

Light and Wide

Guide to Selection and
Pre-dimensioning of Kielsteg
Elements.

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Any questions about how to use Kielsteg?
Contact us!

Phone: +43 (0) 316 269 7881

E-mail: office@kielsteg.com

www.kielsteg.com

03.Kielsteg construction element	11.Openings
04.Raw material wood	12.Fire protection
05.Applications	13.Thermal insulation
06.Strengths	14.Sound insulation and acoustics
07.Surface	15.Permissible span widths
08.Forms and Types	16.Use as roof element
09.Design principles	17.Permissible span widths
10.Structural principles	18.Use as structural floor



KIELSTEG construction elements...

... are lightweight, strong construction elements made of wood, with a linear cellular structure, which are used to make horizontal structures – structural floors and roofs –with wide clear spans. They use strips of timber to form top and bottom flanges, which are connected by curved webs of plywood or OSB. The name comes from the characteristic curve of the webs inside the elements, which resembles the cross section of a boat's keel. The system concentrates material exactly where it is needed for optimal load-bearing.

Building with Kielsteg means: Improving the flexibility of use of the building, saving material and promoting sustainability.

Certificates



The European Technical Assessment regulates the manufacturing and use of Kielsteg elements in the member states of the European Union as the basis for the CE certification mark.



Environmental Product Declarations (EPD) provide the data for environmental assessments. They enable meaningful comparisons of building materials in systems, or in whole buildings, over their whole life cycle ... from cradle to grave.



PEFC, the Program for the Endorsement of Forest Certification Schemes, is a certification and labelling program for products derived from ecologically, economically and socially sustainable forestry – covering the entire processing chain. When customers buy products with the PEFC label, they can be sure that their purchase supports environmentally friendly forestry.



Things we believe!

1. Only long-term applications of wood – uses that last beyond the natural life cycle of a tree – achieve real sustainability through CO2 sequestration.
2. The time gained by using wood in long-term applications enables the following generations of trees to grow and become a meaningful CO2 sink. Wood is a natural and renewable resource, but using it is only justifiable when it comes from sustainable forestry. We need eco-labels to be unimpeachable, reliable indicators of sustainability!
3. Sustainable forestry is good, but we also need to use the resource ‘wood’ as efficiently as possible, and for that we need manufacturers of wood products to keep innovating. Extending the service life of wood products needs to be a priority.
4. Architects and planners have a responsibility to design buildings that can be used as flexibly as possible, so that their lifetime is as long as possible. Because a long lifetime, along with suitable recycling options, to maximize the time until the wood is burned as a substitute for fossil fuels, are relevant parameters for improving resource efficiency.



Austrian Green Planet Building Technology Award 2022

The award honours outstanding sustainable and energy-efficient buildings which are built with the participation of Austrian companies in other countries.

Roof

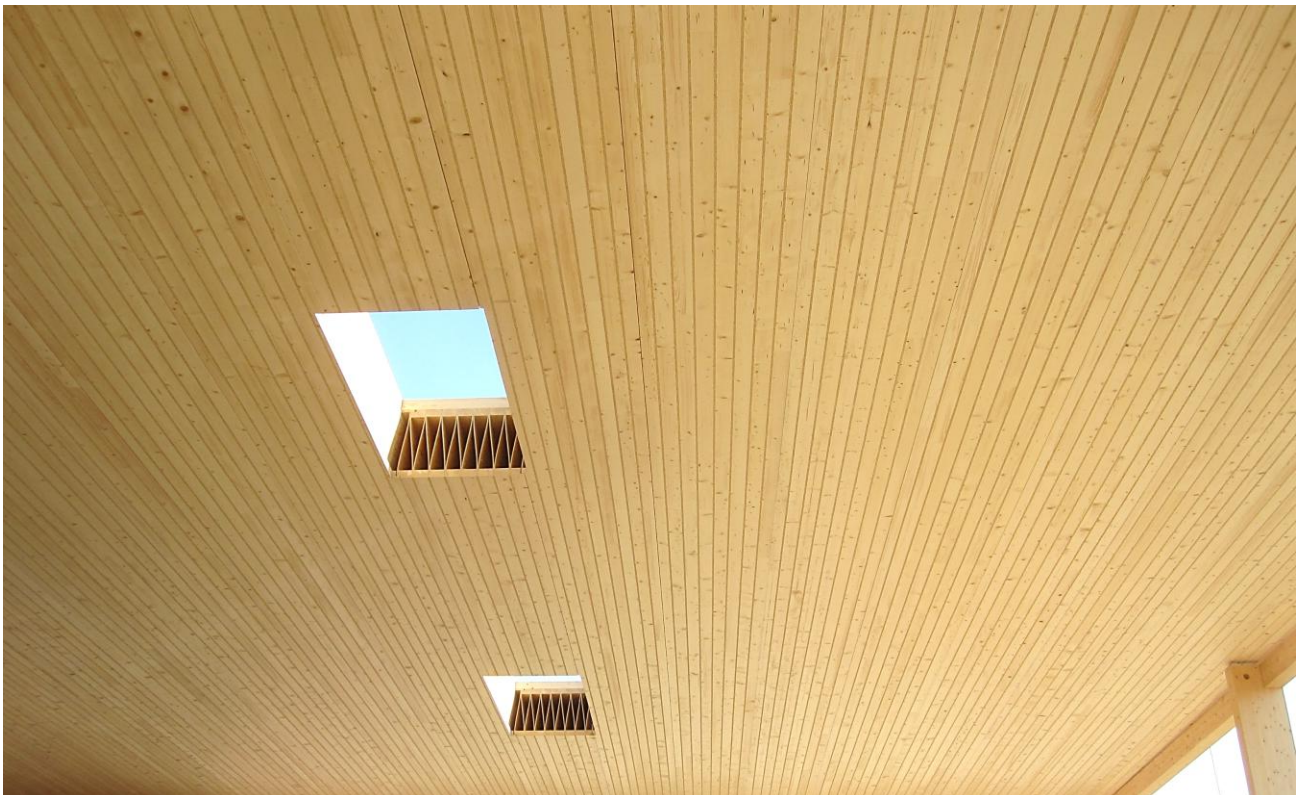
Kielsteg elements are most often used to form flat or gently sloped single-pitch roof constructions. Flat roofs are the use case that exploits Kielsteg's structural performance to the maximum.

