KVH® structural timber by Stora Enso

Duobalken®

Triobalken®

rethink.

storaenso

Stora Enso
Doing good for people and our planet

Stora Enso is a leading provider of renewable solutions in paper, packaging, biomaterials and wooden constructions on global markets. Our aim is to replace fossil-based materials by innovating and developing new products and services based on wood and other renewable materials. In 2015, the company recorded sales of €10 billion and employed some 26,000 staff in over 35 countries. Stora Enso shares are listed on the Helsinki and Stockholm stock exchanges.

Stora Enso's Wood Products division provides versatile wood-based solutions for building and housing. Our product range covers all areas of urban construction including solid-wood elements, housing modules, pellets and wood components. Our portfolio is rounded off by a range of sawn timber products. Our customers are mainly construction and joinery companies, wholesalers and retailers. The Wood Products division operates globally and has more than 20 production units in Europe.

Rethink is our company philosophy. It encourages us to think differently about the way we live our lives and inspires us to find ways to improve our world with renewable solutions.

Our core values — remain at the forefront of innovation and conduct business ethically — underpin everything we do. These values must always comply with local laws and regulations and at the same time should help us have a positive impact on people and their communities beyond the local level.

Our company vision — doing good for people and their planet — expresses our ultimate goal. All our endeavours are guided by a well thought-out and responsible strategy. We strive to improve this world, its communities and the lives of everyone that comes into contact with us through our products, activities and services.

Photo: Regnauer Hausbau

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Structural timber:
The solution for sophisticated modern structures

The safest and easiest way to be certain that you are using the right timber for modern timber structures is to use KVH® structural timber.

In collaboration with the Association of German Carpenters (Bund Deutscher Zimmermeister – BDZ) in the Central Association of the German Building Trade (Zentralverband des Deutschen Baugewerbes e. V.), the Supervisory Board for Structural Timber (Überwachungsgemeinschaft Konstruktionsvollholz e. V.) has drafted requirements and defined these in an agreement to form the basis for production and supply.

Therefore, KVH® structural timber complies with additional requirements which exceed the general building inspectorate guidelines.

KVH® structural timber is a technically-dried, strength-graded and generally finger-jointed solid wood product made from softwood (mainly spruce) and designed for a wide variety of applications in modern timber construction. Alternative types of softwood are also available for special uses, such as for thresholds or for outdoor areas not directly exposed to the elements.

Precisely-defined product characteristics, requests for filigree supporting frameworks and attractive surfaces coupled with fast delivery times to the site of use are further good reasons to use KVH® structural timber.

Highlights

- Meets increased demands in comparison to normal solid wood.
- Attractive solid wood appearance with different surfaces.
- Finger-jointing enables lengths of up to 16.00 m to be produced.
- Preferred dimensions are held in stock and are therefore available quickly.
- Customised production is possible at short notice, e.g. “custom order KVH® structural timber”.
- Superior dimensional stability thanks to the technical drying process.
- Free from contents that pose a risk to health.

Overview of product features

KVH® structural timber by Stora Enso is a quality-controlled product with clearly defined characteristics that satisfy the requirements of DIN EN 15497:2014 (for finger-jointed solid wood) and DIN EN 14081-1 (for non-finger-jointed solid wood).

Depending on the intended use, we manufacture two ranges which essentially differ only in terms of their visual appearance:

- **KVH®-Si for visible areas**
- **KVH®-NSi for non-visible structures**

During the grading process — a crucial requirement for ensuring the appropriate use of KVH® structural timber in construction — the timber is subject to quality criteria which significantly exceed those stipulated for customary sawn structural timber: The timber is graded according to EN 14081 and DIN 4074-1 and is monitored externally.

In addition to the requirements set by these standards, the following grading criteria are also met:

- **defined wood moisture content**
- **type of cut (free of heart)**
- **dimensional stability of the cross-sections**
- **surface properties**

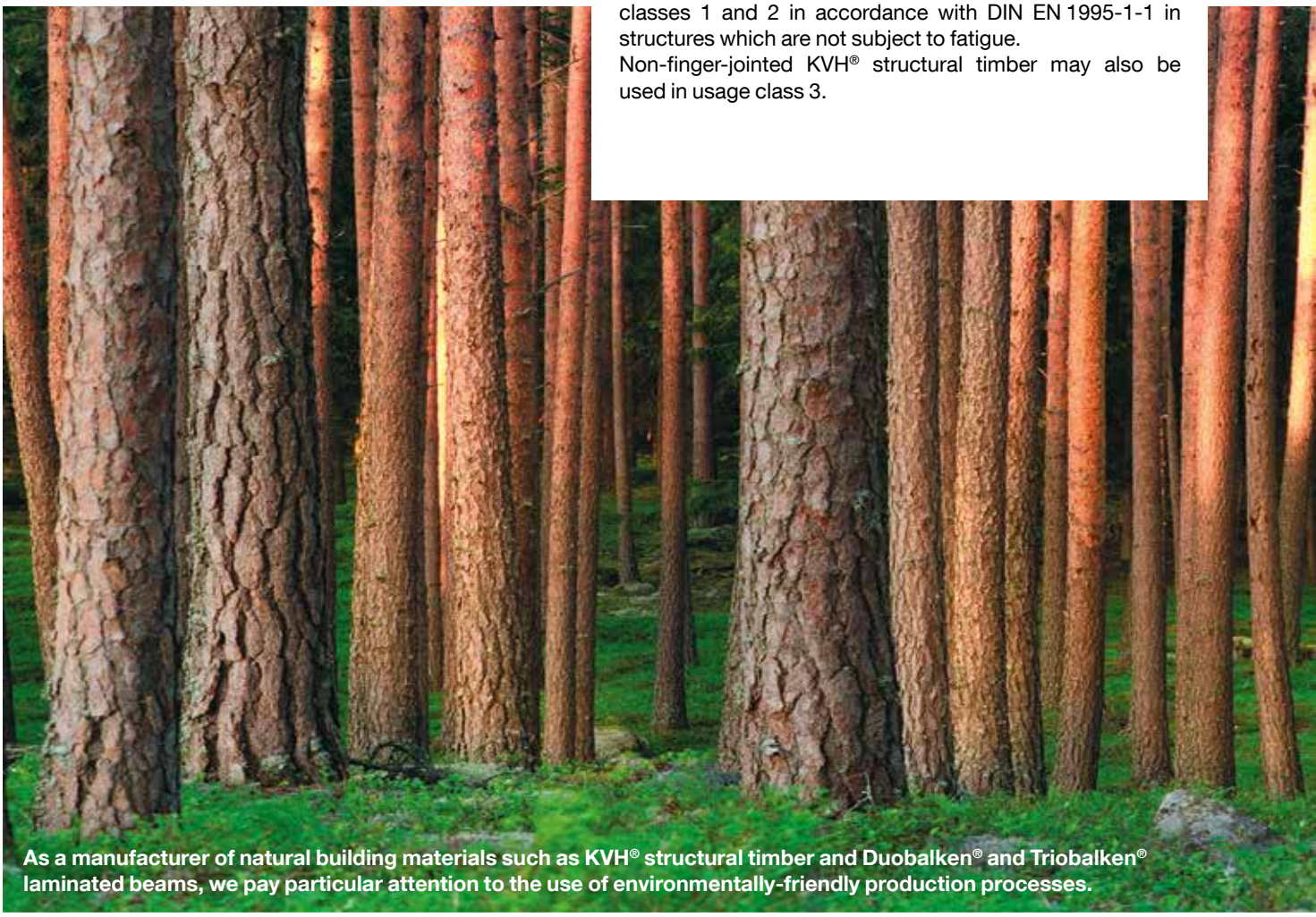
All grading characteristics and conditions can be found in the "KVH® structural timber by Stora Enso — Quality Criteria" table below.

