BRL 3107
dated 08/08/2005

ASSESSMENT DIRECTIVE

FOR THE

SKH-KOMO® PRODUCT CERTIFICATE

FOR

CONSTRUCTION ADHESIVES

Technical area B1/E2/E3/E6

Adopted by the Board of Timber Experts
dated 25/10/2005

Adopted by the Building Harmonisation Committee
of Stichting Bouwkwaliteit (SBK – Foundation for Building Quality)
dated 22/12/2005

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GENERAL INFORMATION CONCERNING THIS PUBLICATION

This Assessment Directive was declared binding on 22 December 2005 by the certification and attestation body SKH according to the SKH Regulations for Product Certification and Attestation and shall, as from 22 December 2005, be employed for the issuing of a SKH-KOMO® Product Certificate 'Construction adhesive'.

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1 Introduction

The requirements set out in this Assessment Directive are used by the certification and attestation bodies, which have been duly accredited by the Council for Accreditation in the Netherlands for the processing of an application respectively maintaining of a product certificate for construction adhesives.

The quality declaration to be issued is designated as follows:

- KOMO® Product Certificate

The certification and attestation bodies lay down additional requirements together with the requirements laid down in this Assessment Directive, in the sense of general procedure requirements of certification and attestation, as laid down in the general certification and attestation regulations of the relevant body.

1.1 Area of application

A construction adhesive as referred to in this Assessment Directive is used to quickly and easily, if required invisibly, bond various materials to wooden, concrete, stone, metal, plastic or other surfaces. The bond is achieved without the use of presses or clamps.
A construction adhesive is a viscous, filling adhesive that could be originated from rubbers and resins, a dispersion, or on a reactive system (for example MS polymer or polyurethane). However, this does not exclude adhesives based on other systems.
The adhesive is not considered to contribute to a constructive load-bearing connection.
On the basis of the tests included in this Assessment Directive, the suitability of the products as an adhesive for the bonding of façade cladding (BRL 4101-7) or as an adhesive for non-load bearing applications (BRL 2339) cannot be demonstrated.

2 Terminology

Open time: the time between the application of the adhesive on one or both substrates and the assembly of the two substrates (definition derived from prEN 923). If both substrates are bonded by applying the adhesive, joining together both substrates, pull loose both substrates and than again bond the substrates together. The open time is starts when both substrates are separated after the first time they are pressed together.

3 Certification procedure

3.1 Start

The applicant of the product certificate states whether he supplies construction adhesives according to the specifications stated in chapter 4. The applicant supplies the data that are necessary for the drafting of the ‘technical specification’.
He indicates which statements have to be included in the quality declaration and supplies the evidence for these statements.

3.2 Initial inspection

The certification body assesses whether the statements to be included in the product certificate comply with the provisions of chapter 4. A report of the initial inspection is prepared, on the basis of which the KOMO® product certificate will be issued, with or without certain requirements.

3.3 Assessment of the applicant's quality system

The certification body investigates whether the applicant's quality system is consistent with chapter 6.

3.4 Issuing of the product certificate

The product certificate shall be issued in accordance with the model determined by the Building Harmonisation Committee, when in accordance with the general regulations of the certification body, the initial inspection (section 3.2) and the assessment of the quality system of the applicant (section 3.3) are concluded positively.

3.5 External quality management

Once the product certificate has been issued, the checks as described in chapter 7 are conducted by the certification body.

4 Product requirements

In order to qualify for certification, the sum of the different classes should add up to at least 11.

4.1 Final strength

After complete drying of the adhesive system, a sufficiently strong and durable bond should be realised to hold the substrate. The adhesive system should be able to bear the weight of the bonded substrate as well as other loads such as impact loads and distortion of the substrate.
The average shear strength is determined according to the method as described in 5.1 and is classified as follows:

	Class			
	1	2	3	4
Final strength	> 1.5 N/mm^2	> 2.5 N/mm^2	> 3.5 N/mm^2	> 4.5 N/mm^2

4.2 Initial strength / adhesion under tension

The initial strength should be such that the object remains in place upon mounting, without sagging.
The average shear strength is determined according to the method as described in 5.2 and is classified as follows:

	Class			
	1	2	3	4
Initial bond	> 0.001 N/mm^2	> 0.01 N/mm^2	> 0.03 N/mm^2	> 0.06 N/mm^2

4.3 Elasticity

The adhesive should be sufficiently elastic to absorb any tension or distortion in or between materials.
The elasticity is determined according to the method as described in 5.3 and is classified as follows:

	Class			
	1	2	3	4
Elasticity	> 0 mm	> 0.1 mm	> 0.5 mm	> 1 mm

4.4 Filling capacity

The filling capacity of a construction adhesive is important when two substrates with irregular surfaces are bonded together.
The filling capacity is determined according to the method as described in 5.4 and is classified as follows:

	Class			
	1	2	3	4
Filling capacity	> 0.5 mm	> 1 mm	> 2 mm	> 4 mm

4.5 Moisture resistance

Moisture resistance is important if the product is applied in outdoor areas or wet indoor areas.
The moisture resistance is determined according to the method as described in 5.5 and is classified as follows:

	Class			
	1	2	3	4
Moisture resistance	I: > 0.05 N/mm^2 II: > 0.2 N/mm^2	I: > 0.2 N/mm^2 II: > 0.7 N/mm^2	I: > 0.35 N/mm^2 II: > 1.2 N/mm^2	I: > 0.5 N/mm^2 II: > 1.7 N/mm^2

Note: To be classified according to a particular class, all conditions of that class must be met.

4.6 Temperature resistance

All construction adhesives must meet the same requirements concerning temperature resistance.
The shear strength is determined according to 5.6 and must be at least 1.0 N/mm^2.

4.7 Thixotropy

All construction adhesives must meet the same requirements concerning thixotropy.
In accordance with the maximum sagging allowed is 3 mm.

5 Determination methods

The following test pieces are used for the tests:

To determine the shear strength, two beech wood strips measuring 40 x 100 x 5 mm (w x l x d) are glued together by means of a 'dot' of construction adhesive (see Figure 1). The quantity of construction adhesive applied should be such that, after assembling the two strips, a dot is created with a diameter of (30 ±5) mm. If required, an open time in accordance with the supplier's processing instructions is taken into account. After assembling the beech wood parts, a mass of 7 ±0.1 kg is applied for a certain length of time. This duration depends on the test.

Note: If the supplier of the adhesive requires a different method to be applied, (e.g. the assemble-disassemble-assemble method) this method may be used. Any deviations will be listed in the certificate.

Note: If the supplier's application instructions indicate a minimum and a maximum open time, the average is taken.