The linear cellular structure of Kielsteg elements means that they are predestined for use under bending loads.

This load-bearing ability is especially valuable whenever there is a need to span wide open spaces. Kielsteg's unique ability to meet this demand is demonstrated in numerous buildings across Europe.

The strengths of Kielsteg make it perfect for

- **Schools and kindergartens**
- **Indoor sports and event arenas**
- **Supermarktes and superstores**
- **Factories and commercial buildings**



Kielsteg construction elements



Wide spans

Kielsteg's outstanding loadbearing performance enables roof designs with clear spans from 6 to 27 m. It minimizes the number of supports needed inside a building, maximizing its flexibility of use.

Low profile

Kielsteg not only spans wide spaces, but it does this while occupying much less height than most alternatives. It achieves the maximum clear height in the interior for any given total building height. Comparing the ratio of span width 'l' to built height 'h':

- Kielsteg element single span $l/h = 30-35$
- Glulam beam single span $l/h = 15-20$

Performance

Projecting roofs – a frequent request for supermarkets, commercial and industrial buildings. Kielsteg can be cantilevered out 10 m beyond the body of a building, with no additional supports or reinforcement – technically simple, aesthetically clean.

Efficient

Kielsteg is manufactured in a factory with close control of process and product parameters to ensure constant quality. Elements are prefabricated exactly to plan.

The high level of prefabrication is a key factor for rapid construction.

See the quality

The natural, untreated surfaces of Kielsteg have a distinctive striped appearance that designers can use to add a touch of class. Kielsteg surfaces also add to the look and feel of a space: you can use them to enhance subjective thermal comfort, colour mood and acoustic quality. No extra cladding of the elements is needed either for aesthetic reasons or for fire resistance. As a continuous flat wooden surface, a Kielsteg ceiling provides a convenient attachment plane for utilities and fittings.



Optional grooved surface

As well as the standard smooth surface, Kielsteg elements are available with longitudinal grooves – set at different intervals depending on the width of the flanges in the particular element type. The more strongly patterned surface offers an additional design option.

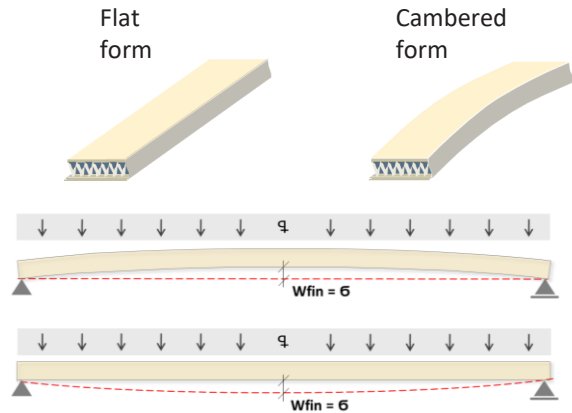


The elements are manufactured in surface quality Grade 1 (industry quality) and Grade 2 (visible quality).

Characteristic	Surface quality 1 (Industrial quality)	Surface quality 2 (Visible quality)
Planing quality	Rough patches acceptable	Rough patches not acceptable
	Scalloping acceptable	Scalloping up to 10 mm length, 1 mm depth acceptable
Knots	Sound knots acceptable, Knot holes acceptable	Sound knots acceptable Knot holes greater than 20 mm diameter must be filled
Resin pockets	Acceptable	Acceptable up to 5 x 50 mm, must be filled if larger
Pith	Acceptable	Acceptable
Discoloration	Blue stain acceptable	Discoloration by blue stain and red streaks acceptable on up to 5% of the surface area
	Red streaks acceptable	
Insect damage	Acceptable as defined by ÖNORM DIN 4074-1	Not acceptable
Webs	Edge of webs may be offset below surface	Offset of web edges is acceptable up to a total length of 0.5 m per 5 m ² of surface area
Cracks	Drying cracks acceptable up to a depth of 1/3 of the flange thickness.	

Form of the elements

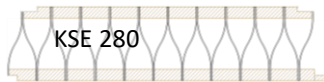
Kielsteg elements are available flat or cambered. Cambered elements have a constant radius of 950 m along their length. Cambered elements are a very useful and proven version of Kielsteg. For structural floor and roof constructions with large clear spans, they meet the requirements on the serviceability limit state more effectively. They also avoid visible sagging.



