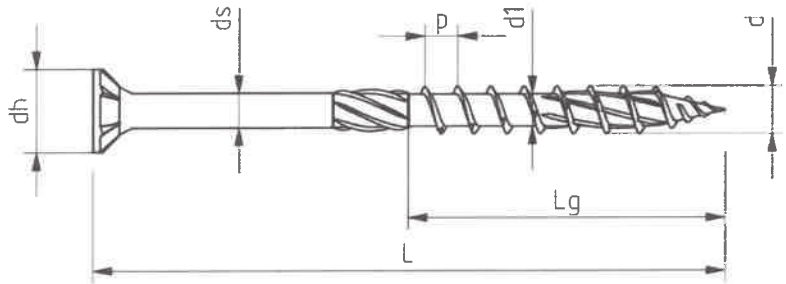
DECLARATION OF PERFORMANCE No WKCS-3/23

1. Unique identification code of the product-type: **WKCS-3**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-3**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	3,0	
	d_h		[mm]	6,0	
	d_s		[mm]	2,2	
	d_1		[mm]	2,0	
	p		[mm]	1,5	
	L	min	[mm]	30	
		max		40	
	L_g	min	[mm]	17	
		max		22	
Characteristic yield moment	$M_{y,k}$		[Nm]	1,5	
Bending angle	α		°	40,9	
Characteristic tensile strength	$f_{tens,k}$		[kN]	3,5	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	1,5	
Insertion moment	$R_{tor,mean}$		[Nm]	$\leq f_{tor,k} / 1,5$	
Characteristic yield strength	$f_{y,k}$		[N/mm^2]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	13	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			15	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	22,5	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

Essential characteristic

Mechanical resistance and stability (BWR1)

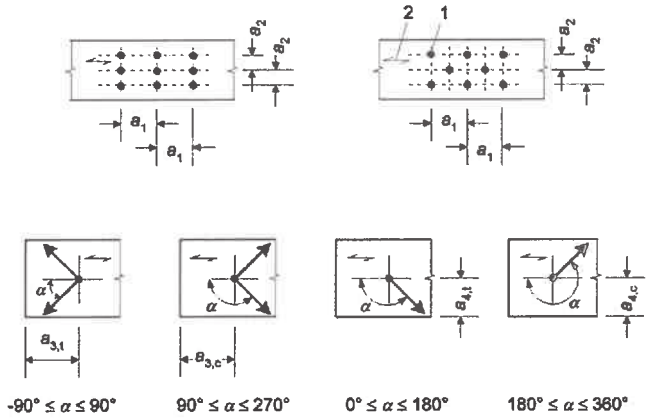
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=3	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	15	9	36	21	9	9
α=90°	12	12	21	21	15	9



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

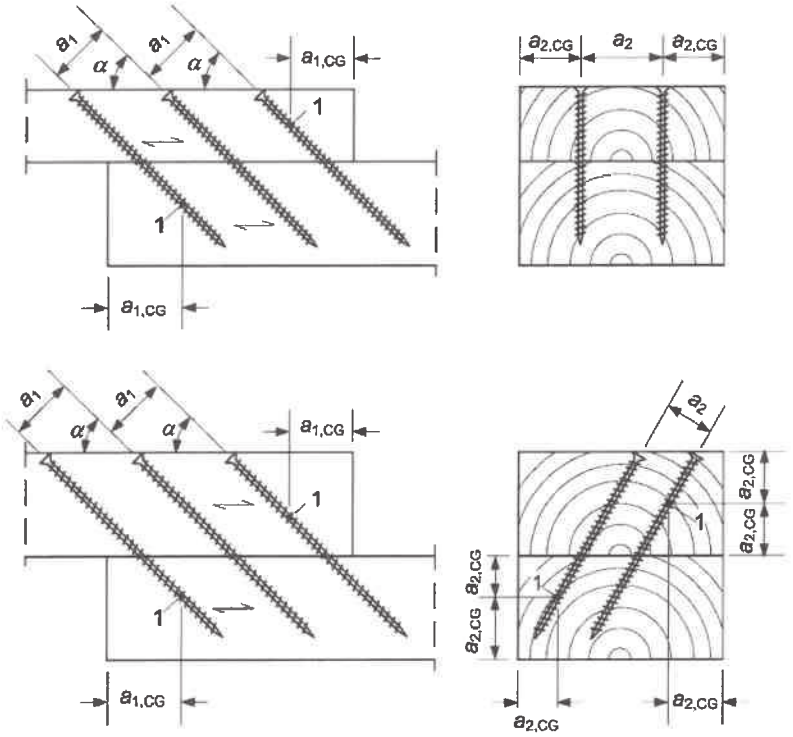
d=3	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	30	15	45	30	15	15
α=90°	15	15	30	30	21	15

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
21	15	30	12



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 30 mm

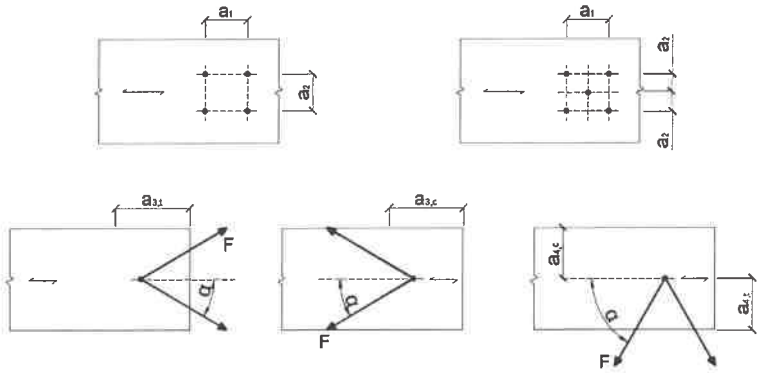
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 30 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

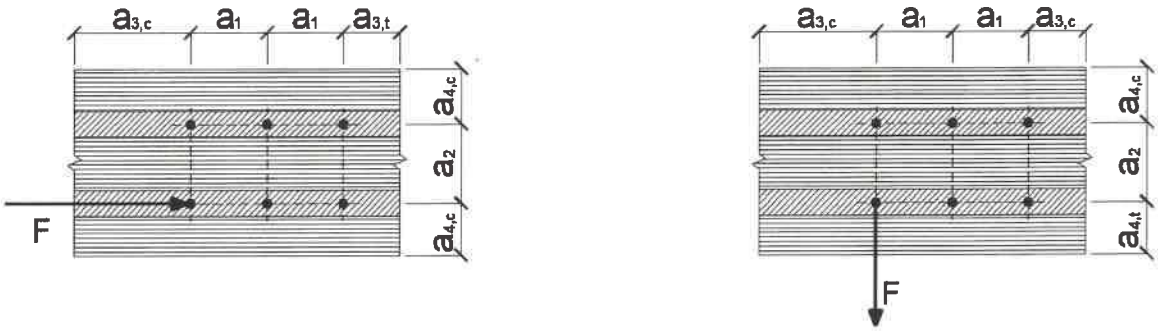
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=3	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	12	18	18	7,5	18	7,5
A2.2	30	36	21	12	18	9