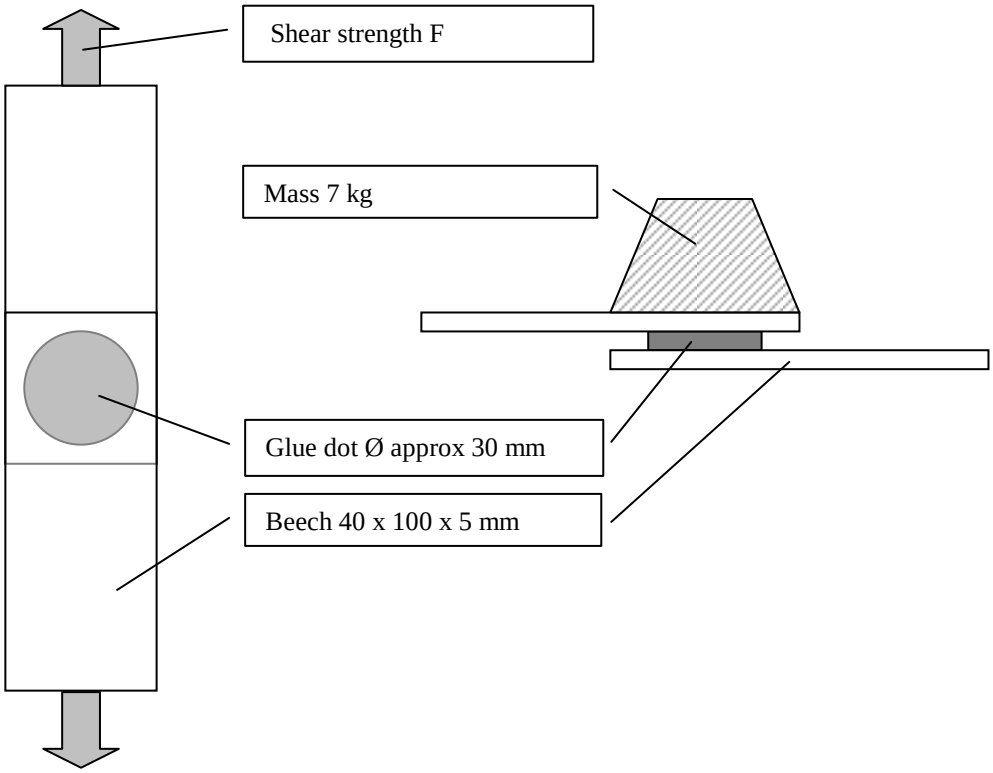

Figure 1

5.1 Final strength

10 samples are made according to the general method, whereby a load time of 10 ±0.5 min is used. After assembly of the test pieces, these are stored for 7 days at (20 ±2) °C and (65 ±5)% RH.
Next, a shear force is applied ; whereby the break takes place after 30(± 10 s.
For each test piece, the diameter of the glue dot is measured in two places and the average taken. The maximum shear strength in N/mm^2 is calculated by:

$$\tau_{\max} = \frac{4F_{\max}}{\pi d_{gem}^2}$$

The following terms are used:

τ_{max}	Maximum shear strength	N/mm^2
F_{max}	Maximum shear force	N
d_{ave}	Average diameter glue dot	mm

The final strength is the average of the 10 measurements.

5.2 Initial strength / adhesion under tension

10 samples are made according to the general method, whereby a load time of 5 ±1 s is used. Next, a shear force is applied; whereby the break takes place after 30 ±10 s.
For each test piece, the diameter of the glue dot is measured in two places and the average taken. The maximum shear strength in N/mm^2 is calculated by:

$$\tau_{\max} = \frac{4F_{\max}}{\pi d_{gem}^2}$$

The following terms are used:

τ_{max}	Maximum shearing tension	N/mm^2
F_{max}	Maximum shear force	N
d_{ave}	Average diameter glue dot	mm

The initial bond is the average of the 10 measurements.

5.3 Elasticity

The elasticity of the adhesive is determined according to the method as described in Appendix 1. The results obtained in the test described in 5.1 are used to calculate the elasticity

5.4 Filling capacity

The samples are made according to the general method whereby on two sides of the glue dot a spacer of 1, 2, 3 or 4 mm is placed. A load time of 10 ±0.5 min is used. For each spacer thickness, 10 test pieces are made. After assembly of the test pieces, these are stored for 7 days at 20 ±2 °C and 65 ±5% RH.
Next, a shear force is applied; whereby the break takes place after (30 ±10) s.
For each test piece, the diameter of the glue dot is measured in two places and the average taken. The maximum shear strength in N/mm^2 is calculated by:

$$\tau_{\max} = \frac{4F_{\max}}{\pi d_{gem}^2}$$

The following terms are used:

τ_{max}	Maximum shear strength	N/mm^2
F_{max}	Maximum shear force	N
d_{ave}	Average diameter glue dot	mm

The thickness whereby the average shear strength (from 10 measurements) of the adhesive is at least 80% of the value from 5.1 represents the filling capacity.

5.5 Moisture resistance

20 samples are made according to the general method, whereby a load time of 10 ±0.5 min is used. After assembly of the test pieces, these are stored for 7 days at 20 ±2 °C and 65 ±5% RH.
Next, the samples are exposed to

Climate I (10 test pieces)	Climate II (10 test pieces)
4 hours immersion in water at 20 ±2 °C	4 hours immersion in water at 20 ±2 °C

	7 days in standard climate of 20 ±2 °C and 65 ±5% RH

Next, the test pieces are loaded for sagging; whereby the break takes place after (30 ±10) s.
For each test piece, the diameter of the glue dot is measured in two places and the average taken. The maximum shear strength in N/mm^2 is calculated by:

$$\tau_{\max} = \frac{4F_{\max}}{\pi d_{gem}^2}$$

The following terms are used:

τ_{max}	Maximum shear strength	N/mm^2
F_{max}	Maximum shear force	N
d_{ave}	Average diameter glue dot	mm

The shear strength is the average of the 10 measurements.