KIELSTEG Types



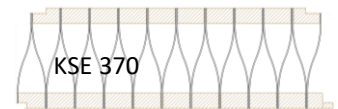
The elements of thickness 280 mm to 370 mm are made with webs of 4 mm spruce and pine plywood.



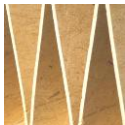
KSE_280-35-102
Element weight 42.9 kg/m²
KSE_280-40-102
Element weight 46.7 kg/m²



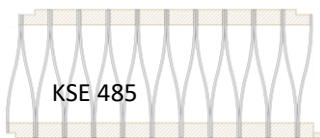
KSE_330-40-93
Element weight 51.4 kg/m²
KSE_330-50-93
Element weight 58.9 kg/m²



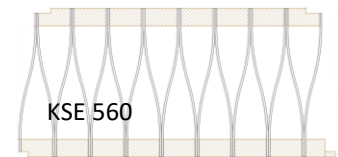
KSE_370-40-85
Element weight 55.9 kg/m²
KSE_370-60-85
Element weight 70.7 kg/m²



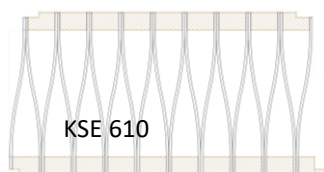
The elements of thickness 485 mm to 900 mm are made with webs of 8 mm, 10 mm and 12 mm OSB3.



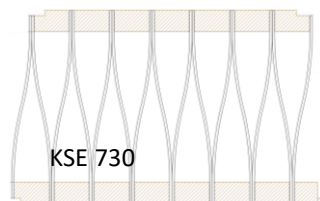
KSE_485-40-96
Element weight 77.6 kg/m²
KSE_485-50-87
Element weight 89.1 kg/m²



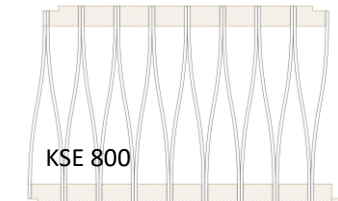
KSE_560-50-107
Element weight 87.1 kg/m²
KSE_560-60-107
Element weight 94.2 kg/m²



KSE_610-50-103
Element weight 104.4 kg/m²
KSE_610-60-103
Element weight 111.2 kg/m²



KSE_730-70-117
Element weight 123.7 kg/m²
KSE_730-80-134
Element weight 122.4 kg/m²



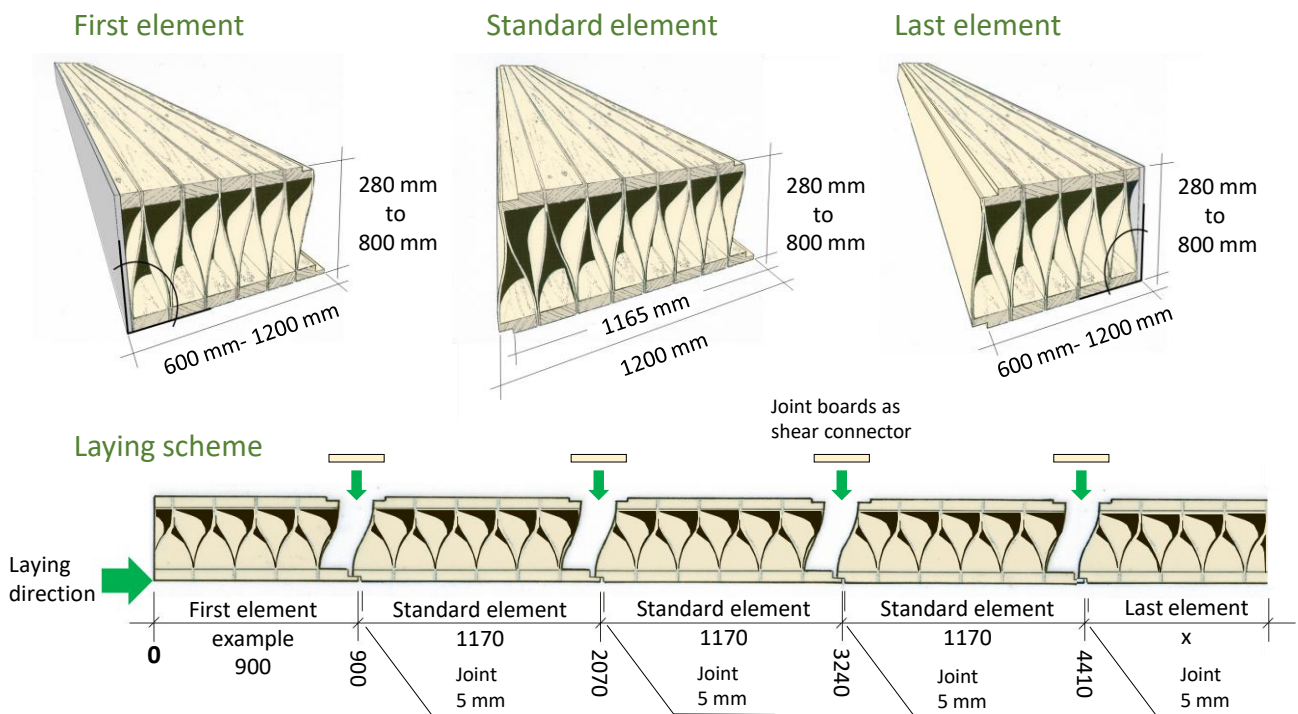
KSE_800-70-113
Element weight 145.6 kg/m²
KSE_800-80-113
Element weight 152.3 kg/m²

Dimensions

Kielsteg elements come in heights from 280–800 mm; which height to use depends on structural requirements. The long axis spans the space between the supports.