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -

[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

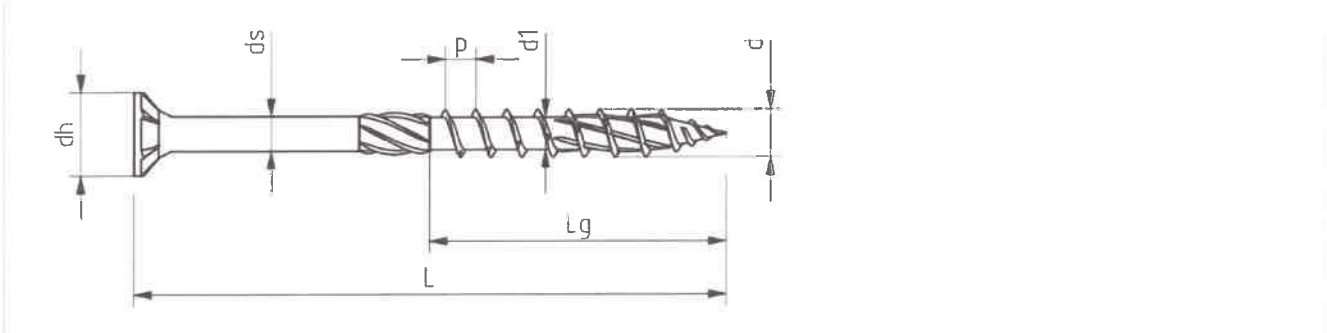
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-3.5/23

1. Unique identification code of the product-type: **WKCS-3.5**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-3.5**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	3,5	
	d_h		[mm]	7,0	
	d_s		[mm]	2,5	
	d_1		[mm]	2,3	
	p		[mm]	1,8	
	L	min	[mm]	30	
		max		50	
	L_g	min	[mm]	17	
		max		30	
Characteristic yield moment	$M_{y,k}$		[Nm]	2	
Bending angle	α		°	38,7	
Characteristic tensile strength	$f_{tens,k}$		[kN]	4	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	2	
Insertion moment	$R_{tor,mean}$		[Nm]	≤ $f_{tor,k}$ / 1,5	
Characteristic yield strength	$f_{y,k}$		[N/mm²]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	13	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			15	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	20,8	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

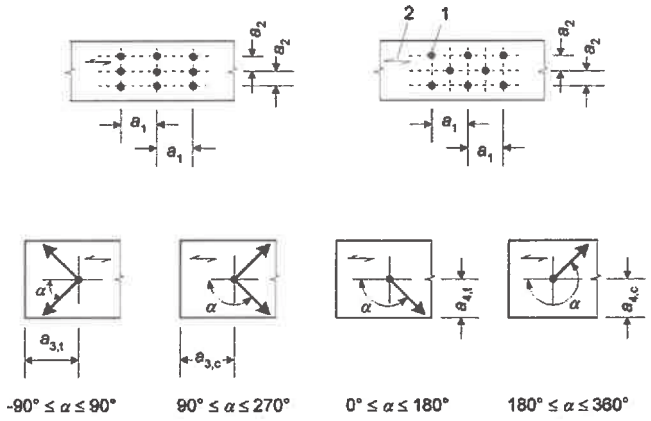
Essential characteristic
Mechanical resistance and stability (BWR1)
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=3,5	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	17,5	10,5	42	24,5	10,5	10,5
α=90°	14	14	24,5	24,5	17,5	10,5



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

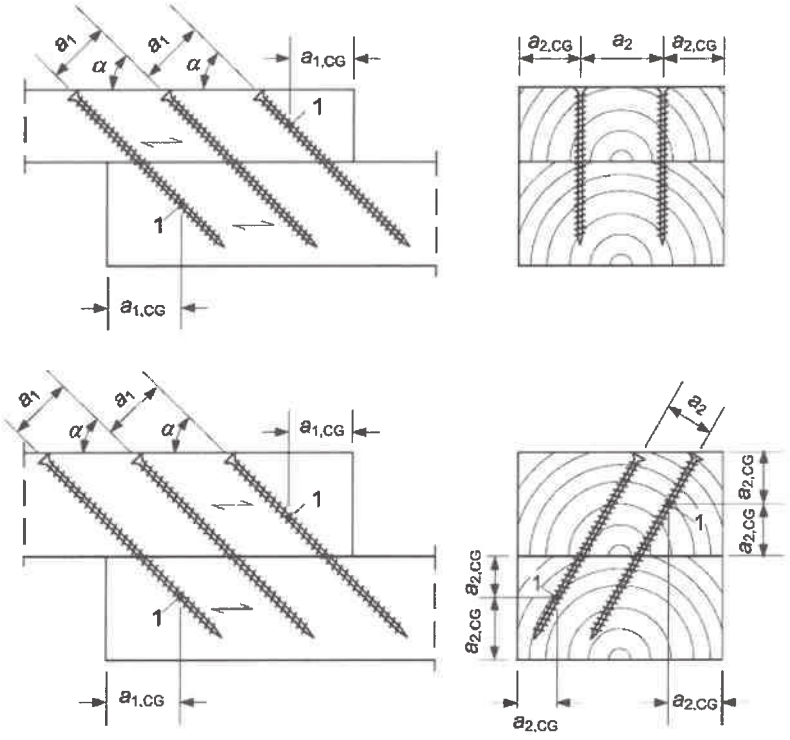
d=3,5	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	35	17,5	52,5	35	17,5	17,5
α=90°	17,5	17,5	35	35	24,5	17,5

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
24,5	17,5	35	14



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 35 mm

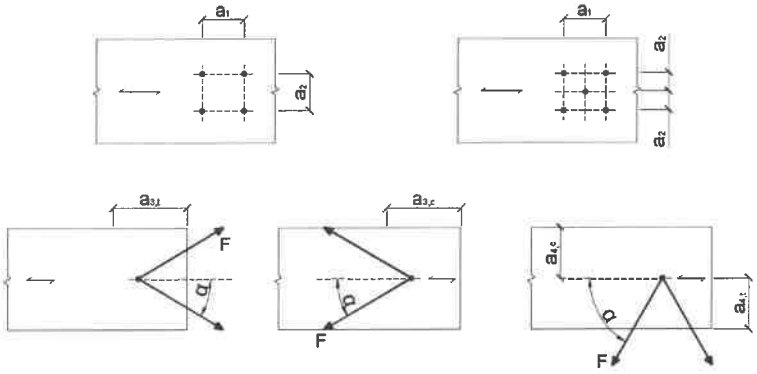
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 35 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

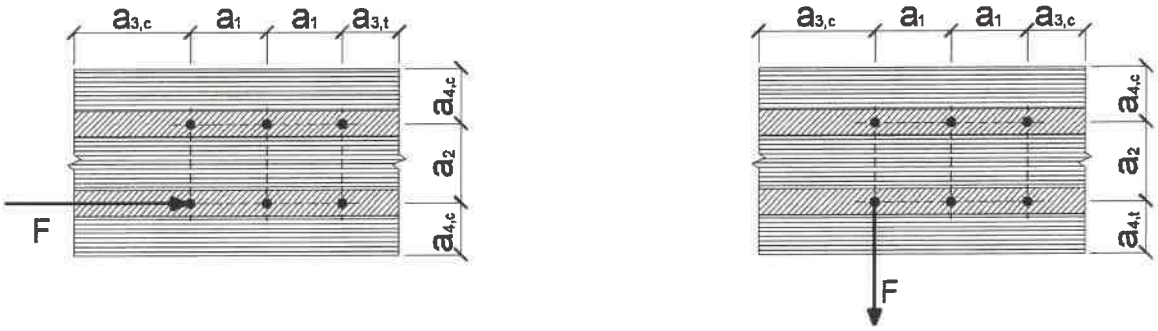
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=3,5	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	14	21	21	8,75	21	8,75
A2.2	35	42	24,5	14	21	10,5



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -
[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