Dimensional stability through the technical drying process
To minimise the deformation of timber and the associated adverse effects on structures caused by shrinking and swelling, an average wood moisture content of 15% ± 3% has been set for KVH® structural timber. At Stora Enso, this value is precisely set by a technical drying process in computer-controlled drying kilns, and each individual piece of timber is checked prior to processing.

Variable lengths achieved through finger-jointing
Finger-jointing enables lengths of up to 16.00 m of timber to be produced. The process involves bonding together individual sections without this affecting the strength value of the whole component.

Adhesives used
KVH® structural timber by Stora Enso is also outstandingly environmentally-friendly. It is bonded using formaldehyde-free adhesives, making it an extremely environmentally-friendly and safe product.

KVH® structural timber area of application
Finger-jointed KVH® structural timber may be used in usage classes 1 and 2 in accordance with DIN EN 1995-1-1 in structures which are not subject to fatigue.
Non-finger-jointed KVH® structural timber may also be used in usage class 3.



As a manufacturer of natural building materials such as KVH® structural timber and Duobalken® and Triobalken® laminated beams, we pay particular attention to the use of environmentally-friendly production processes.

Standard dimensions

KVH® structural timber is produced in standard cross-sections to cover virtually all the requirements of modern timber construction.

The advantages of standardisation for trade and the wood processing industry speak for themselves:

- produced as stock
- short delivery times
- economic planning and construction

Our Pfarrkirchen plant is also optimised for maximum flexibility. Custom orders from customers can be produced quickly and accurately, and are also trimmed.

For this purpose, the end of every piece of timber can be labelled, showing the component number(s), cross-section, length and other details.

Trimming is performed on standard industry machines. Therefore, you can send your data to us electronically.

Whether you require a standard, trimmed or custom order, you decide which of the available versions is best suited to your purposes.

Our current warehouse information is available upon request. Further dimensions can be provided upon request or are available as Duobalken® and Triobalken® laminated beams.

The maximum weight per package is 3 tons.

Standard dimensions for KVH® structural timber in NSi and Si quality

Standard length: 5.00 m and 13.00 m (up to 16.00 m is possible)

Species of wood: spruce

order-based manufacturing

goods held in stock

Width (mm)	Height (mm)											
	60	80	100	120	140	160	180	200	220	240	260	280
40	[1]	[2]	[2]		[2]		[2]					
piece/package	180	130	110	90	80	70	60	50	50	40		
50		[3]					[3]		[3]			
piece/package		104	88	54	64	56	48	40	40	32		
60	[1]											
piece/package	126	91	77	63	56	49	42	35	35	28	28	28
80												
piece/package		65	55	45	40	35	30	25	25	20	20	20
100												
piece/package			44	36	32	28	24	20	20	16	16	16
120												
piece/package				27	24	21	18	15	15	12	12	12
140												
piece/package					24	21	18	15	15	12		

[1] Dimensions 40 × 60 mm and 60 × 60 mm are only available in the standard length of 5.00 m and are not S10TS/C24-graded.
[2] Dimensions 40 × 80/100/140/180 mm only possible with calculated measurement 43 mm.
[3] Dimensions 50 × 80/180/220 mm only possible with calculated measurement 53 mm.
Additional dimensions are technically possible but only upon request; visible quality (Si) possible in preferred dimensions.

Custom order KVH® structural timber

The wide range of standard dimensions with widths starting from 60 mm and heights of up to 280 mm satisfy the majority of general requirements for KVH® structural timber. Standardised lengths of 13.00 m ensure comprehensive availability at short notice while allowing customised use of goods held in stock for any cut length. In addition, it can be beneficial and more economical for certain areas of application to use custom order KVH® structural timber. In this case, the lengths can be produced quickly and accurately and trimmed and packaged (with right alignment) according to customer requirements. This eliminates the need for order-picking or repackaging in carpentry shops or interim storage facilities, as the timber required for a specific project is directly available without loss of length or loss of time.

Individual pieces of timber are optimised in terms of length and, if required, joined together in multiple lengths, whereby the possible lengths of individual pieces of timber range between 3.00 and 16.00 m. Detailed information about package content and, where applicable, the multiple lengths of joined individual beams is printed on labels on the front of the piece, and also on packaging label.

A range of available special dimensions and intermediate dimensions, tried and tested production processes, individual delivery cycles (i.e. specified with the customer) and the diverse assortment of KVH® structural timber leave little to be desired.

Ranges of KVH® structural timber by Stora Enso

- **KVH® standard:**
  Package consisting of one cross-section and one grade in a defined packaging unit.

- **KVH® structural timber system lengths:**
  Package with one system length of for example 7.00 m, 7.50 m, 8.00 m, 8.50 m or 9.00 m, with a uniform dimension and quality (NSi, Si).

- **Custom order KVH® structural timber:**
  Optimised list of different cross-sections available in multiple lengths.