The standard width is 1200 mm ; however, the elements overlap laterally, so that the actual laid unit width is calculated as 1165 mm, plus 5–10 mm joint allowance.

Exact widths of the complete assembly are achieved by trimming the first and last elements to a custom width: this should be approximately equal, with a minimum of 600 mm each.



Wood expansion and shrinkage

Length	6.00 m to 35.00 m
Service class	Service classes 1 and 2
Bonding	MUF glue of emission class E1
Wood	Spruce
Humidity	On delivery: 12 % ± 3 %
Dimensional changes longitudinal	0,01 % per 1% change in wood moisture content
Dimensional changes lateral	0,24 % per 1% change in wood moisture content
Dimensional changes thickness	negligible

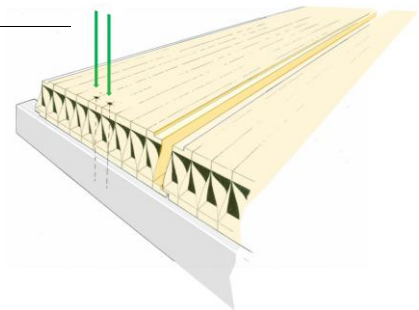
Constructing a Kielsteg diaphragm

Kielsteg elements are laid in a manner that respects the hygroscopic character of untreated wood, allowing for expansion and shrinkage depending on climatic conditions. The essential measures that achieve this are the overlapping joints between the elements, which incorporate space for movement, and the placement of fastenings at the midline of each element. These factors avoid a buildup of internal stress. However, despite the fact that the elements are not butted hard against each other, they can still transmit significant forces in the horizontal plane, which means that a Kielsteg floor or roof can be considered as a stiff diaphragm and can provide a bracing effect against lateral forces on the structure.

Screws concentrated at the element midline

The fasteners used to connect the elements to the substructure are concentrated at the midline of each element. This allows for the elements to expand and shrink in their width. The number of fasteners is determined by structural calculations.

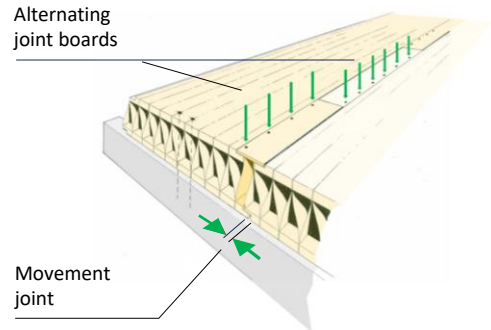
Screws at midline



Alternating joint boards

Joint boards fit flush into the top edge profile of the elements; each board is nailed to one of the elements in an alternating pattern. The joint boards butt tightly against each other along the longitudinal axis of the Kielsteg elements, which provides the mechanical linkage that resists applied force and creates an effective diaphragm. A defined movement joint of 5–10 mm between the elements allows them to expand and shrink in their width.

Alternating joint boards



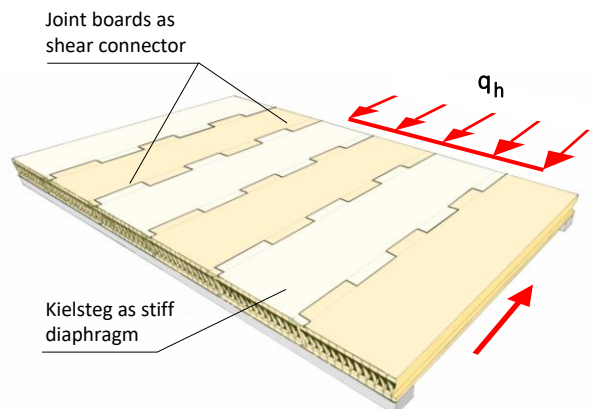
Stress-free diaphragm

The horizontal bracing effect of a Kielsteg roof or floor is based on the individual elements acting as shear fields which are connected to each other along their long edges.

The special joint design allows for internal expansion and shrinkage while still providing a stiff diaphragm.

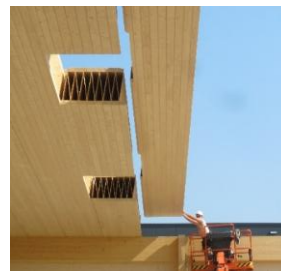
If necessary the whole diaphragm structure can be further reinforced by a layer of OSB boards laid on top of the elements.

Joint boards as shear connector



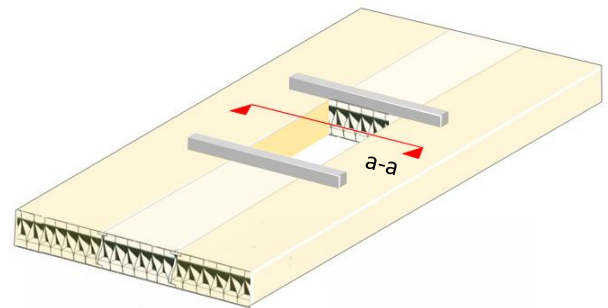
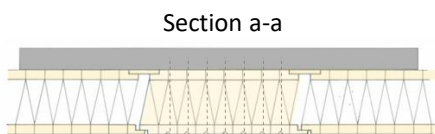
Guide to forming openings

Openings and penetrations for stairs, skylights and other purposes should be specifically designed. Openings of up to 25x25 cm can be made without reinforcing the element, as long as the remaining cross-section of the element is adequate for the applied load. The required fire resistance class is achieved by suitable covering and cladding of the opening. To maintain the strength of the KIELSTEG assembly around larger openings, the elements are reinforced with wooden beams as needed. This can be done in a number of ways depending on the structural and aesthetic needs. Generally, the width of an opening should not exceed 120 cm. There is no limit to the length of the opening.