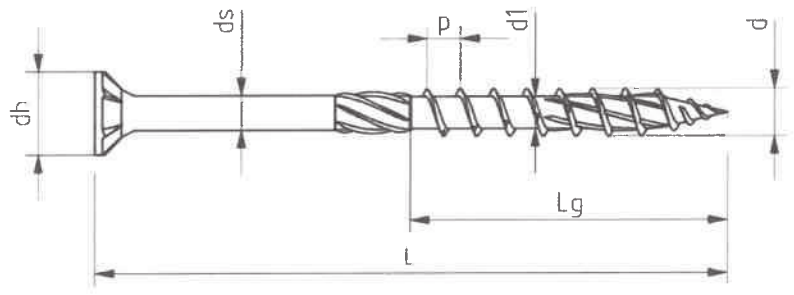
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-4/23

1. Unique identification code of the product-type: **WKCS-4**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-4**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	4,0	
	d_h		[mm]	8,0	
	d_s		[mm]	2,9	
	d_1		[mm]	2,6	
	p		[mm]	2,0	
	L	min	[mm]	30	
		max		70	
	L_g	min	[mm]	17	
		max		40	
Characteristic yield moment	$M_{y,k}$		[Nm]	3,5	
Bending angle	α		°	37,1	
Characteristic tensile strength	$f_{tens,k}$		[kN]	6	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	3,5	
Insertion moment	$R_{tor,mean}$		[Nm]	$\leq f_{tor,k} / 1,5$	
Characteristic yield strength	$f_{y,k}$		[N/mm^2]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	13	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			15	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	19,4	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

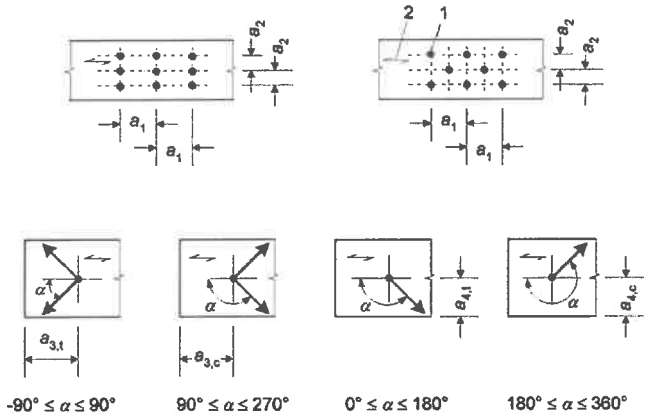
Essential characteristic
Mechanical resistance and stability (BWR1)
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=4	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	20	12	48	28	12	12
α=90°	16	16	28	28	20	12



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

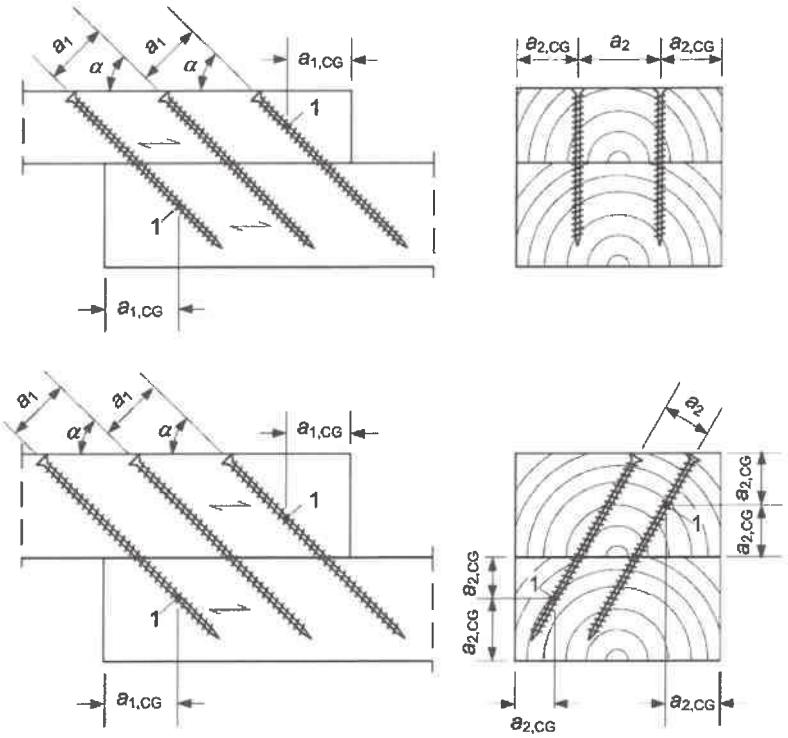
d=4	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	40	20	60	40	20	20
α=90°	20	20	40	40	28	20

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
28	20	40	16



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 40 mm

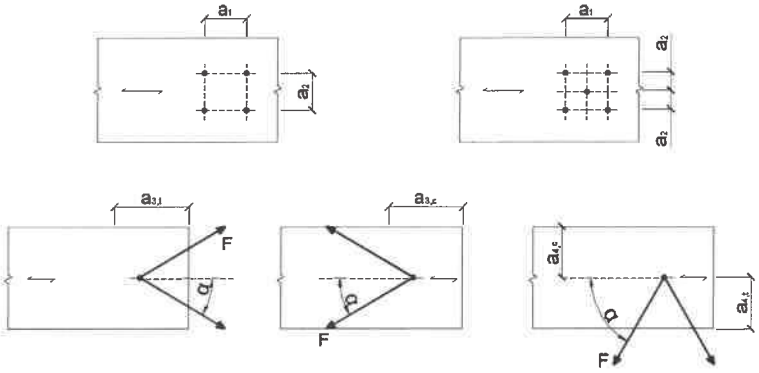
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 40 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

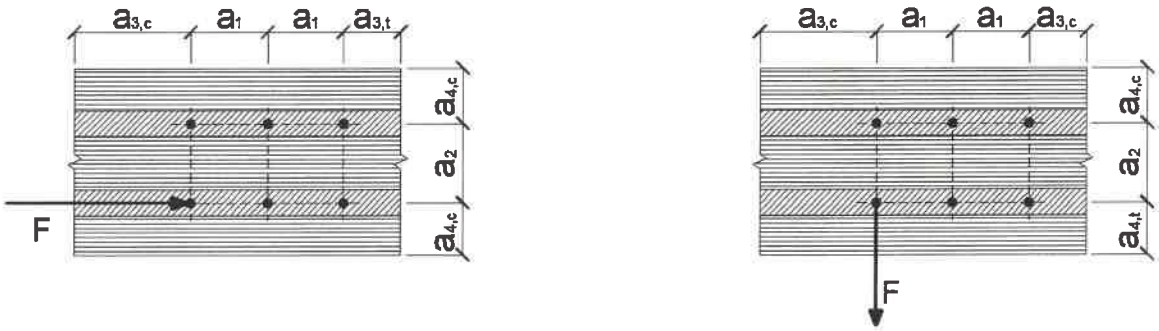
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=4	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	16	24	24	10	24	10
A2.2	40	48	28	16	24	12



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -
[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

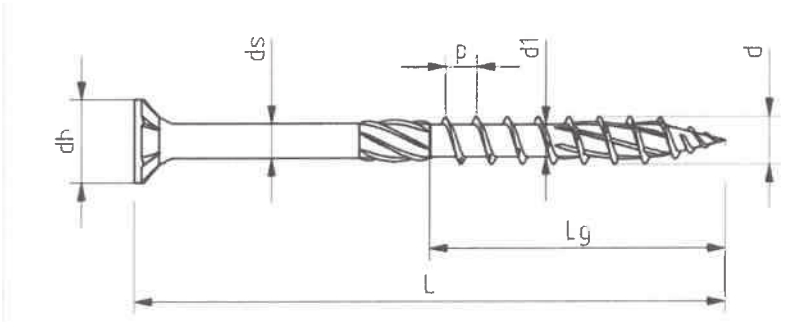
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-4.5/23