  Produced according to DIN EN 15497:2014 (finger-jointed solid wood) and EN 14081-1 (non-finger-jointed solid wood)

Custom order package with labels on the front of each piece

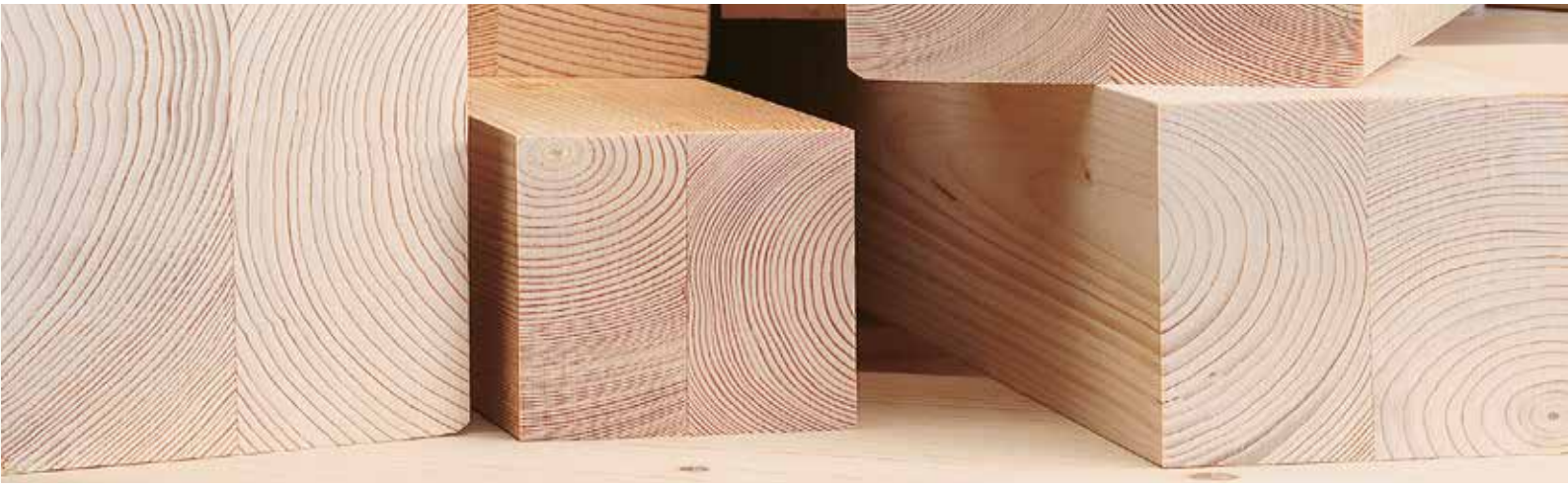
Packaging label with detailed information

KVH® structural timber by Stora Enso
Quality criteria

Requirements to be met by KVH® structural timber in accordance with the inspection regulations and the agreement between the Association of German Carpenters (Bund Deutscher Zimmermeister – BDZ) and the Supervisory Board for Structural Timber (Überwachungsgemeinschaft Konstruktionsvollholz e. V.).

Grading criterion	Requirement to be met by KVH®-Si	Requirement to be met by KVH®-NSi	Comments
Technical standard	DIN EN 15497:2014 DIN EN 14081:-1	DIN EN 15497:2014 DIN EN 14081:-1	Finger-jointed solid wood Non-finger-jointed solid wood
Strength class according to DIN EN 338	At least C24	At least C24	The strength, rigidity and bulk density properties decisive for the load-bearing capacity are derived for dimensioning purposes according to Eurocode 5 from DIN EN 338, table 1 and DIN EN 1995-1-1/NA
Grading standard for visual grading	DIN 4074-1	DIN 4074-1	The elastomechanical properties according to DIN EN 338 can be found in the table on page 13.
Wood moisture content	15% ± 3% Technically dried: timber which is dried in a suitable, process-controlled plant at a temperature of T ≥ 55°C for at least 48 hours to a wood moisture content of u ≤ 20%.	15% ± 3%	The specified wood moisture content is a prerequisite for dispensing, for the most part, with preservative treatments, and can also be the precondition for finger-joint assembly.
Type of cut	The cut is made taking into account the fact that on an ideally formed log, the pith is cut through with two-strand cutting.		
Wane in accordance with DIN 4074-1	Not permitted	≤ 10% of the smaller cross-section side	
Dimensional stability of the cross-section	DIN EN 336 Dimensional stability class 2: w ≤ 100 mm: ±1.0 mm w > 100 mm: ±1.5 mm	DIN EN 336 Dimensional stability class 2: w ≤ 100 mm: ±1.0 mm w > 100 mm: ±1.5 mm	The dimensional stability for the longitudinal dimensions must be agreed between the customer and supplier.
Knot condition	Loose knots and dead knots are not permitted. Occasional faulty knots or parts of knots up to max. 20 mm in diameter are permitted.	DIN 4074-1 Grading class S10	Replacement with natural wood dowels is permitted.
Knot diameter ratio	S10: A ≤ ⅔ Not exceeding 70 mm	S10: A ≤ ⅔ Not exceeding 70 mm	Knot diameter ratio A is determined in accordance with DIN 4074-1. The following applies to mechanical grading: • Knot sizes are not taken into consideration for KVH®-NSi. • For KVH®-Si, A ≤ ⅔ applies.
Ingrown bark	Not permitted	DIN 4074-1	

Grading criterion	Requirement to be met by KVH®-Si	Requirement to be met by KVH®-NSi	Comments
Cracks, radial shrinkage cracks (dry cracks)	Width of the crack w ≤ 3 % of the respective cross-section width	DIN 4074-1	For Si, the requirements are stricter than those applicable to grading class S10 in accordance with DIN 4074-1.
Resin pockets	Width w ≤ 5 mm	—	Additional criterion
Discolourations	Not permitted	DIN 4074-1	For Si, the requirements are stricter than those applicable to grading class S10 in accordance with DIN 4074-1.
Insect damage	Not permitted	DIN 4074-1	For Si, the requirements are stricter than those applicable to grading class S10 in accordance with DIN 4074-1.
Twisting	DIN 4074-1	DIN 4074-1	The permissible extent of twisting is not specified in further detail as no unacceptable twisting should be expected if all the other criteria are complied with.
Longitudinal warping	For free of heart cutting: ≤ 8 mm/2 m For heart-free cutting: ≤ 4 mm/2 m	For free of heart cutting: ≤ 8 mm/2 m	In comparison: According to DIN 4074-1 S10: ≤ 8 mm/2 m
Finishing of the ends	Trimmed perpendicular	Trimmed perpendicular	
Surface properties	Planed and chamfered	Levelled and chamfered	
Packaging	Packages wrapped over four sides in green film; upon request Si-quality individual beams can be wrapped in (black) film	Packages wrapped over four sides in green film	Additional feature for KVH® by Stora Enso
Marking	All qualities are marked once on the narrow face (ink jet printer).		Additional feature for KVH® by Stora Enso
Certificates	All Stora Enso certificates can be sent to you on request.		