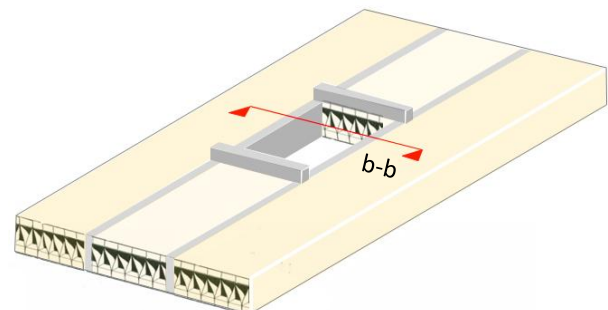
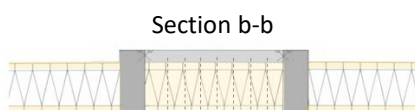
Type 1:

In this variant, the load on the affected Kielsteg element is transferred to the neighbouring elements using wooden beams. These can be positioned on top of the Kielsteg elements or underneath them, as required.



Type 2:

In this version, the load on the Kielsteg element interrupted by the opening is transferred to longitudinal glulam beams. These can be linked to the ends of the opening either above or below the Kielsteg element. This construction can also be used for full-length skylight strips between the Kielsteg elements.



Guide to fire resistance

Suitably dimensioned Kielsteg elements qualify as fire resistance class REI 30 or REI 60 without any additional cladding of the lower surface. Penetrations through the elements for pipes or other installations are possible with suitable measures to protect their integrity as space-enclosing partitions. Because of the cellular structure of the Kielsteg elements, with the top and bottom flange layers of solid wood, the fire duration until failure and the remaining load-bearing ability are evaluated in terms of the burning of the flange layer next to the fire source. With fire-protective tape in the joints between the elements, these are confirmed to fulfil the stated fire resistance classes.

Fire resistance classes that can be achieved with different Kielsteg types

KSE 280	KSE 330	KSE 370	KSE 485	KSE 560	KSE 610	KSE 730	KSE 800
REI 30	REI 30	REI 30	REI 30	REI 30	REI 30	REI 30	REI 30
REI 60	REI 60	REI 60	REI 60	REI 60	REI 60	REI 60	REI 60

The fire resistance of Kielsteg has been classified in accordance with the following standards:

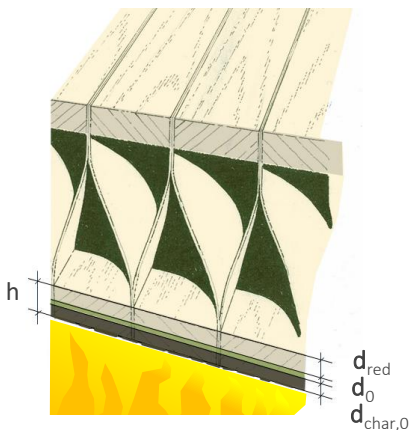
	Fire resistance class	Fire resistance duration t in minutes	
According to EN 1363-1 and EN 11365-2	Fire retardant	> 30 min	REI 30
	Highly fire retardant	> 60 min	REI 60
European fire classification of construction products			
According to DIN 4102	Normally flammable	B2	
According to EN 13501-1	D-s1,d0	Klasse D	

The calculation for exposure to fire on one side from below is done as specified in ÖNORM EN 1995-1-2.

$$d_{\text{char},0} = \beta_0 \times t$$

At $\beta_0 = 0.656 \text{ mm/min}$ and $t = 30 \text{ minutes}$, $d_{\text{char},0} = 19.7 \text{ mm}$.

At $\beta_0 = 0.656 \text{ mm/min}$ und $t = 60 \text{ minutes}$, $d_{\text{char},0} = 39.4 \text{ mm}$.

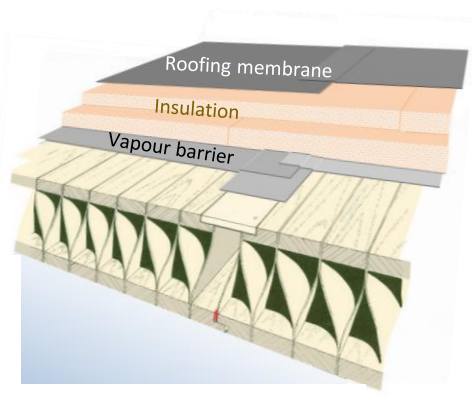


- d_0 = Zero strength layer 7 mm
- $d_{\text{char},0}$ = Char depth
- d_{red} = Reduced depth
- β_0 = Charring rate 0.656 mm/min

The green zone and the power plant on the roof

The optimal roof layup with Kielsteg is a warm roof with thermal insulation on the outside: this gives the most robust behaviour in terms of building physics, long life and sustainability. As roofs also represent a significant area in terms of soil sealing, we also should be looking at their potential to mitigate this effect. Many Kielsteg roofs are used as green roofs and for solar power generation.