1. Unique identification code of the product-type: **WKCS-4.5**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-4.5**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	4,5	
	d_h		[mm]	9,0	
	d_s		[mm]	3,1	
	d_1		[mm]	3,0	
	p		[mm]	2,2	
	L	min	[mm]	40	
		max		80	
	L_g	min	[mm]	22	
		max		50	
Characteristic yield moment	$M_{y,k}$		[Nm]	5	
Bending angle	α		°	35,7	
Characteristic tensile strength	$f_{tens,k}$		[kN]	8	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	4,5	
Insertion moment	$R_{tor,mean}$		[Nm]	≤ $f_{tor,k}$ / 1,5	
Characteristic yield strength	$f_{y,k}$		[N/mm^2]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	13	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			15	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	18,3	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

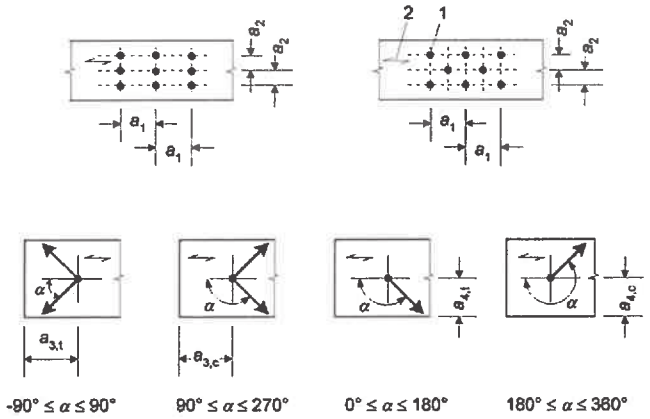
Essential characteristic
Mechanical resistance and stability (BWR1)
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=4,5	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	22,5	13,5	54	31,5	13,5	13,5
α=90°	18	18	31,5	31,5	22,5	13,5



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

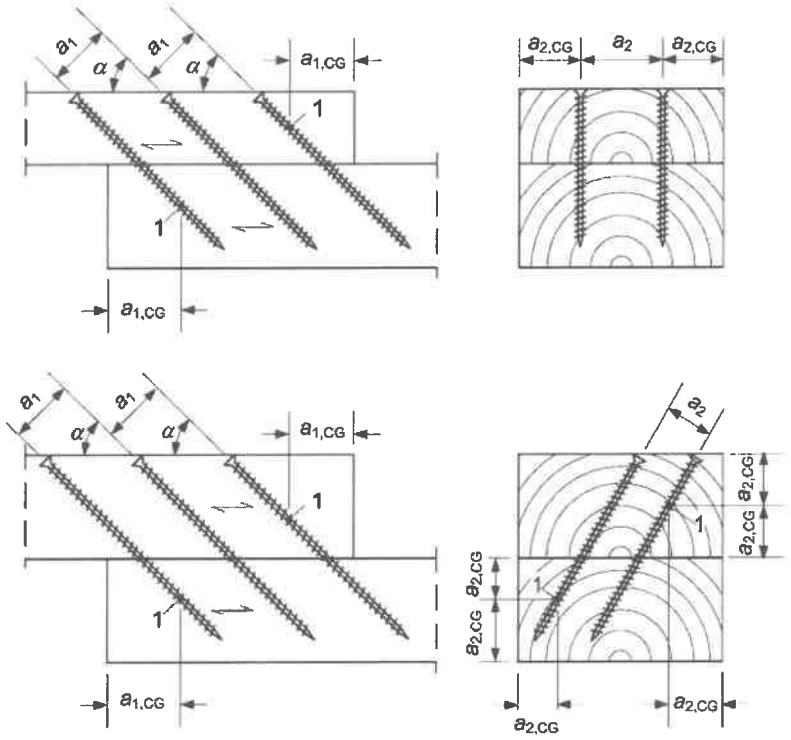
d=4,5	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	45	22,5	67,5	45	22,5	22,5
α=90°	22,5	22,5	45	45	31,5	22,5

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
31,5	22,5	45	18



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 45 mm

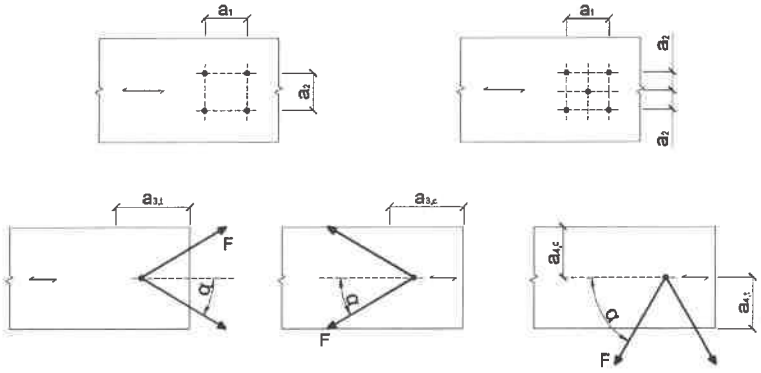
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 45 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

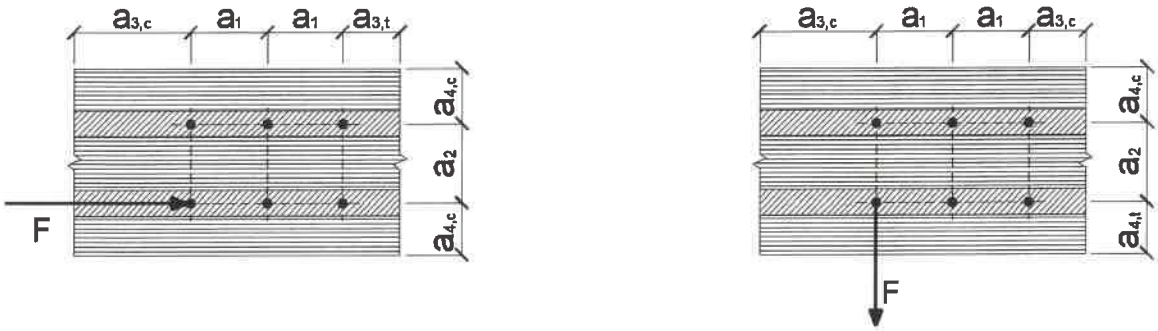
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=4,5	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	18	27	27	11,25	27	11,25
A2.2	45	54	31,5	18	27	13,5



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -
[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

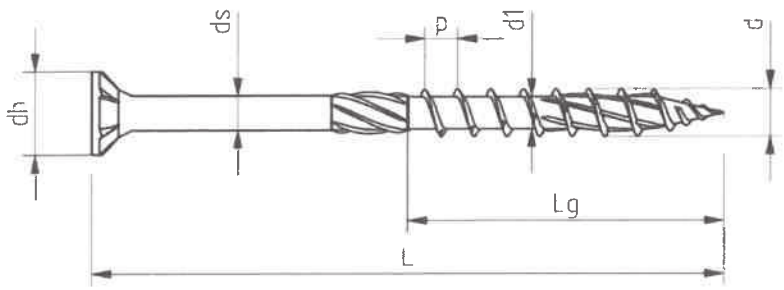
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-5/23