Duobalken® and Triobalken® laminated beams and glued laminated timber by Stora Enso

Glued laminated timber is particularly suitable for average-sized solid wood cross-sections (beam dimensions of less than 30 cm) where there are strict requirements for a natural solid wood appearance without noticeable joints of numerous individual lamellas.

This involves gluing together at least two, and at most five, individual cross-sections — generally produced according to DIN EN 14080:2013 — by their face sides with the grain running parallel. Part of the possible variety of sizes and special cross-sections can also be produced in accordance with the general building inspectorate approval Z-9.1-440. Where there are two lamellas, this is referred to as Duobalken® laminated beams, and where there are three lamellas, this is referred to as Triobalken® laminated beams.

By finger-jointing the glued laminated timber, lengths of up to 16.00 m can be produced. Finally, the form stability and targeted low wood moisture content make the product particularly suitable for exposed ceiling beams and rafters or purlin roofs, including in visible areas. Hardly any difference is noticeable when combined with KVH® structural timber as the visual appearance and aesthetic qualities of the products are very similar.

Highlights

- For dimensionally stable timber construction
- Excellent value for money
- Greater rigidity compared to solid wood with the same strength class
- Attractive appearance
- Use in visual and non-visual areas

Overview of product features

It is possible to glue together up to five similar-sized individual cross-sections with the same strength class and a maximum thickness of 80 or 85 mm to form Duobalken® and Triobalken® laminated beams or glued laminated timber with dimensions of max. 240 × 280 mm (according to Z-9.1-440) or 280 × 280 mm (according to DIN EN 14080:2013). Further dimensions are possible in accordance with the general building inspectorate approval Z-9.1-440.

A standard length of 13.00 m ensures logistical manageability and can be cut to size on site in line with the customer's needs. System and special lengths cover the majority of intermediate lengths and are individually machined. Preferred cross-sections also ensure quick availability.

Technical standards
The minimum requirements according to DIN EN 14080:2013 generally apply to the production of glued laminated timber. For Duobalken® and Triobalken® laminated beams which are not regulated by DIN EN 14080:2013, the general building inspectorate approval Z-9.1-440 continues to apply with corresponding references to standards.

Particularly with regard to minimizing cracking and deformations from shrinkage caused by drying, stricter requirements regarding limiting the wood moisture content, dimensional stability and appearance also apply. These points are specified in the agreement between the Supervisory Board for KVH® structural timber and the Association of German Carpenters (Bund Deutscher Zimmermeister – BDZ) for Duobalken® and Triobalken® laminated beams. They also apply accordingly to all glued laminated timber cross-sections.

Dimensional stability through the technical drying process
To minimise the deformation of timber and the associated adverse effects on structures caused by shrinking or swelling, an average timber moisture content of 12% ± 2% has been set for Duobalken® and Triobalken® laminated beams and glued laminated timber. At Stora Enso, this value is precisely set by a technical drying process in computer-controlled drying kilns, and each individual piece of timber is checked prior to processing.

Adhesives used
Duobalken® and Triobalken® laminated beams and glued laminated timber are glued with melamine adhesives, making them extremely environmentally-friendly and safe products.

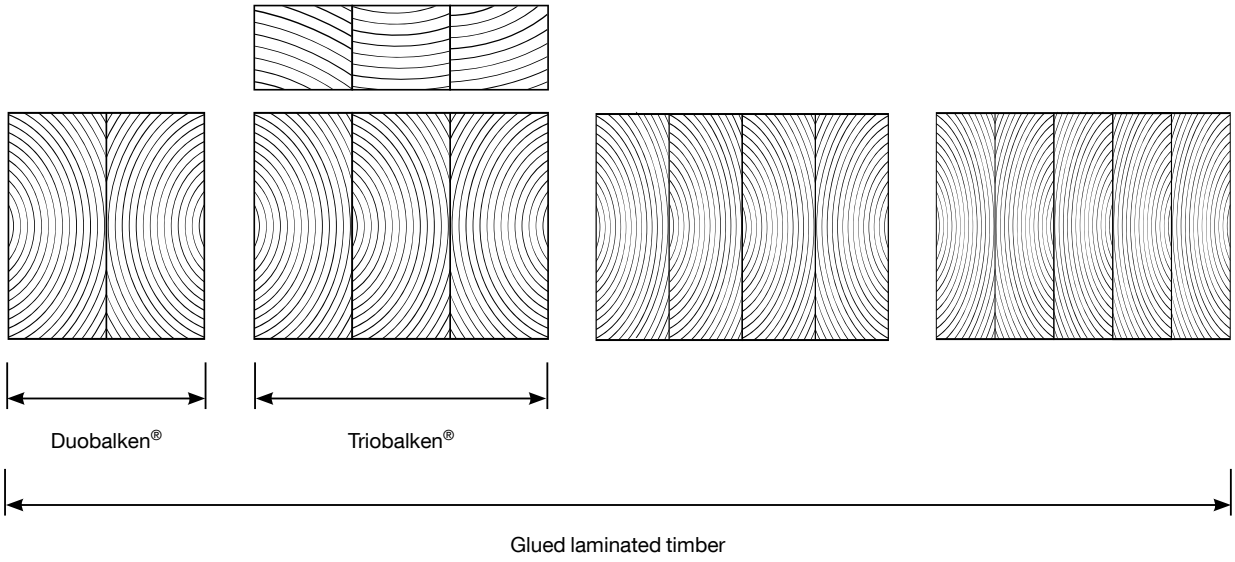
Surface qualities
Duobalken® and Triobalken® laminated beams and glued laminated timber are planed and chamfered on four sides as standard. Beams used in visible areas are specially selected during evaluation of the raw materials and during production. If necessary, any small faults are reworked. Thus, two different surface quality classes are available: non-visible (NSi) and visible (Si). More information can be found in the following table which lists the corresponding quality criteria.