Recommended roof layup
with outside insulation



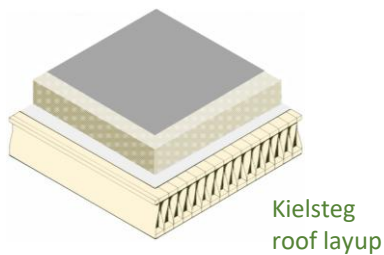
U-values

The insulation thicknesses needed to achieve different U-values are shown in the table below. The figures are for warm roof constructions with mineral insulation. Due to the large variety of available materials for the vapour barrier, insulation and outer roofing, it is not possible to cover all of their properties here. It will be necessary to choose a combination of materials that meets the requirements of the individual project for waterproofing and humidity regulation.

Insulation depth		KSE 280	KSE 330	KSE 370	KSE 485	KSE 560	KSE 610	KSE 730	KSE 800
Mineral insulation $\lambda = 0.040$	120 mm	0.242	0.241	0.232	0.240	0.232	0.224	0.218	0.210
	140 mm	0.216	0.215	0.208	0.214	0.208	0.201	0.196	0.190
	160 mm	0.195	0.194	0.188	0.193	0.188	0.183	0.178	0.173
	180 mm	0.177	0.177	0.172	0.176	0.172	0.167	0.164	0.160
	200 mm	0.163	0.162	0.158	0.162	0.158	0.154	0.151	0.148

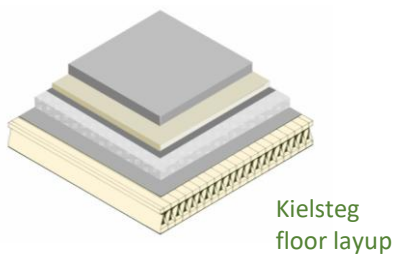
Guide to sound insulation

Kielsteg structural floors achieve the normal standards for airborne and impact noise insulation in residential and residential-like use with the usual and well-proven floor layouts. Our basic warm roof layout, which is chosen to meet hygrothermic requirements, already provides significant sound insulation. Further soundproofing can be achieved by increasing the insulation thickness or adding a green roof layer.



Airborne sound
 $R_w = 50.0 \text{ dB}$

Roofing membrane
14.0 cm mineral insulation
Vapour barrier
Kielsteg



Airborne sound
 $R_w = 58.7 \text{ dB}$

6.0 cm floor screed + PVC membrane
3.5 cm footfall sound insulation
5.0 cm bound fill +
trickle protection sheet
Kielsteg

Airborne sound
 $R_w = 59.5 \text{ dB}$

Impact sound
 $L_{n,w} = 43.2 \text{ dB}$

A 1.2 cm gypsum board mounted on acoustic brackets with 7.0 cm rockwool filling in the ceiling cavity gives an even higher level of soundproofing.

Acoustics

The dimensions and geometry of a space as well as the material properties of its surfaces affect the auditory experience of sounds such as speech or music. The reverberation time is affected in a frequency-dependent manner by the absorption surface area and its relation to the volume of the space. Testing of sound absorption by Kielsteg elements is done in accordance with EN ISO 354. The rating of the frequency-dependent sound absorption characteristics of a material is described in EN ISO 11654.

The weighted sound absorption coefficient for Kielsteg elements with a smooth surface is $\alpha_w = 0.10$.

Median frequency fm						
Octave band	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Sound absorption coefficient α						
KIELSTEG	0.25	0.10	0.10	0.10	0.10	0.15
The grooved Kielsteg elements have a slightly increased absorption in the 200 Hz third band.						

Use as roof element

The main applications of KIELSTEG elements are as structural floors and flat or low-slope roofs with wide spans in the service classes 1 and 2.

Use of Kielsteg exposed to the weather in service class 3 is not allowed.

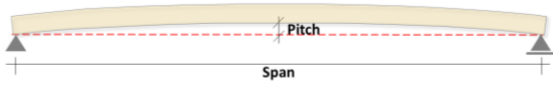
Kielsteg roofs must have a minimum slope of 3%. The slope should not exceed 15% along the length of the elements or 5% laterally.



Load tables for roof structures of service class 1

qk (kN/m)	1		1.5		2		2.5		3	
Type	l/200	l/300	l/200	l/300	l/200	l/300	l/200	l/300	l/200	l/300
KSE_280-35-102	14.5	12.5	13.2	11.5	12.2	10.7	11.3	10.0	9.5	9.5
KSE_280-40-102	14.8	12.9	13.4	11.7	12.5	10.9	11.5	10.3	9.8	9.7
KSE_330-40-93	16.8	14.7	15.3	13.3	14.2	12.4	12.9	11.7	11.0	11.0
KSE_330-50-93	17.2	15.0	15.7	13.7	14.7	12.8	13.5	12.1	11.6	11.5
KSE_370-40-85	18.3	16.0	16.7	14.6	15.5	13.5	14.1	12.8	12.1	12.1
KSE_370-60-85	19.1	16.7	17.6	15.4	16.4	14.4	15.5	13.6	13.4	12.9
KSE_485-40-96	20.6	18.0	19.0	16.6	17.7	15.5	16.8	14.7	16.0	14.0
KSE_485-50-87	21.2	18.5	19.6	17.2	18.4	16.1	17.5	15.3	16.7	14.6
KSE_560-50-107	23.7	20.7	21.9	19.2	20.6	18.0	19.5	17.1	18.7	16.3
KSE_560-60-107	24.4	21.3	22.6	19.8	21.3	18.6	20.2	17.7	19.3	16.9
KSE_610-50-103	24.6	21.5	22.9	20.0	21.6	18.8	20.5	17.9	19.6	17.1
KSE_610-60-103	25.4	22.1	23.6	20.6	22.3	19.5	21.2	18.5	20.3	17.8
KSE_730-70-117	29.5	25.8	27.6	24.1	26.1	22.8	24.9	21.8	23.9	20.9
KSE_730-80-134	30.4	26.5	28.4	24.8	26.9	23.5	25.7	22.4	24.6	21.5
KSE_800-70-113	30.8	26.9	28.9	25.3	27.5	24.0	26.3	22.9	25.2	22.0
KSE_800-80-113	31.4	27.4	29.6	25.8	28.1	24.5	26.9	23.5	25.9	22.6

