in accordance with NEN-EN 384.

The composite bamboo or laminated bamboo shall have at least durability class 2 for fungi in accordance with NEN-EN 350.

5.4.5 Production requirements

For production, Annex G of NEN-EN 15497 applies.

If during the initial test it has been demonstrated that the finger joint complies with a timber moisture content higher than 18%, chapter G.4.4 does not apply. The timber moisture percentage must not exceed the timber moisture percentage in the initial test +5% and shall comply with the instructions of the adhesive supplier.

5.4.6 Adhesive

The adhesives shall comply with AD 2338 requirements. Only adhesive type I in accordance with NEN-EN 301 is permitted.

5.5 Protection

Finger jointed timber with a moisture content of 18% or less must be adequately protected against weather influences during transport, storage and the construction phase in order to maintain the given quality. Finger jointed timber with a moisture content higher than 18% must be adequately ventilated during transport, storage and the construction phase to prevent deterioration.

Finger jointed timber must be kept free of the ground during transport and storage and must be given sufficient and flat support to prevent deformation.

6. INTERNAL QUALITY SYSTEM REQUIREMENTS

6.1 General

The management of the certificate holder is responsible at all times for the quality of the production process, the operability of the quality system, internal quality control and the quality of the product. Internal quality control must meet the requirements laid down in this chapter.

6.2 Processing instructions and application conditions

The performance of the product in its application may also depend on the manner in which and the conditions under which the application was carried out, as well as on the specifications of the (auxiliary) products and/or (auxiliary) materials used in its application.

The holder of the attestation with product certificate draws up processing instructions and provides these upon delivery of the product to be applied. The application conditions are included in the KOMO® attestation with product certificate.

The application conditions and processing instructions specify the methods to be applied and the conditions to be observed which are conditional for the achievement of the performance(s) of the product in its application as stated in the attestation with product certificate.

6.3 Quality system

The certificate holder must have a quality system tailored to the processes and scope as laid down in this assessment directive.

The quality system of the certificate holder shall be laid down in a quality manual containing at least the following elements:

- a description of the company and its organization;
- a management statement setting out the principles and objectives of the quality policy;
- procedures for the management of the quality documents and quality records;
- procedures for internal assessments;
- complaint handling;
- procedures regarding purchase and assessment of suppliers;
- procedure for qualifying employees for specific positions;
- the working methods and instructions described;
- the applicable safety instructions described;
- procedures for handling deviations and follow-up of corrective actions;
- internal quality control scheme (in accordance with chapter 6.4);

6.4 Internal quality control

The certificate holder must have and apply an internal quality control (IQC) scheme which includes at least the requirements of this chapter.

The certificate holder must at least demonstrably lay down the following in this scheme:

- Which aspects are checked by the organization of the certificate holder, including entry control on the raw materials, inspection of the end product and inspection of the measuring equipment.
- The methods by which these checks are carried out and the equipment to be used.
- How often these checks are carried out.
- Whether and, if so, how the inspection results are recorded and retained.
- Identification and traceability of deliveries.

The internal quality control shall enable the certificate holder to continuously demonstrate compliance with the requirements of this assessment directive.

In the case of the production of 'finger jointed timber made of other timbers' (chapter 5.2), inspection of finger joints in accordance with Annex C of NEN-EN 15497 is also included. In the case of application in climate class 3, the test results must be corrected by the factor determined during the initial test.

With the production of finger jointed modified timber (section 5.3), the inspection of finger joints in accordance with Annex C of NEN-EN 15497 is also included. In case of application in climate class 3, the test results shall be corrected by the factor determined during the initial test.

In the production of finger jointed combinations of deciduous timber-coniferous timber, modified timber-coniferous timber and composite bamboo-coniferous timber or laminated bamboo-coniferous modified timber (chapter 5.4), inspection of the finger joints is in accordance with Annex C of NEN-EN 15497. The test results should be corrected by the factor established in the initial test.

6.5 Quality management system

Within the organizational structure, an officer must be appointed who is responsible for managing the quality system. This officer is also responsible for the functioning of the quality system. This officer must report directly to the management on the functioning of the internal quality control. This officer has appropriate powers for this purpose.