1. Unique identification code of the product-type: **WKCS-5**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-5**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	5,0	
	d_h		[mm]	10,0	
	d_s		[mm]	3,5	
	d_1		[mm]	3,2	
	p		[mm]	2,6	
	L	min	[mm]	40	
		max		120	
	L_g	min	[mm]	22	
		max		60	
Characteristic yield moment	$M_{y,k}$		[Nm]	6	
Bending angle	α		°	34,6	
Characteristic tensile strength	$f_{tens,k}$		[kN]	9	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	6	
Insertion moment	$R_{tor,mean}$		[Nm]	≤ $f_{tor,k}$ / 1,5	
Characteristic yield strength	$f_{y,k}$		[N/mm^2]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	12	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			15	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	17,4	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

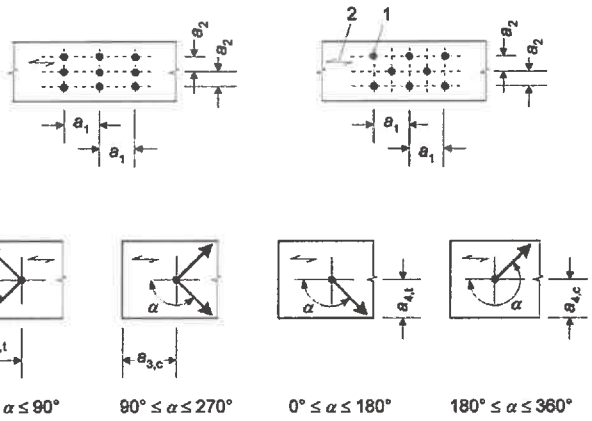
Essential characteristic
Mechanical resistance and stability (BWR1)
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=5	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	25	15	60	35	15	15
α=90°	20	20	35	35	35	15



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

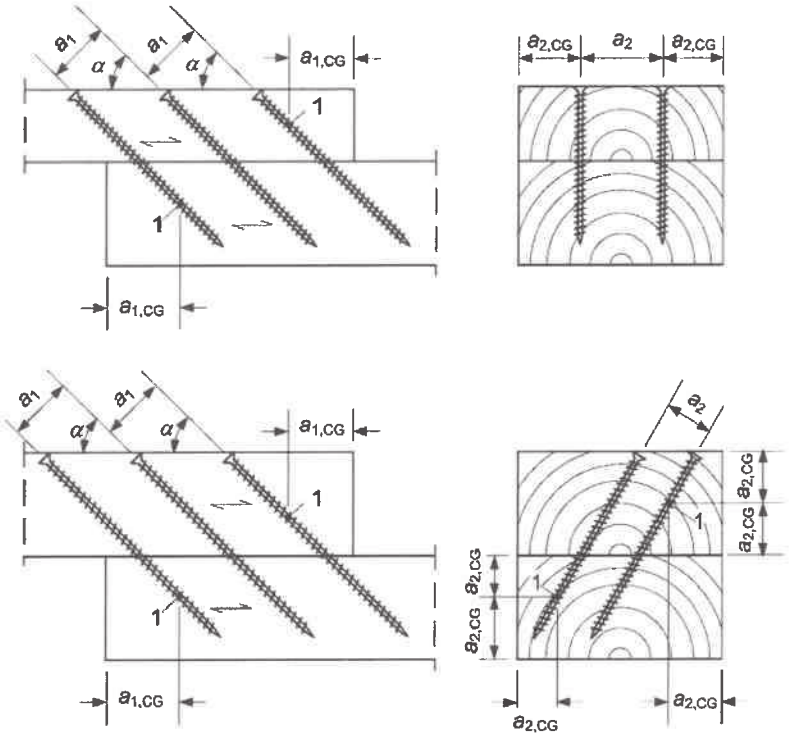
d=5	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	60	25	75	50	25	25
α=90°	25	25	50	50	50	25

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
35	25	50	20



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 50 mm

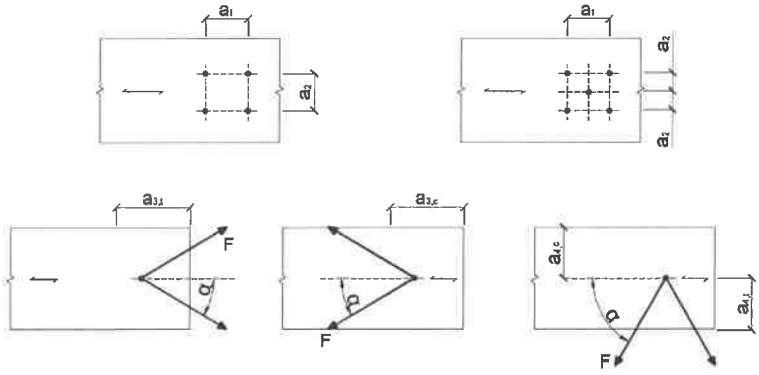
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 50 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

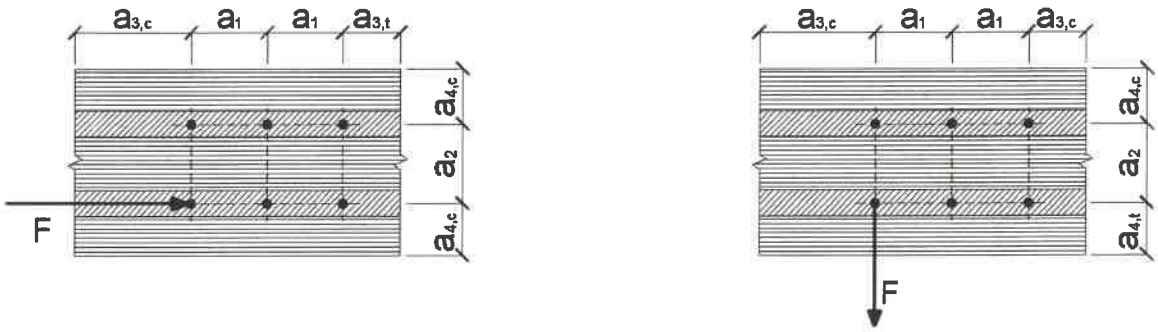
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=5	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	20	30	30	12,5	30	12,5
A2.2	50	60	35	20	30	15



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -
[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

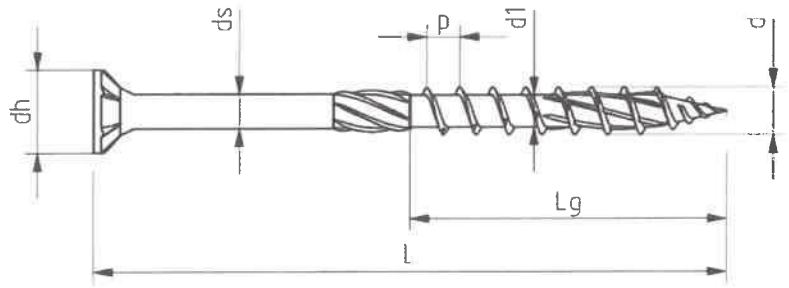
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-6/23

1. Unique identification code of the product-type: **WKCS-6**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-6**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	6,0	
	d_h		[mm]	12,0	
	d_s		[mm]	4,3	
	d_1		[mm]	3,8	
	p		[mm]	3,3/4,5	
	L	min	[mm]	50	
		max		300	
	L_g	min	[mm]	30	
		max		75	
Characteristic yield moment	$M_{y,k}$		[Nm]	10	
Bending angle	α		°	32,8	
Characteristic tensile strength	$f_{tens,k}$		[kN]	13	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	10	
Insertion moment	$R_{tor,mean}$		[Nm]	$\leq f_{tor,k} / 1,5$	
Characteristic yield strength	$f_{y,k}$		[N/mm^2]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	12	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			13	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	15,9	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