Calculate the sum of the characteristic load from the weight of the roof layout and the snow load; the numbers already allow for the dead weight of the Kielsteg elements.



The table below shows the camber (pitch height) at different span lengths. Since the radius of the camber is constant at 950 m, the pitch height increases with the span length.

Span (m)	6	7	8	9	10	11	12	13	14	15	16
Pitch height (cm)	0.47	0.64	0.84	1.06	1.31	1.59	1.89	2.22	2.57	2.96	3.36

Span (m)	17	18	19	20	21	22	23	24	25	26	27
Pitch height (cm)	3.80	4.26	4.75	5.26	5.80	6.36	6.96	7.57	8.22	8.89	9.59

Load tables for roof structures of service class 1

q _k (kN/m)	3.5		4		4.5		5		5.5	
Type	l/200	l/300	l/200	l/300	l/200	l/300	l/200	l/300	l/200	l/300
KSE_280-35-102	8.4	8.4	7.4	7.4	6.7	6.7	6.1	6.1	5.5	5.5
KSE_280-40-102	8.6	8.6	7.6	7.6	6.9	6.9	6.2	6.2	5.7	5.7
KSE_330-40-93	9.6	9.6	8.5	8.5	7.7	7.7	7.0	7.0	6.4	6.4
KSE_330-50-93	10.2	10.2	9.0	9.0	8.1	8.1	7.4	7.4	6.8	6.8
KSE_370-40-85	10.5	10.5	9.4	9.4	8.5	8.5	7.7	7.7	7.1	7.1
KSE_370-60-85	11.8	11.8	10.5	10.5	9.5	9.5	8.6	8.6	7.9	7.9
KSE_485-40-96	15.3	13.4	14.4	12.9	13.7	12.5	13.1	12.2	12.6	11.8
KSE_485-50-87	16.1	14.0	15.5	13.5	14.9	13.1	14.3	12.7	13.7	12.4
KSE_560-50-107	17.9	15.7	17.1	15.1	16.3	14.6	15.5	14.2	14.9	13.8
KSE_560-60-107	18.6	16.2	17.9	15.7	17.4	15.2	16.7	14.8	15.7	14.4
KSE_610-50-103	18.5	16.5	17.6	15.9	16.7	15.4	16.0	15.0	15.4	14.6
KSE_610-60-103	19.6	17.1	18.8	16.5	17.9	16.0	17.2	15.6	16.5	15.2
KSE_730-70-117	22.8	20.1	21.7	19.5	20.7	18.9	19.8	18.4	19.1	17.9
KSE_730-80-134	23.7	20.7	23.0	20.1	22.2	19.5	20.8	18.9	19.2	18.5
KSE_800-70-113	23.8	21.3	22.7	20.6	21.7	20.0	20.8	19.5	20.0	19.0
KSE_800-80-113	25.0	21.8	23.8	21.1	22.8	20.5	21.9	20.0	21.1	19.5

Calculate the sum of the characteristic load from the weight of the roof layup and the snow load; the numbers already allow for the dead weight of the Kielsteg elements.

Use as structural floor

The serviceability of structural floors with wide spans is assessed primarily by evaluating their vibrational properties. The analysis needs to consider the deflection under load and the vibrational frequencies. Floors in residential buildings must avoid 'vibrations annoying to humans'.

As single-span systems, structural floors with Kielsteg enable spans from 6 to 13 m.

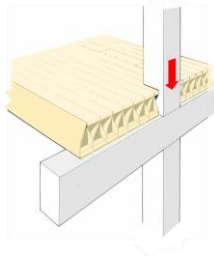
In our load tables we show values designed to comply with vibrations of 6 Hz or 8 Hz.