5.6 Temperature resistance

10 samples are made according to the general method, whereby a load time of 10 ±0.5 min is used. After assembly of the test pieces, these are stored for 7 days at 20 ±2 °C and 65 ±5% RH.
Next, the test pieces are placed in an oven at 50 ±2 °C for 1 hour, after which immediately a shear force is applied, whereby the break shall take place after 30 ±10 s.
For each test piece, the diameter of the glue dot is measured in two places and the average taken. The maximum shear strength in N/mm^2 is calculated by:

$$\tau_{\max} = \frac{4F_{\max}}{\pi d_{gem}^2}$$

The following terms are used:

τ_{max}	Maximum shear strength	N/mm^2
F_{max}	Maximum shear force	N
d_{ave}	Average diameter glue dot	mm

The shear strength is the average of the 10 measurements.

5.7 Thixotropy

One strip of adhesive is placed horizontally, and one vertically, on a vertically placed, smooth surface. Both strips are triangular and have a basis of 10 mm and a height of 8 mm. The length of the strip is at least 100 mm. After 1 hour, the adhesive beads are assessed for sagging.

6 Requirements regarding the company's quality system

6.1 Internal quality assurance of the producer

6.1.1 General

6.1.1.1 Responsibility

The responsibility for the manufacturing process of the product and the internal quality control lies with the producer.

6.1.1.2 Reporting changes

Any changes in the quality system, such as changes in procedures, the internal quality control plan, production methods, etc, shall be reported in advance to the certification body in writing.

6.1.1.3 Internal quality control

The procedures for inspection, testing and registration within the scope of the quality system shall be laid down in an Internal Quality Control plan. This IQC plan shall satisfy the requirements contained in section 6.1.5.

6.1.2 Management responsibilities

6.1.2.1 General
The management is responsible for the entire quality policy. It may delegate the responsibility for maintaining the IQC plan to an employee, who may also have other duties in the company.

6.1.2.2 Organisation
An organisation chart (a diagram of the organisation), of which the certification body must have a copy, must record the current situation within the company. The organisation chart must show who is responsible for what. In the event of any change in the situation, the organisation chart must be adapted and the certification body must be provided with a copy.

6.1.2.3 Assessment of the quality system
The management assesses the quality system on the basis of inspection forms and makes adjustments to procedures, if necessary (see section 6.1.5). If requested by the certification body, the inspection forms must be available.

6.1.3 Testing and inspection

6.1.3.1 Quality system
The quality system for the production process shall be laid down in written procedures.

6.1.3.2 Registration
Records must be kept of the inspections and tests described in the IQC plan.

6.1.3.3 Calibration
Inspection aids and testing equipment shall be calibrated regularly. Records must be kept of this.

6.1.3.4 Non-conformities in products
Products or parts of products not meeting the requirements during the production process shall be clearly marked and set aside. If necessary, corrective measures shall be taken.

6.1.3.5 Supplies
Raw materials, semi-manufactured products, etc that are subject to certification regulations shall satisfy the relevant assessment directive. The goods received must be inspected according to the IQC plan.

6.1.3.6 Laboratory
The certificate holder shall dispose of a separate room and over the prescribed measuring and testing equipment in order to be able to carry out the laboratory activities. If an external laboratory is used, it must be approved by the certification body.

The producer of ‘construction adhesives’ must have the following equipment:
- thermostatic bath (or other means for conditioning samples)
- viscosity meter
- pH meter
- drying oven
- scale and balance
- tensile testing machine
- press
- stopwatch
- thermometers, including a calibrated thermometer.