No chemical wood preservation required
Thanks to the technical drying process during production and given the continuously low wood moisture content, taking prevailing construction conditions into account, there is no danger of Duobalken® and Triobalken® laminated beams or glued laminated timber being infested by wood-destroying mould or insects, and chemical wood preservation is not necessary.

Should the structure require the use of chemical wood preservation, approved impregnation agents are available.

Areas of application
National rules concerning the use of glued laminated timber (e.g. DIN 20000-3 for Germany) must be observed. In addition, finger-jointed Duobalken® and Triobalken® laminated beams and glued laminated timber are limited to usage classes 1 and 2 in accordance with EN 1995-1-1. Thus, attention must be paid to an average wood moisture content of max. 20% in the assembled state (moisture content in the building material at a temperature of 20°C and relative humidity of the ambient air may only exceed 85% for a few weeks per year).

Production and applicability are subject to national regulations which may deviate from one another. For this reason, Duobalken® and Triobalken® laminated beams and glued laminated timber are currently produced as shown below. To standardise the applicability and availability within this possible variety of sizes, the next pages provide a list of standard cross-sections which are either held in stock or order-based.



Number of lamellas	2	3	4	5
in accordance with approval Z-9.1-440	Duobalken®	Triobalken®	not possible	not possible
max. overall dimension	160 × 280 mm	240 × 280 mm or 100 × 360 mm	–	–
max. lamella dimension	80 × 280 mm	80 × 280 mm or 100 × 120 mm	–	–

in accordance with DIN EN 14080:2013	Glued laminated timber			
max. overall dimension	170 × 280 mm	255 × 280 mm	280 × 280 mm	280 × 280 mm
max. lamella dimension	85 × 280 mm	85 × 280 mm	70 × 280 mm	56 × 280 mm

Pieces of timber which are multiple-bonded in accordance with EN 14080:2013 with lamella thicknesses of ≤ 45 mm are referred to as glued laminated timber.

Standard dimensions

Duobalken® and Triobalken® laminated beams and glued laminated timber are produced in standard cross-sections and can be used, in particular, to construct structures with cross-sections exceeding the usual KVH structural timber cross-section range.

The advantages of standardisation for trade and the wood processing industry speak for themselves:

- **Produced as stock**
  For packaged deliveries and preferred series for precise delivery (individual beams)
- **Short delivery times**
- **Economic planning and construction**

It is possible to call-off finished products held in stock at the Stora Enso Ždírec plant. In addition, fixed lengths of individual beams can also be ordered from a preferred series of cross-sections.

Upon request, we will be delighted to send you information on our current stocks. Other dimensions are available upon request.

Order-based standard dimensions for Duobalken® and Triobalken® laminated beams in NSi und Si quality

Standard length: 13.00 m (up to 16.00 m possible)

Species of wood: spruce

Order-based manufacture of: NSi (non-visible) NSi (non-visible) and Si (visible quality)

Width (mm)	Height (mm)								
	80	100	120	140	160	180	200	220	240
60									
piece/package	91	77	63	56	49	42	35	35	28
80									
piece/package	65	55	45	40	35	30	25	25	20
100			[1]						
piece/package		44	36	32	28	24	20	20	16
120									
piece/package			27		21	18	15	15	12
140						[2]			
piece/package				24	21	18	15		12
160									
piece/package					14		10		8
180									
piece/package						12	10	10	8
200									
piece/package							10		
240									
piece/package							8		4

[1] Only possible with calculated measurement 100 × 140 mm.
[2] Only possible with calculated measurement 140 × 200 mm.

Visible quality (Si): high-quality product for optically demanding areas such as visible ceiling beams, rafters and log house beams.

Standard dimensions held in stock for Duobalken® and Triobalken® laminated beams in NSi und Si quality

Standard length: 13.00 m (up to 16.00 m possible)

Species of wood: spruce

Goods held in stock: goods held in stock (NSi or Si)

Width (mm)	Height (mm)						
	100	120	140	160	180	200	240
100							
piece/package	44	36	32	28		20	16
120							
piece/package		27		21	18	15	12
140							
piece/package			24		18	15	12
160							
piece/package				14		10	8
180							
piece/package					12	10	8
200							
piece/package						10	8

Species of wood, strength values and mathematical values of structural-physical properties

Technical characteristics	KVH® structural timber	Duobalken® and Triobalken®
Species of wood [1]	**Spruce** [1] / fir, pine, larch	
Strength classes according to DIN EN 338, definitive values according to DIN EN 14080:2013 or the general building inspectorate approval Z-9.1-440	at least C24 or C24M [2]	
Mean value of modulus of elasticity parallel to the grain	$E_{o,mean}$ 11,000 N/mm²	11,000 N/mm² (11,600 N/mm²) [3]
Wood moisture content u_m	15% ± 3%	≤ 15%
Swelling and shrinkage ratio	0.24% per 1% change in wood moisture content	
Building material class in accordance with DIN 13501-1	D-s2, d0	
Thermal conductivity calculation value λ	0.13 W/(mK)	
Water vapour diffusion resistance factor μ	40	

[1] Species of wood which are not printed in bold are available on request but have longer delivery times; other softwood types are permitted, but not generally used.

[2] M = machine graded.

[3] The value in brackets applies to glued laminated timber according to approval Z-9.1-440.

DIN 18334 “German construction contract procedures (VOB), Part C: General technical specifications in construction contracts (ATV) — Carpentry and timber construction works” stipulates a maximum wood moisture content of 18% for timber frame houses. Duobalken®and Triobalken® laminated beams and glued laminated timber satisfy this requirement without any problems.

Duobalken® and Triobalken® laminated beams by Stora Enso

Standard:
Package consisting of one cross-section and one grade in a defined packaging unit.

System lengths:
Package with one system length of for example 7.00 m, 7.50 m, 8.00 m, 8.50 m or 9.00 m, with a uniform dimension and quality (NSi, Si).