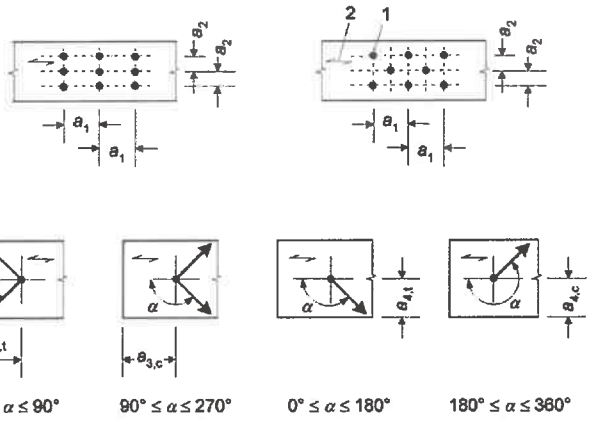
Essential characteristic
Mechanical resistance and stability (BWR1)
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=6	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	30	18	72	42	18	18
α=90°	24	24	42	42	42	18



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

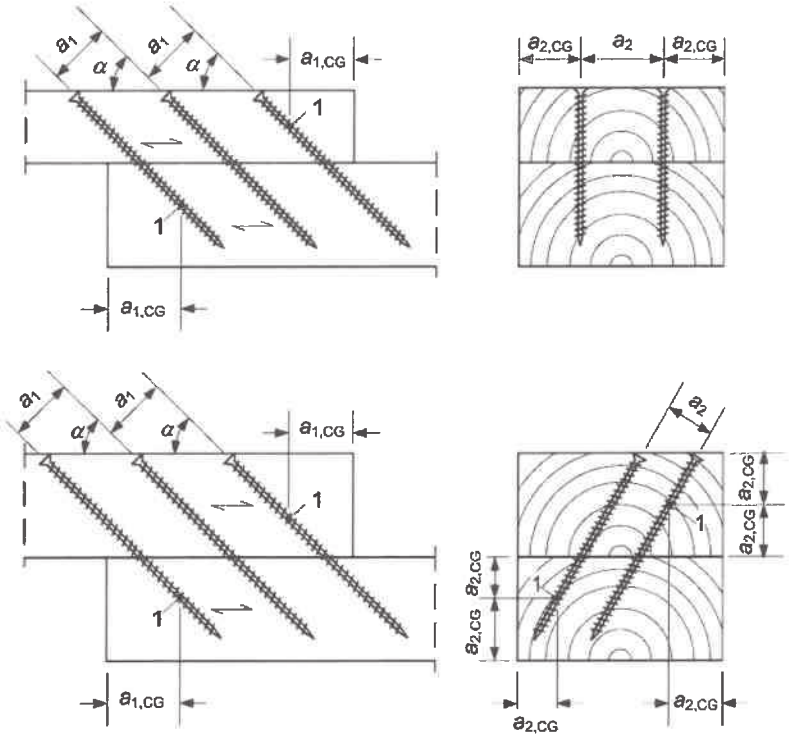
d=6	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	72	30	90	60	30	30
α=90°	30	30	60	60	60	30

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
42	30	60	24



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 60 mm

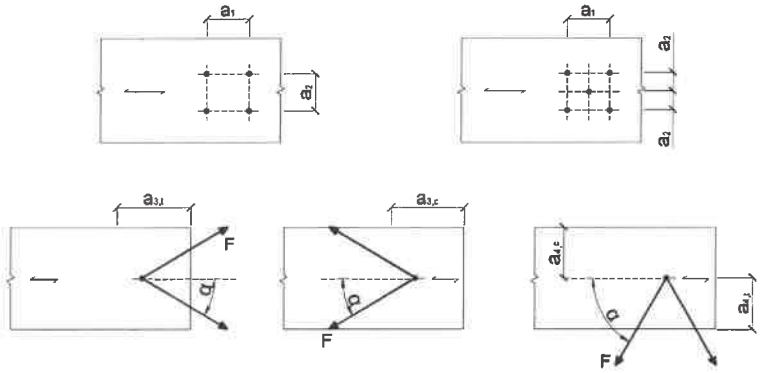
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 60 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

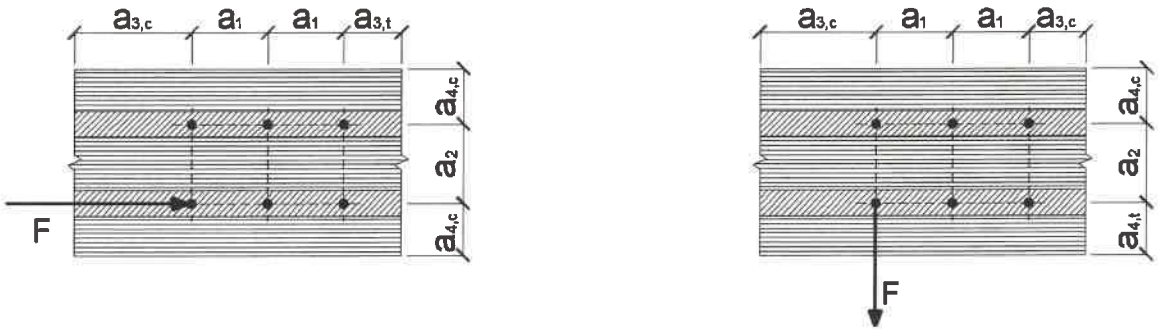
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=6	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	24	36	36	15	36	15
A2.2	60	72	42	24	36	18



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -

[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

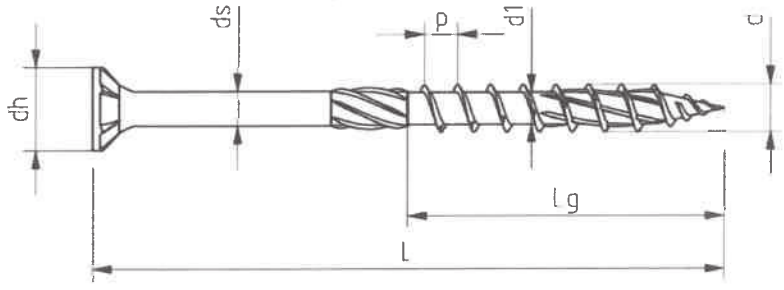
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-8/23

1. Unique identification code of the product-type: **WKCS-8**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-8**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	8,0	
	d_h		[mm]	14,0	
	d_s		[mm]	5,8	
	d_1		[mm]	5,5	
	p		[mm]	5,6	
	L	min	[mm]	40	
		max		600	
	L_g	min	[mm]	35	
		max		100	
Characteristic yield moment	$M_{y,k}$		[Nm]	25	
Bending angle	α		°	30,5	
Characteristic tensile strength	$f_{tens,k}$		[kN]	25	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	27	
Insertion moment	$R_{tor,mean}$		[Nm]	≤ $f_{tor,k}$ / 1,5	
Characteristic yield strength	$f_{y,k}$		[N/mm²]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	12	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			13	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	14,7	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