Load tables for structural floors in apartment and office buildings

q _k (kN/m)	2		2.5		3		3.5		4		4.5	
Typ	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz
KSE_280-35-102	8.3	7.2	8.0	6.9	7.7	6.7	7.5	6.5	6.6	6.3	5.9	5.9
KSE_280-40-102	8.4	7.3	8.1	7.0	7.8	6.8	7.6	6.6	6.8	6.4	6.1	6.1
KSE_330-40-93	9.3	8.0	8.9	7.7	8.6	7.5	8.4	7.2	7.6	7.1	6.8	6.8
KSE_330-50-93	9.5	8.2	9.1	7.9	8.8	7.7	8.6	7.4	8.0	7.2	7.2	7.1
KSE_370-40-85	9.9	8.6	9.5	8.3	9.2	8.0	8.9	7.7	8.4	7.5	7.5	7.4
KSE_370-60-85	10.3	8.9	9.9	8.6	9.6	8.3	9.4	8.1	9.1	7.9	8.4	7.7
KSE_485-40-96	10.9	9.4	10.5	9.1	10.2	8.8	9.9	8.6	9.7	8.4	9.4	8.2
KSE_485-50-87	11.1	9.7	10.8	9.3	10.5	9.1	10.2	8.8	10.0	8.6	9.7	8.4
KSE_560-50-107	12.1	10.5	11.7	10.1	11.4	9.9	11.1	9.6	10.8	9.4	10.6	9.2
KSE_560-60-107	12.4	10.7	12.0	10.4	11.7	10.1	11.4	9.8	11.1	9.6	10.9	9.4
KSE_610-50-103	12.5	10.8	12.1	10.5	11.8	10.2	11.5	9.9	11.2	9.7	11.0	9.5
KSE_610-60-103	12.8	11.1	12.4	10.7	12.1	10.4	11.8	10.2	11.5	10.0	11.3	9.8
KSE_730-70-117	14.3	12.4	13.9	12.1	13.6	11.8	13.3	11.5	13.0	11.2	12.7	11.0
KSE_730-80-134	14.6	12.7	14.2	12.3	13.9	12.0	13.6	11.7	13.3	11.5	13.0	11.3
KSE_800-70-113	14.8	12.8	14.4	12.5	14.1	12.2	13.8	11.9	13.5	11.7	13.2	11.5
KSE_800-80-113	15.0	13.0	14.7	12.7	14.3	12.4	14.0	12.1	13.7	11.9	13.5	11.7

Calculate the sum of the characteristic load from the weight of the roof layout and the snow load; the numbers already allow for the dead weight of the Kielsteg elements.



Load transmission
past Kielsteg

Load transmission

In Kielsteg structural floor constructions, the essential structural point to observe is avoiding a compressive load on the element at the points where it rests on the substructure. Loads from above – such as from load-bearing walls or columns – must be transmitted past the Kielsteg element directly into the substructure. The ends of the Kielsteg elements are prefabricated with cutouts to fit precisely around columns. Loads from walls are carried by a framework resting on solid wooden sills at the level of the Kielsteg elements.

Load tables for structural floors in apartment and office buildings

q _k (kN/m)	5		5.5		6		6.5		7		7.5	
Type	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz	6 Hz	8 Hz
KSE_280-35-102	5.4	5.4	4.9	4.9	4.5	4.5	4.2	4.2	3.9	3.9	3.7	3.7
KSE_280-40-102	5.5	5.5	5.1	5.1	4.7	4.7	4.3	4.3	4.0	4.0	3.8	3.8
KSE_330-40-93	6.2	6.2	5.7	5.7	5.2	5.2	4.9	4.9	4.5	4.5	4.3	4.3
KSE_330-50-93	6.6	6.6	6.0	6.0	5.6	5.6	5.2	5.2	4.8	4.8	4.5	4.5
KSE_370-40-85	6.8	6.8	6.3	6.3	5.8	5.8	5.4	5.4	5.0	5.0	4.7	4.7
KSE_370-60-85	7.7	7.6	7.1	7.1	6.5	6.5	6.1	6.1	5.7	5.7	5.3	5.3
KSE_485-40-96	9.3	8.0	9.1	7.9	8.9	7.7	8.8	7.6	8.6	7.5	8.5	7.4
KSE_485-50-87	9.6	8.3	9.4	8.1	9.2	8.0	9.1	7.9	8.9	7.7	8.8	7.6
KSE_560-50-107	10.4	9.0	10.2	8.8	10.0	8.7	9.9	8.5	9.7	8.4	9.6	8.3
KSE_560-60-107	10.7	9.2	10.5	9.1	10.3	8.9	10.1	8.8	9.9	8.6	9.3	8.5
KSE_610-50-103	10.8	9.3	10.6	9.2	10.4	9.0	10.3	8.9	10.1	8.7	10.0	8.6
KSE_610-60-103	11.1	9.6	10.9	9.4	10.7	9.3	10.5	9.1	10.4	9.0	10.2	8.9
KSE_730-70-117	12.5	10.8	12.3	10.6	12.1	10.5	11.9	10.3	11.8	10.2	11.6	10.0
KSE_730-80-134	12.8	11.1	12.6	10.9	12.4	10.7	12.2	10.6	12.0	10.4	11.5	10.3
KSE_800-70-113	13.0	11.3	12.8	11.1	12.6	10.9	12.4	10.8	12.3	10.6	12.1	10.5
KSE_800-80-113	13.3	11.5	13.0	11.3	12.9	11.1	12.7	11.0	12.5	10.8	12.3	10.7

Calculate the sum of the characteristic load from the weight of the floor layout and the service load; the numbers already allow for the dead weight of the Kielsteg elements.



Kielsteg elements are lightweight wooden construction elements with a linear cellular structure and high load-bearing capacity, generally used to form structural floors and roofs with wide spans.

Their structural performance makes for outstanding solutions in buildings that need wide open spaces.

Kielsteg GmbH
Reininghausstraße 13A
8020 Graz
Austria

Tel.: +43 (0)316 - 269 7881
E-mail: office@kielsteg.com
www.kielsteg.com