6.6 Notification of changes

All changes within the quality system, such as procedures, IQC scheme, etc., must be reported to the certification body.

6.7 Management of documents and registrations

The certificate holder shall ensure that:

- The current versions of the quality documents are available to all employees who need them and where they are used. This also applies to project and/or process-specific manuals and instructions.
- The established procedures and instructions referred to in chapter 6.2 are regularly reviewed and updated where necessary and are implemented effectively on an ongoing basis.
- New and amended quality documents are authorized and released for use by a designated responsible person.
- The registrations that are relevant for the demonstrability of a controlled production process in accordance with this assessment directive and other non-compliant actions, are correctly identified, legible and traceable.

The project documents and records referred to in this assessment directive shall be kept for a period of at least 10 years and longer if required by law.

After a verification, the certification body may decide to reduce or extend the retention period.

6.8 Inspection of measuring equipment

Inspection, measuring and testing equipment shall be calibrated at least once a year, unless another period is specified by the manufacturer of the equipment. Records must be kept of this.

Calibration can be performed internally (calibrated reference measuring equipment) or externally (calibration company).

6.9 Supply

Raw materials, semi-finished products, etc., with reference to another assessment directive, must meet the requirements of the relevant assessment directive. The goods received must be checked according to the quality system. Records must be kept of this.

6.10 Laboratory

For the performance of laboratory work it is necessary to have an equipped (separate) room and the prescribed measuring and testing equipment available or to make use of an external laboratory approved by the certification body.

The samples used for inspection and testing should be clearly identified. Any test sequence shall be recognizable.

The finger jointed timber manufacturer must have the following equipment:

- hygrometer;
- wood moisture meter;
- bending test machine;
- stopwatch.

6.11 Measures for non-complying products

If the results of the internal quality control show that certain products do not meet the set requirements:

- The product must be marked, not delivered and stored recognizably (separately).
- The cause must be investigated and, if necessary, corrective measures must be taken.
- The deviations found and the corrective or additional measures taken must be recorded.

If the defects referred to above only come to light after delivery, the customer must also be informed and will be involved in the follow-up steps to be taken.

There should also be a procedure for handling these products and recognizable (separate) storage.

6.12 Complaints procedure

The certificate holder must have a procedure for handling complaints in relation to the product supplied.

This procedure should at least specify:

- Who is responsible for assessing and dealing with complaints
- The registration of complaints and the ensuing follow-up and handling process.
- The intended follow-up and settlement times.
- Provide for adequate information of the complainant.
- Taking remedial and corrective measures in response to complaints.

6.13 Procedures and work instructions

The certificate holder must be able to submit procedures for:

- How to deal with deviations;
- Corrective measures to be taken when deficiencies are identified;
- Complaints procedure;
- Managing work instructions and inspection forms used (registration, retention obligation, etc.).

The certificate holder must have work(location) instructions (including monitoring of the production process).

6.14 Marks

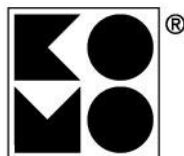
Every piece or bundle delivered under KOMO® attestation with product certificate shall be marked with:

- KOMO® word or figurative mark; minimum 5mm in size;
- number of attestations with product certificate;
- strength class (for deciduous timber and deciduous-coniferous timber) or;
- bending strength (in the case of modified timber, modified-coniferous timber and bamboo-coniferous timber)
- production date;
- "M" if the timber is mechanically strength graded;
- "KD" if the timber moisture content is less than 18% and for application in climate class 1 or 2.

For each lot delivered under KOMO® attestation with product certificate, a written specification must be provided to the customer stating per order line:

- KOMO® word or logo;
- species;
- dimensions;
- quantity;
- strength class (for deciduous and deciduous-coniferous timber) or;
- bending strength (in the case of modified timber, modified-coniferous timber and bamboo-coniferous timber).