6.1.3.7 Internal control

In addition to the inspections and tests of the products supplied, the production process and the finished product, it is necessary to demonstrate that all the required inspections have been carried out.
The producer shall keep a suitable and accessible register of the inspections and tests carried out, which shall be kept up-to-date, so that it can be used to show that the specified requirements have been fulfilled. Where necessary, statistical techniques must be applied to the results of the inspections and tests. The equipment referred to in section 6.1.3.6 shall be available at the laboratory.
Moreover, the certificate holder shall have properly functioning production equipment to enable the products to be manufactured in accordance with this Assessment Directive.

6.1.3.8 External control

The producer shall cooperate with the certification body in respect of the control activities by allowing access to the factory and, when requested, to inspect all relevant documents.

6.1.4 Handling of complaints

The producer (holder of the product certificate) must demonstrably maintain a sound registration of complaints and how these are handled with regard to the construction adhesives to which the product certificate relates and their application. For each complaint, it shall be indicated how this complaint has been analysed and dealt with.

6.1.5 Internal quality control

The producer must maintain an internal quality control system. At least the following aspects and procedures must be included and laid down in writing:

- raw materials inspection upon arrival
- workplace instructions
- inspection of the end product
- inspection of the measuring equipment
- complaint registration.

6.1.6 Certification mark

The construction adhesive supplied under the product certificate is to be clearly provided with the following information:

- the KOMO® brand by means of text or logo
- the number of the product certificate
- batch number
- final processing date or production date and maximum storage life.

Also, the producer shall ensure that the user of the construction adhesive has access to the processing instructions. These instructions shall at least contain the following information:

- processing method
- materials to be glued
- minimum and maximum open times
- minimum and maximum processing temperatures
- maximum storage life.

7 Requirements regarding external quality control

The certification body conducts inspections, if possible unannounced, 2 times a year to check whether the products comply with the technical specifications, whether the production is in accordance with the specifications laid down by the producer and agreed on with the certification body and whether the producer's internal quality control system meets the requirements laid down in section 6.1. A written report is prepared of these checks. If necessary, on advice of the Board of Experts, the above-mentioned control frequency can be adjusted on the basis of well-founded arguments.

7.1 Qualification requirements of certification staff

Position	Training	Knowledge and experience
Auditor	Senior secondary vocational education level ('MBO' level)	Production and application of construction adhesive

Assessor	Higher professional education level (‘HBO’ level)	Production and application of construction adhesive
Decision maker	Higher professional education level (‘HBO’ level)	Management Certification Accreditation

8 List of documents referred to

BRL 2339 Adhesives for non-load bearing applications
BRL 4101-7 Adhesive for the mounting of façade cladding
prEN 923: 2005 Adhesives – Terms and definitions

For the correct dates of the BRLs concerned, please consult the SBK website.

Appendix 1 – Method to determine the elastic part of the stretch

The stretch tests are based on the following measurements: the stretch (ε in mm) and the tension (σ in N/mm^2).

It is not possible to take measurements immediately at the origin of the stretch-tension diagram. To avoid faults at the beginning of the test (for example as a result of settings), the data from 1 mm of stretch are used for the calculations (this is point A in Figure 1). The correlation coefficient r^2 is now calculated from this point up to stretch x, whereby x > 1 mm at all times. As x increases, this r^2, which was initially close to 1, will decrease as a result of the curving line. The final point that is considered to be on the straight part of the line, is the point whereby $r^2 > 0.9985$. This point (indicated by the B in Figure 1) serves as the basis for the calculation of the average σ/ε (this ratio between tension and stretch indicates the direction coefficient of the straight part of the curving line). Next, all measuring points between points A and B are used in a linear regression to determine the parameters a and b in the following equation: $\sigma = a*\varepsilon + b$. For all measured values between A and B, the 'σ/ε corrected' is calculated by: (σ - b) / ε (so that the linear part passes through the origin). The average of these values equals a; the standard deviation is calculated separately (std). It can now be stated with 95% reliability that the first point past A (ε = 1 mm), where the following applies: (σ - b) / ε < (a – 2 * std), is the point where the stretch is no longer purely elastic. This is point C in Figure 1.