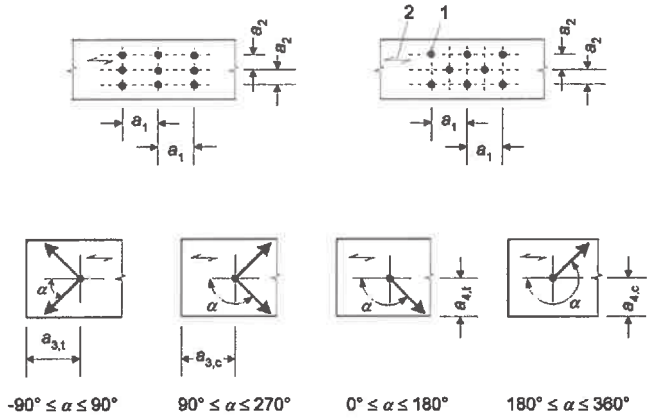
Essential characteristic
Mechanical resistance and stability (BWR1)
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=8	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	40	24	96	56	24	24
α=90°	32	32	56	56	56	24



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

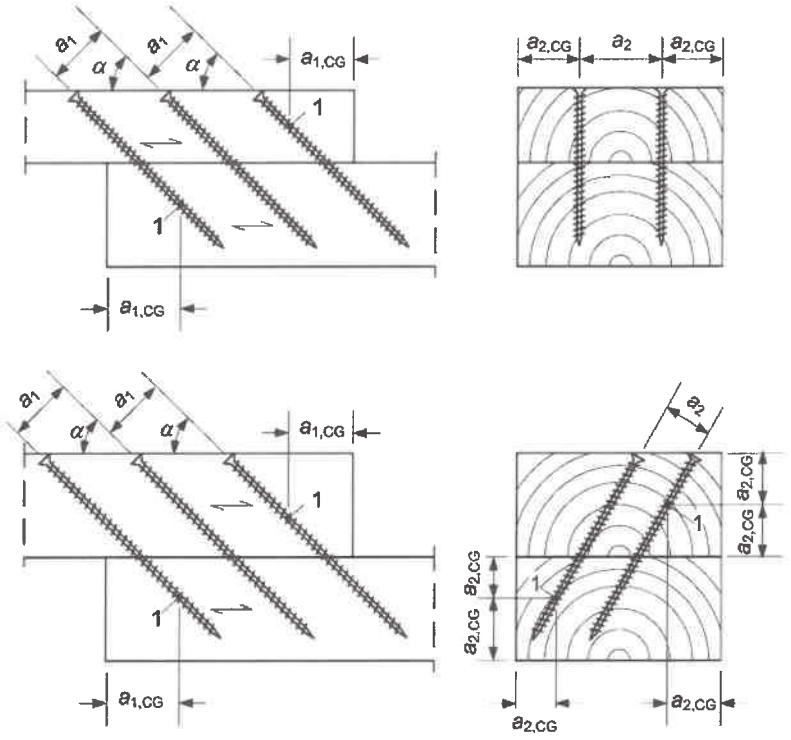
d=8	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	96	40	120	80	40	40
α=90°	40	40	80	80	80	40

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
56	40	80	32



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 80 mm

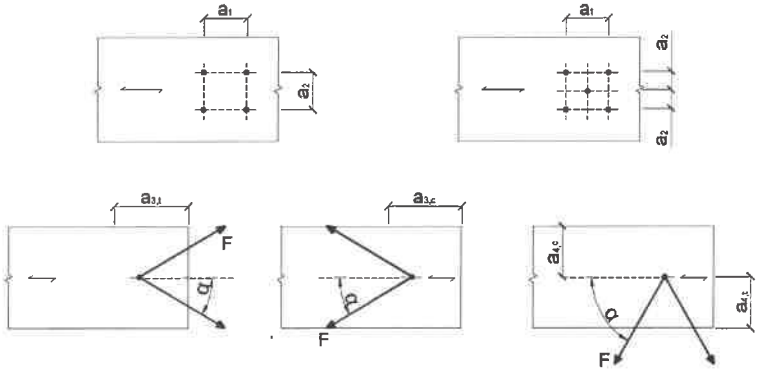
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 80 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

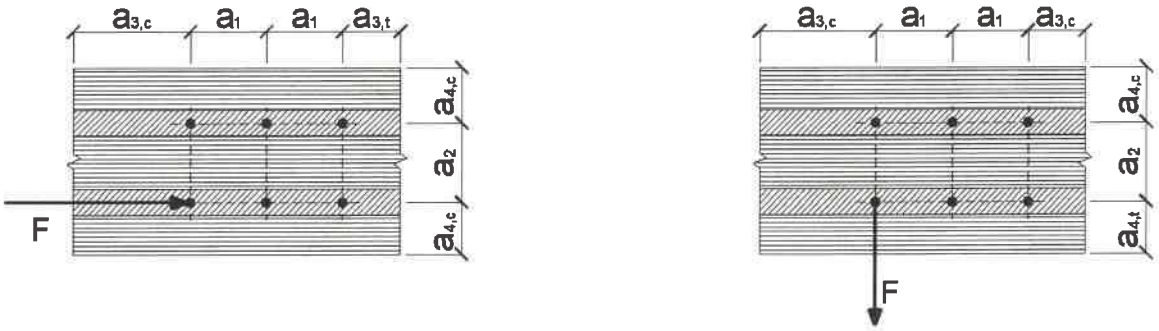
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=8	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	32	48	48	20	48	20
A2.2	80	96	56	32	48	24



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -

[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

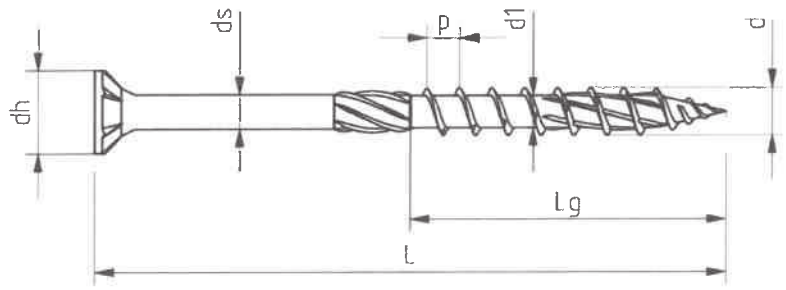
Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.

DECLARATION OF PERFORMANCE No WKCS-10/23

1. Unique identification code of the product-type: **WKCS-10**
2. Intended use/es: **Screws for use in timber constructions**
3. Manufacturer: **Wkręt-met Sp. z o.o.**
   Kuźnica Kiedrzyńska
   ul. Wincentego Witosa 170/176; 42-233 Mykanów
4. Authorised representative: **not applicable**
5. System/s of AVCP: **system 3**
6. European Assessment Document: **EAD 130118-01-0603**
   European Technical Assessment: **ETA-18/0817 - 7/06/2023**
   Technical Assessment Body: **DEUTSCHES INSTITUT FÜR BAUTECHNIK**
   Notified body/ies: **0769**
7. Declared performance/s:

Essential characteristic				**Performance/s**	**WKCS-10**
Mechanical resistance and stability (BWR1)					
Dimensions	d		[mm]	10,0	
	d_h		[mm]	18,0	
	d_s		[mm]	7,0	
	d_1		[mm]	6,3	
	p		[mm]	6,0	
	L	min	[mm]	60	
		max		600	
	L_g	min	[mm]	50	
		max		100	
Characteristic yield moment	$M_{y,k}$		[Nm]	43	
Bending angle	α		°	29	
Characteristic tensile strength	$f_{tens,k}$		[kN]	36	
Characteristic torsional strength	$f_{tor,k}$		[Nm]	45	
Insertion moment	$R_{tor,mean}$		[Nm]	≤ $f_{tor,k}$ / 1,5	
Characteristic yield strength	$f_{y,k}$		[N/mm^2]	NPD	