The design of the logo is as follows:



7. REQUIREMENTS FOR PERIODIC ASSESSMENTS

7.1 General

The external assessment is recorded by the certification body in accordance with the requirements of the Body of Experts and the Product Certification Regulations of the certification body.

7.2 Nature and frequency of the external assessment

After the attestation with product certificate has been issued, the certification body periodically assesses the certificate holder's compliance with its obligations. At the time of entry into force of this assessment directive, the frequency has been set at 2 periodic assessments per year.

The periodic assessments must cover:

- The results of the product checks carried out by the certificate holder in accordance with Chapter 6;
- Assessment of the continued and effective application of the quality system in accordance with Chapter 6;
- Correct marking of certified products;
- The permanent value and suitability of the processing instructions drawn up by the certificate holder.

Where applicable, it will be checked whether the documents provided with regard to the product and/or internal quality control and the results stated therein meet the requirements of this assessment directive. A written report will be drawn up of these assessments. Following the advice of the Body of Experts, the sanction policy and the aforementioned assessment frequency can be adjusted based on arguments.

For each timber-adhesive combination¹, four samples must be taken once a year by the certification body for further assessment by an external laboratory (assessment in accordance with Annex C "factory production control" of NEN-EN 15497). If there is reason to do so, extra samples may be taken. The costs of such an assessment shall be borne by the manufacturer.

¹ *Not applicable to finger jointed timber with CE marking and associated Declaration of Performance in accordance with NEN-EN 15497.*

With regard to the essential product characteristics, as mentioned in annex ZA of the harmonised European standard, with the corresponding parts of the internal quality control, the certification will investigate whether the declarations still comply with the requirements of this assessment directive.

Note:

With regard to the essential characteristics (as laid down in the declaration of performance drawn up within the framework of the European Construction Products Regulation) no assessment of the quality system and/or determination of product specifications will be carried out for the purpose of the KOMO® attestation with product certificate, but the certification body will investigate whether the declarations still comply with the requirements laid down in this assessment directive.

With regard to the essential requirements, quality assurance is covered by Factory Production Control (FPC) as defined in the Annex ZA of the harmonised European standard(s).

The certificate holder must give the certification body the opportunity to assess the implementation of the production processes at the production site.

The country of the certificate holder/applicant should, in general, be safe for assessment visits by the certification body. In case of negative travel advice, the country will not be visited and therefore no assessment visits can be carried out. In that case, the validity of the KOMO® attestation with product certificate will be (temporarily) suspended.

7.3 Sanctions policy

The sanctions policy (the measures to be taken by the certification body in case of shortcomings) must be laid down in the procedure of the certification body referred to in chapter 8.1 or in a separate document drawn up for that purpose.

8. REQUIREMENTS FOR THE CERTIFICATION BODY

8.1 General

The certification body must have a procedure in place in which the general rules used for certification are laid down.

8.2 Certification personnel

The personnel involved in the certification process can be divided into:

- Inspector: in charge of carrying out the external audit;
- preliminary inspector: in charge of carrying out the admission assessments and the assessment of the auditors' reports;
- assessor: in charge of the assessment of the preliminary test examiner and inspector; decisions on the need to take corrective measures;
- decision-maker: in charge of making decisions in response to admission assessments carried out, continuation of certification in response to checks carried out.

8.3 Qualification Requirements

Personnel involved in the certification process must be demonstrably qualified to carry out the necessary work. With regard to education, expertise/experience the following qualification requirements apply:

Personnel Certification	Training	Knowledge and Experience
- Inspector - Preliminary inspector	Secondary vocational education level	- Production and application of coniferous and deciduous timber or equivalent - Auditor training ISO 9001 - At least 2 years' experience in the timber industry or equivalent
- Assessor	Higher professional educational level	- Production and application of coniferous and deciduous timber. - At least 2 years' experience at senior level in the timber industry or equivalent.
- Decision maker	Higher professional educational level	- Management experience or equivalent - Certification or equivalent - Accreditation criteria or equivalent - Knowledge of relevant certification system

Certification personnel must be demonstrably qualified by training and experience to meet the above requirements. If qualification takes place based on different criteria, this must be recorded in writing. The competence with regard to qualification must be laid down in the quality process of the certification body.