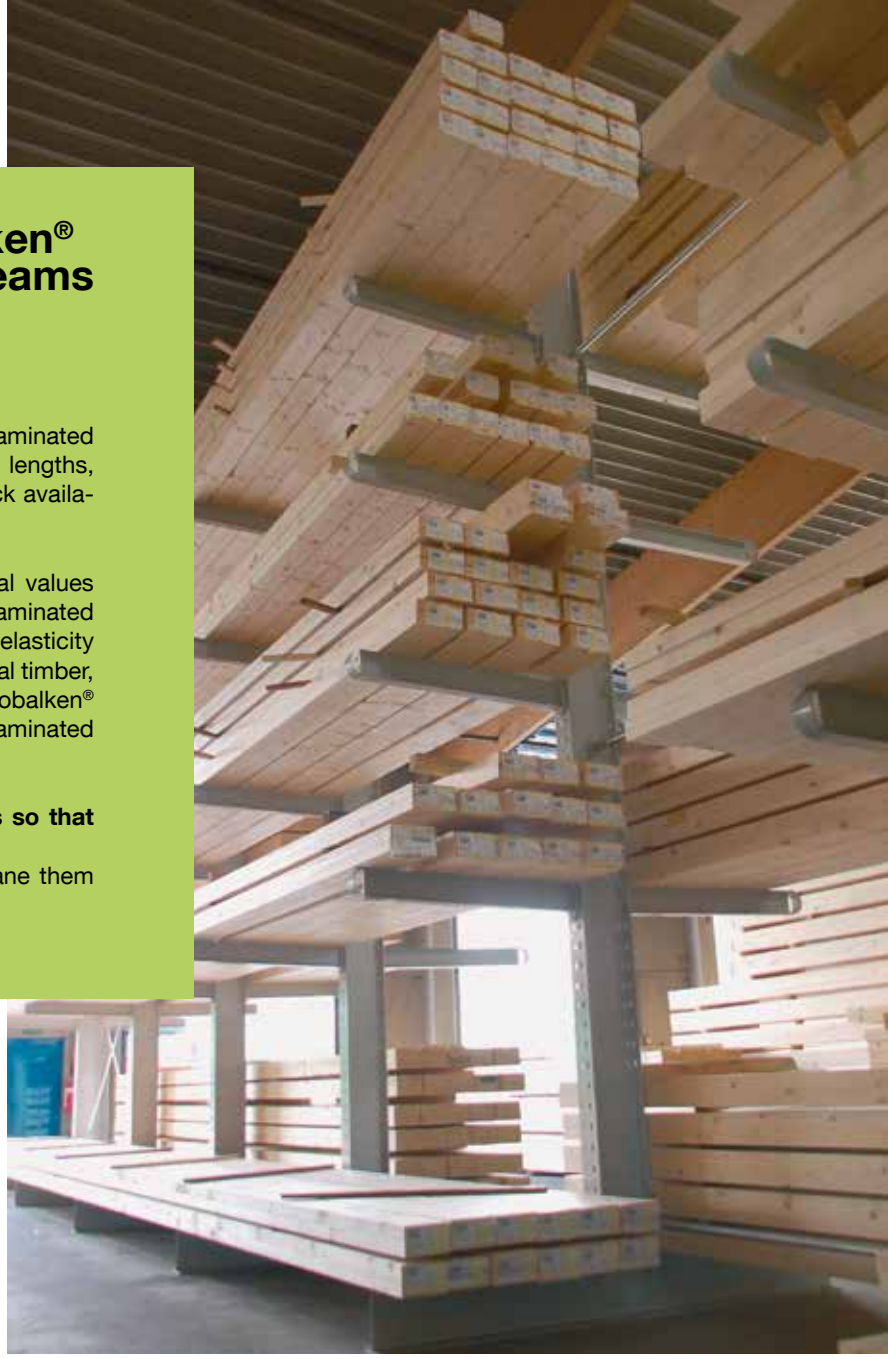
Individual beams:
Preferred series of cross-sections which guarantees precise availability.

Individual lengths of Duobalken® and Triobalken® laminated beams and glued laminated timber by Stora Enso

The availability of Duobalken® and Triobalken® laminated beams and glued laminated timber as individual lengths, together with our storage facilities offer flexibility, quick availability and technical advantages.

In accordance with the approval, increased structural values can be calculated for Duobalken® and Triobalken® laminated beams. Instead of the mean value of modulus of elasticity parallel to the grain of 11,000 N/mm² for KVH® structural timber, 11,600 N/mm² can be calculated. Duobalken® and Triobalken® laminated beams are therefore equivalent to glued laminated timber with strength class GL24h.

We also offer these products in individual lengths so that you can exploit this advantage to the full.
We keep rough sawn beams in stock and freshly plane them just before delivery to guarantee a perfect surface.



Individual lengths of Duobalken® and Triobalken® laminated beams in visible quality — Ex-stock

In packages (see pages 10 and 11)

- ● dimensions held in stock and sold individually
- ○ planed-down cross-section of the next largest dimension, dimension should be calculated as next largest standard size

Width (mm)	Length [m]	Height (mm) 100	12	140	160	180	200	220	240
100	13 m	●	●	●	●	●	●	●	●
	10 m	–	–	–	●	●	●	●	●
120	13 m	–	●	●	●	●	●	●	●
	10 m	–	–	–	●	●	●	●	●
140	13 m	–	–	●	●	●	●	○	●
	10 m	–	–	–	–	–	●	○	●
160	13 m	–	–	–	●	–	●	–	●
	10 m	–	–	–	–	–	●	–	●
180	13 m	–	–	–	–	●	–	–	–
200	13 m	–	–	–	–	–	●	–	–

Individually wrapped in film upon request

Minimum purchase: 1 piece (combined with other products in a full lorry)

Quality criteria of Duobalken® and Triobalken® laminated beams and glued laminated timber