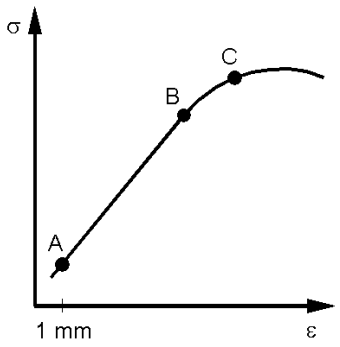

Figure 2

Appendix 2 – Specimen KOMO® Product Certificate

Room for CB logo
Logo of the authorised accreditation body

KOMO® Product Certificate

Semi-manufacture

Name CB
Address
Business location
Telephone
(Fax)
(E-mail)

Construction adhesive

Number:
Issued:
Valid until:
Replaces:

Producer	**Production location**
Name	Name
Address	Address
Business location	Business location
Telephone	
(Fax)	
(E-mail)	

Declaration by (CB name)
This product certificate is based on BRL 3107 'Construction adhesive', issued by (name CB), in accordance with the (name CB) Regulations for Product Certification: (year).

(Name CB) declares that there is a legitimate confidence that the construction adhesives manufactured by the producer continuously comply with the technical specification(s) laid down in this product certificate, provided that the construction adhesives are marked with the KOMO® brand (see below) in a manner as indicated in this product certificate.

For the recognition by the Minister of Housing, Spatial Planning and the Environment ('VROM') reference is made to the 'Overview of Recognised Quality Declarations in the building industry' as listed on the website of Stichting Bouwkwaliteit (SBK) www.bouwkwaliteit.nl

On behalf of (name CB) ..... Director

Users of this product certificate are advised to inquire at (name CB) whether this document is still valid.

This product certificate comprises 2 pages.

® is a collective mark of SBK

The following were assessed:
Product Quality System
Periodic inspection

KOMO® Product Certificate

Sheet Number: 2 of 2
Issued:

Construction adhesive

1. Product specification

The certified construction adhesives are intended to quickly and easily, if required invisibly, bond various materials to wooden, concrete, stone, metal, plastic or other surfaces. The bond is achieved without the use of presses or clamps. The adhesive is not considered to contribute to a constructive load-bearing connection.

1.1. Technical specification

The table below gives a summary of the classifications according to BRL 3107

	Description construction adhesive
Final strength	Class:
Initial bond / adhesion under tension	Class:
Elasticity	Class:
Filling capacity	Class:
Moisture resistance	Class:

1.2 Branding

The packaging of the construction adhesives are to be provided with:
- the number of the product certificate: (no.)
- the KOMO® logo
- a batch number
- the final processing date or the production date.

In addition, the product information should at least comprise the following information:
- the toxicity indicator
- the processing instructions.

2. Tips for the user

Upon delivery, make sure to check that:
- what has been delivered corresponds with what has been agreed;
- the identification and method of identification are correct;
- the product information sheets have been received;
- the products do not show any visible defects as a result of transport, etc.

In the event that on account of the above it should be decided to reject the products, the following organisation(s) should be contacted:

«Bedrijf»

and if necessary:
the certification body (name CB)
(address CB)
(telephone CB).

The approved products are to be stored in a frost-free place.

The person processing the product is to check whether the construction adhesive is suitable for the intended application. Among other things, he/she shall take into account:
- the materials to be glued;
- the requirements regarding processing;
- the requirements regarding the application.

The producer is required to ensure that the purchaser has a copy of the complete product certificate and the product information at his disposal at the workplace.

Make sure to check that this product certificate is still valid.

Amendment sheet dated 12/06/2007
part of
BRL 3107 dated 08/08/2005
'Assessment Directive (BRL) for the KOMO® product certificate for "Contact Adhesives"'
Adopted by the Building Harmonisation Committee of SBK dated 27/06/2007

Replace Section 7 by:

7. Requirements regarding external quality control

The certification body conducts inspections, if possible unannounced, 2 times a year to check whether the production is in accordance with the specifications laid down by the producer and agreed on with the certification body and whether the producer's internal quality control system meets the requirements laid down in section 6.1. A written report is prepared of these checks. If necessary, on advice of the Board of Experts, the above-mentioned control frequency can be adjusted on the basis of well-founded arguments.