8.4 File for admission and certification testing

The results of the admission and certification tests are recorded in a file by the certification body. The file must meet the following requirements:

- **Completeness**; the file contains a statement on all the requirements laid down in the assessment directive.
- **Traceability**; the findings on which statements are based must be traceable.

Upon granting the KOMO® attestation with product certificate, the decision maker must be able to base their decision on the findings laid down in the file.

8.5 Decision on the KOMO® attestation with product certificate

The decision on granting the KOMO® attestation with product certificate and/or the imposition of sanctions and/or the suspension or withdrawal shall be made by a qualified decision maker who has not been involved in the certificate assessment. Based on the assessment, the decision maker decides whether the KOMO® attestation with product certificate can be granted or whether additional information and/or investigation is required before the KOMO® attestation with product certificate can be granted. The decision must be traceably recorded.



8.6 Reporting to the Body of Experts

The certification body reports at least annually on the certification activities carried out. This report must cover the following subjects:

- changes in number of certificates (new / expired);
- number of assessments performed in relation to the set frequency;
- results of the assessments;
- measures imposed in the event of shortcomings found;
- complaints received from third parties about certified products.

8.7 Interpretation of requirements

The Body of Experts may document the interpretation of requirements laid down in this assessment directive in a separate interpretation document. This interpretation document is, if applicable, also available through the website of the scheme manager who has drawn up this assessment directive.

Every certification body making use of this assessment directive is obliged to use the interpretations laid down in it.

9. LIST OF DOCUMENTS LISTED

9.1 Public law regulations

Building Decree 2012	Law Gazette 2011, 416; last amended Law Gazette 2020, 84
Building Decree Regulation 2012	Government Gazette 2011, 23914; last amended Government Gazette 2020, 13004
CPR	Construction Products Regulation EU No 305/2011

9.2 Normative documents

NEN 6090: 2017	Determination of fire load
NEN-EN 301:2017	Adhesives, phenolic and aminoplastic, for load bearing timber structures - Classification and performance requirements
NEN-EN 335:2013	Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products
NEN-EN 350:2016	Durability of wood and wood-based products - Testing and classification of the durability to biological agents of wood and wood-based materials
NEN-EN 384:2016+A1:2018	Structural timber - Determination of characteristic values of mechanical properties and density
NEN-EN 408:2010+A1:2012	Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties
NEN-EN 1990+A1+A1/ C2:2011 +NB:2011	Eurocode: Basis of structural design
NEN-EN 1991-1-1+C1:2011+NB:2011	Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings
NEN-EN 1991-1-2 +C1:2011+NB:2011	Eurocode 1 - Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire
NEN-EN 1991-1-3+C1:2011+A1:2015 +NB:2011	Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads
NEN-EN 1991-1-4+A1+C2:2011 +NB:2011	Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions
NEN-EN 1995-1-1+C1+A1:2011 +C1:2012+A2:2014+NB:2013	Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings
NEN-EN 1995-1-2:2005+C1:2011 +NB:2011	Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design



NEN-EN 1995-2:2005+NB:2011	Eurocode 5: Design of timber structures - Part 2: Bridges
NEN-EN 13501-1:2019	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
NEN-EN 14081-1:2005+A1:2011	Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements
NEN-EN 15497:2014	Structural finger jointed solid timber - Performance requirements and minimum production requirements
AD 0605:2018	Modified timber, SKH
AD 1708:2015	Bamboo Semi-manufactured for exterior and interior applications, SKH
AD 2338:1998+WB:2007	Adhesives for load bearing wooden building constructions, SKH
BGS-005:2014	Semi-manufactured bamboo for exterior and interior applications, SKH
SKH-publication 99-05:2018	Approved timber species to be used in wooden facade elements (window frames, windows and doors) + appendix quality requirements, SKH.

9.3 Informative documents

NEN 5461:2011 Design	Requirements for timber (KVH 2000) - Sawn timber and round wood - General part
NEN-EN-ISO 9001:2015	Quality management systems - Requirements