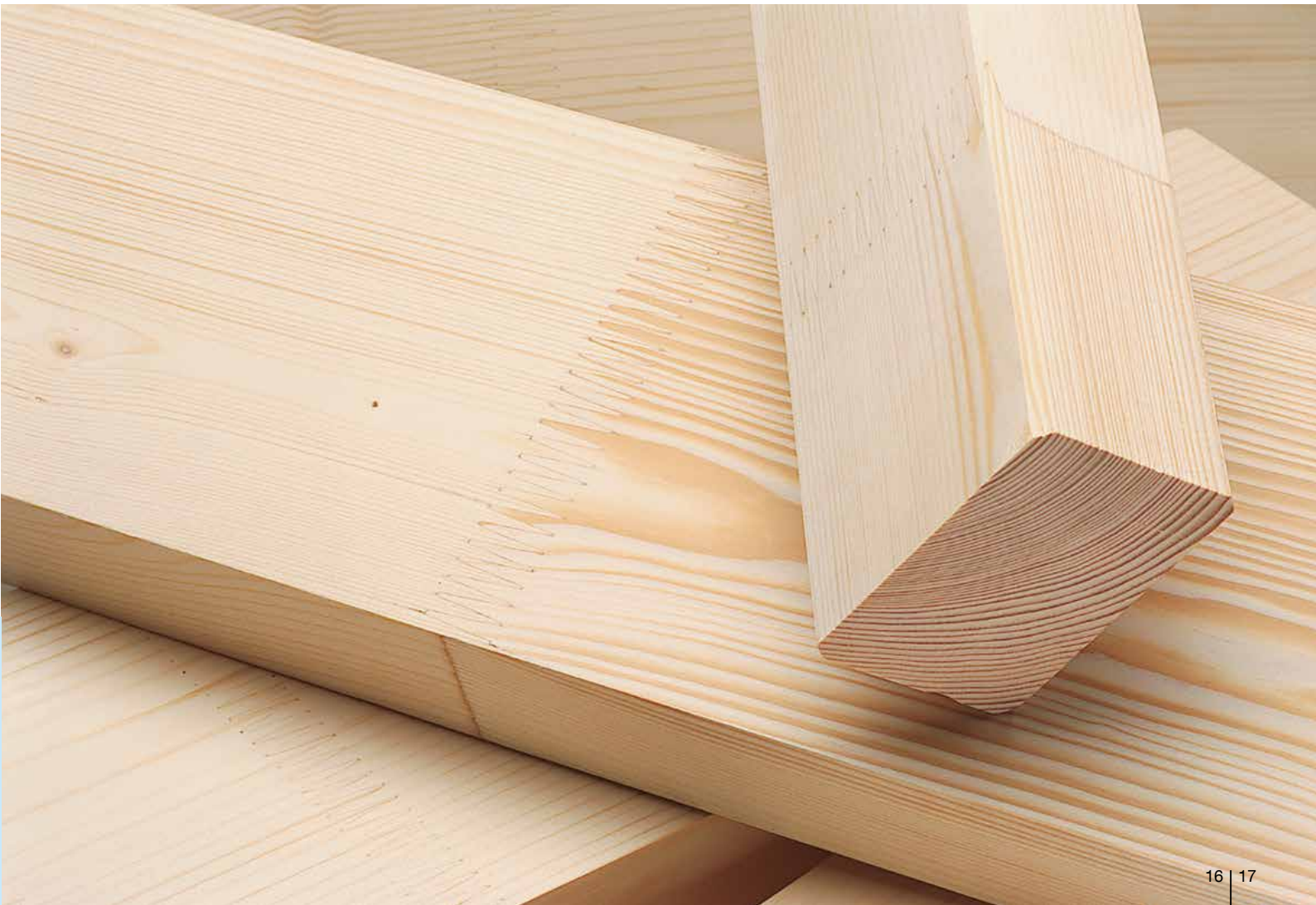
Requirements to be met by Duobalken® and Triobalken® in accordance with the general building inspectorate approval Z-9.1-440 of the German Institute for Structural Engineering and the agreement on Duobalken® and Triobalken® laminated beams.

Grading criterion	Requirements to be met by Duobalken® and Triobalken® laminated beams		Comments
	in visible areas	in non-visible areas	
Technical standard	DIN EN 14080:2013-09 or the general building inspectorate approval Z-9.1-440		
Strength class according to DIN EN 338	At least C24 or C24M		The strength, rigidity and bulk density properties decisive for the load-bearing capacity are derived from DIN EN 14080:2013 or the general building inspectorate approval Z-9.1-440.
Wood moisture content u_m	Maximum 15%		Prerequisite for bonding
Dimensional stability of the cross-section	DIN EN 336 – Dimensional stability class 2 w ≤ 100 mm: ±1.0 mm w > 100 mm: ±1.5 mm		The dimensional stability for the longitudinal dimensions must be agreed between the customer and supplier.
Twisting	≤ 4 mm/2 m		In comparison to DIN 4074-1 S10: ≤ 8 mm/2 m
Longitudinal warping	≤ 4 mm/2 m		In comparison to DIN 4074-1 S10: ≤ 8 mm/2 m
Finishing of the ends	Trimmed perpendicular		
Lamella dimensions (Duobalken® and Triobalken®)	Lamella thickness: max. 80 m Lamella height: max. 280 mm		According to Z-9.1-440 Special lamella dimensions up to 100 × 120 mm
Lamella dimensions (glued laminated timber)	Lamella thickness: min. 45 mm and max. 85 mm Lamella height: max. 280 mm		According to EN 14080:2013
Surface properties	Planed and chamfered	Levelled and chamfered	The right-hand sides (sides next to the heart) must face outwards.
Bonding of timber including finger-jointing	According to DIN EN 14080:2013 or the general building inspectorate approval Z-9.1-440		
Packaging	Packages wrapped over four sides in green film. Upon request, Si-quality individual beams wrapped in (black) film. Upon request, can also be wrapped over three sides in film (protective cover).	Packages wrapped over four sides in green film.	Additional feature for Duobalken® and Triobalken® and glued laminated timber by Stora Enso
Marking	All qualities are marked once on the narrow face (ink jet printer).		Additional feature for Duobalken® and Triobalken® and glued laminated timber by Stora Enso
Certificates	All Stora Enso certificates can be sent to you upon request.		

Usage classes

Usage classes according to EN 1995-1-1	Usage class according to DIN 68800	Example of typical application	Use of KVH®, Duobalken® and Triobalken® and glued laminated timber
SC 1 – dry area Average wood moisture content ≤ 12%	GK 0 GK 1 where accessible to insects	Component enclosed on all sides and heated	KVH®, Duobalken®, Triobalken® and glued laminated timber (all species of wood)
SC 2 – Susceptible area Average wood moisture content ≤ 20 %	GK 2 if temporary moistening is possible	protected components of a car port structure	KVH®, Duobalken® and Triobalken® made from larch or Douglas fir heartwood, or KVH® without finger-jointing
SC 3 – External area Average wood moisture content > 20 %	GK 3 for outside areas exposed to weather	unprotected components, balcony structures*	KVH® without finger-jointing made from larch or Douglas fir heartwood [1]

[1)] The additional requirement for preservative treatment for GK 3 must be decided on a case-by-case basis.
If required, we will be happy to treat KVH®, Duobalken® and Triobalken® and glued laminated timber for you.



Log house beams
by Stora Enso

For some people, log houses are the most exclusive kind of wooden house and represent the most comfortable way to live. They offer a wide range of architectural possibilities, a permanent relationship and direct contact with wood as a natural material and much more besides — and we provide the ideal material to build them: Log house beams by Stora Enso.

Log house beams made from glued solid timber are manufactured in a wide range of dimensions and design variants and from the most diverse species of wood according to the application, dimension and construction requirements. Glued log house beams particularly offer various advantages when it comes to twisting and warping, along with optimised setting behaviour due to the low moisture content of the wood required for surface gluing. Solid wood cross-sections are preferred for relatively narrow areas of use with small cross-sections and for less important, unexposed buildings.

Log house beams are S10TS/C24-graded in accordance with EN 14081 and DIN 4074-1, and are glued in a way that makes them weatherproof. Environmentally-friendly, formaldehyde-free adhesive is used for finger-jointing while melamine resin is used for surface gluing.

A comprehensive self- and third-party monitoring programme simultaneously guarantees consistently high quality, and this applies across the range, from off-the-shelf raw timber to bundled construction kits.

Standard dimensions of 60 × 100 mm to 160 × 240 mm are suitable for a wide range of applications from summer houses to high-quality residential buildings. Standard lengths of 13.00 m and project-related production of lengths of up to 16.00 m enable continuous wall structures for all common building dimensions.

Here, narrow and thin cross-sections are predominantly used for less important building purposes, such as summer houses or shelters.

Medium-sized cross-sections are particularly suitable for buildings, such as holiday homes and garages, etc.

Cross-sections with larger dimensions are designed for multi-layered wall constructions of permanently inhabited buildings.

Special cross-sections, such as those for single layered, solid wall constructions of houses, are manufactured specially for the property and adjusted to suit the specific application.

Duobalken® laminated beams with tongue and groove formation are also ideal for use as surface-forming ceiling beams.

Log houses offer unrivalled cosiness.

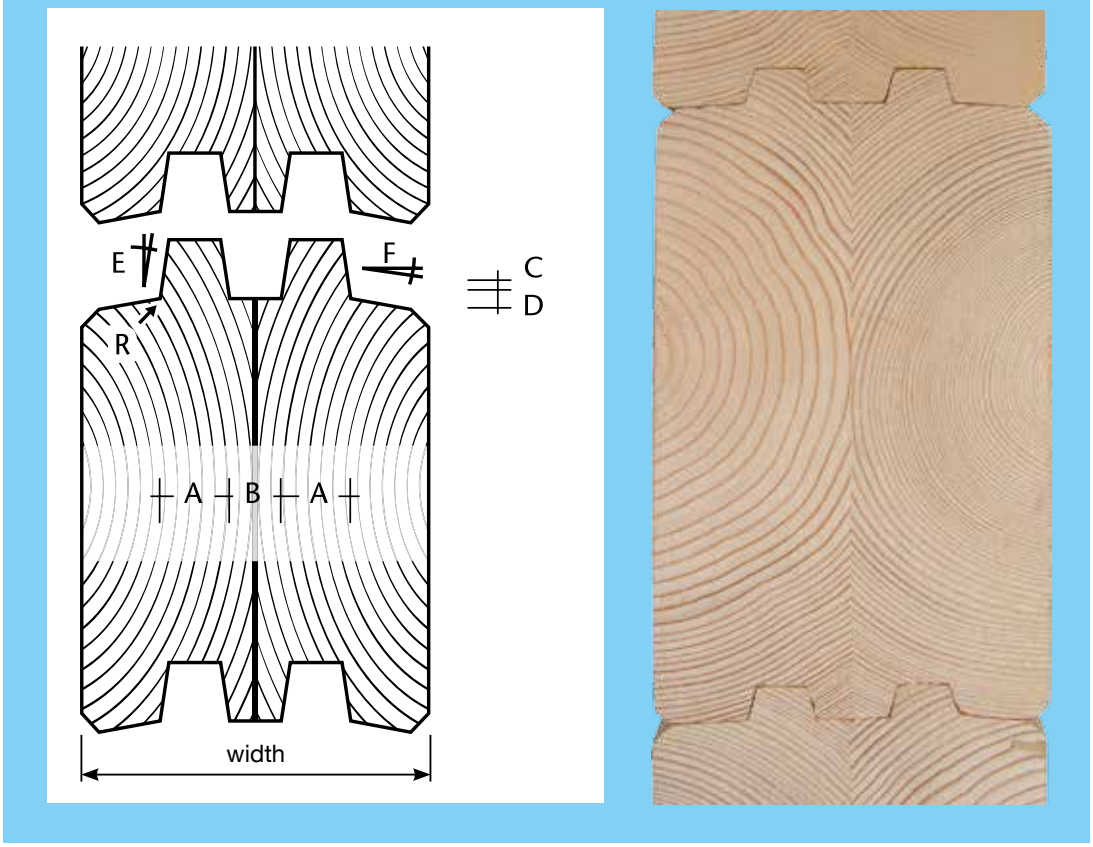
Standard cross-sections of log house beams

The following standard products and cross-sections are available:

Height h profile dimension (incl. tongue) in mm	KVH®	Duo-balken®	Trio-balken®	Width w [1] [mm]	n-number (tongue and groove [2])	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	R [mm]
120–240	●	●		60	2	15	10	0.9	3	15°	5°	R1
120–240	●	●		80	2	15	10	1.6	3	15°	5°	R1
140–240	●	●		100	2	15	15	1.6	3	15°	5°	R1
160–240		●	●	120	2	15	20	1.5	3	15°	5°	R1
200–240		●	●	140	3	20	20	1.5	5	15°	5°	R1
200–240		●	●	160	3	20	20	2.4	5	15°	5°	R1

[1] Width w available in the specified standard widths, intermediate sizes available upon request

[2] Groove: 11 mm; tongue: 10 mm



Alternatively, Cross Laminated Timber – CLT by Stora Enso can be used for solid wood constructions.

For more information, go to www.clt.info

We are committed to our customers in the following associations:

Überwachungsgemeinschaft Konstruktionsvollholz e. V.

Bundesverband Deutscher Fertigbau e. V.

Deutscher Holzfertigbau-Verband e. V.

Österreichischer Fertighausverband

Gesamtverband Deutscher Holzhandel e. V.

Stora Enso
Wood Products Division
Pfarrkirchen plant

Gewerbepark West
DE-84347 Pfarrkirchen
Tel.: +49 8561 3005 0
E-Mail: office.pfarrkirchen@storaenso.com
www.storaenso.com

THE RENEWABLE MATERIALS COMPANY