Characteristic withdrawal parameter	$f_{ax,k}$	[N/mm^2]	11	for screws in solid or glued laminated timber, cross laminated timber and SWP members with maximum characteristic density of 440 kg/m³
			ρa = 350 kg/m^3	
			13	for screws in non pre-drilled LVL with 460 kg/m³ ≤ ρk ≤ 550 kg/m³
			ρa = 480 kg/m^3	
Characteristic head pull-through parameter	$f_{head,k}$	[N/mm^2]	13	for screws or for washer in connections with softwood and in connections with wood-based panels with thicknesses above 20 mm
			ρa = 350 kg/m3	
			8	for screws in connections with wood-based panels with thicknesses between 12 mm and 20 mm
			-	
			8	for screws in connections with wood-based panels with a thickness below 12 mm (minimum thickness of the wood based panels of 1,2·d)
			$F_{ax,Rk} \leq 400$ N	
Slip modulus for mainly axially loaded screws	k_{ser}	[N/mm]	Softwood:	**$25 \cdot d \cdot l_{ef}$**
			lef- Penetration length in the timber member [mm]	
Durability against corrosion	Coating thickness ≥ 5 µm, according to EN ISO 4042 or EN ISO 10683			
	The screws have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service classes 1, 2			

Essential characteristic

Mechanical resistance and stability (BWR1)

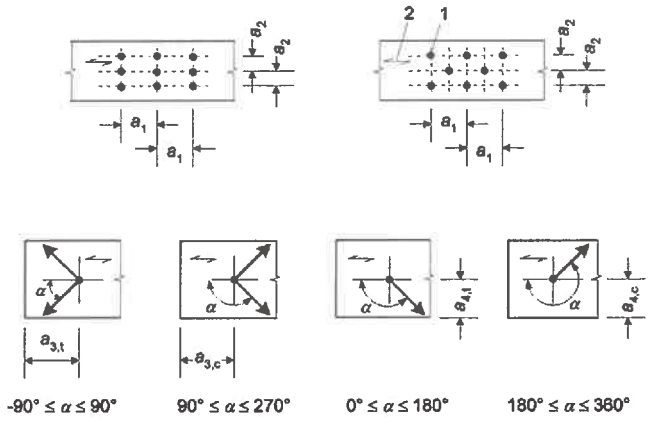
Spacing, end and edge distances of the screws and minimum thickness of the timber material

Laterally or laterally and axially loaded screws

Screws in pre-drilled holes

For KLIMAS screws in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

d=10	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	50	30	120	70	30	30
α=90°	40	40	70	70	70	30



Minimum thickness for structural wood-based members made of solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm.

Screws in non pre-drilled holes

For KLIMAS screws in non-predrilled holes the minimum spacings, end and edge distances and the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

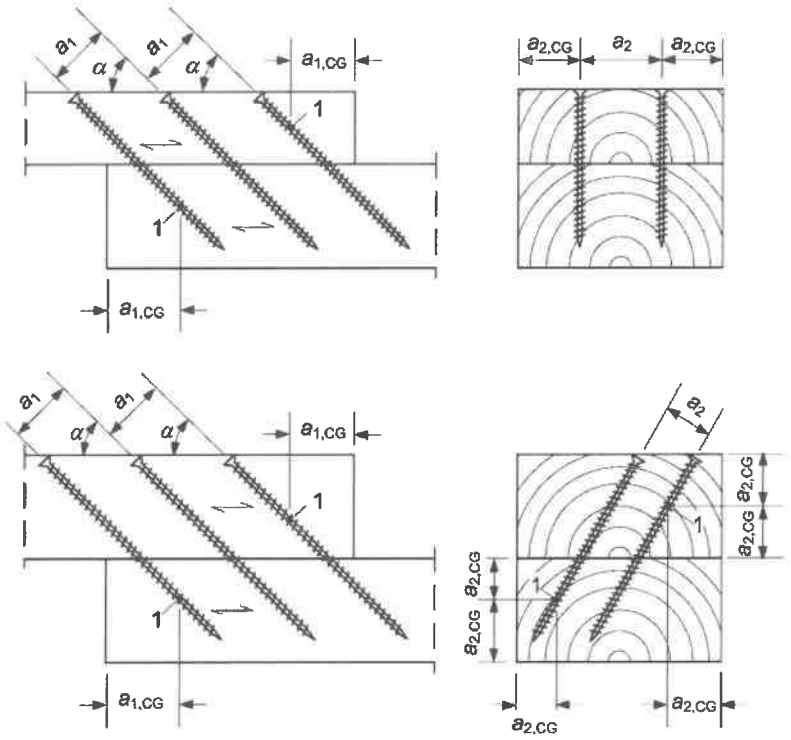
d=10	a_1 [mm]	a_2 [mm]	$a_{3,t}$ [mm]	$a_{3,c}$ [mm]	$a_{4,t}$ [mm]	$a_{4,c}$ [mm]
α=0°	120	50	150	100	50	50
α=90°	50	50	100	100	100	50

For Douglas fir members minimum spacings and distances parallel to the grain shall be increased by 50 %.
Minimum distances from loaded or unloaded ends parallel to the grain shall be at least 15·d for screws with outer thread diameter d > 8 mm and timber thickness t < 5·d.
Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 24 mm for screws with outer thread diameter d < 8 mm, t = 30 mm for screws with outer thread diameter d = 8 mm and t = 40 mm for screws with outer thread diameter d = 10 mm, if the spacing parallel to grain and the end distance are at least 25·d.
Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

Only axially loaded screws

For KLIMAS screws the minimum spacings, end and edge distances as well as the minimum member thickness are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

minimum screw spacing parallel to the grain	minimum screw spacing perpedicular to the grain	minimum end distance of the center of gravity of the threaded part of the screw in the member / front side	minimum edge distance of the center of gravity of the threaded part of the screw in the member / lateral side
a_1 [mm]	a_2 [mm]	$a_{1,CG}$ [mm]	$a_{2,CG}$ [mm]
70	50	100	40



Cross laminated timber CLT

The minimum requirements for spacing, end and edge distances of screws in the wide or narrow faces of cross laminated timber are summarised in Table A.2.3. The definition of spacings, end and edge distance is shown in Figure A.2.1 and Figure A.2.2. The minimum spacings, end and edge distances in the narrow faces are independent of the angle between screw axis and grain direction. They shall be used based on the following conditions:

Minimum thickness of the cross laminated timber: 10d= 100 mm

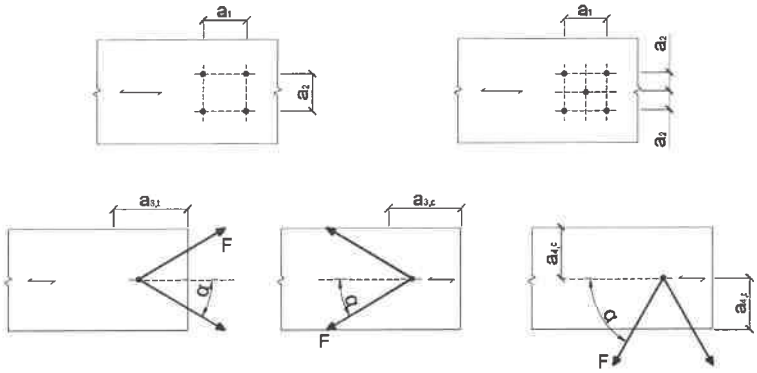
Minimum penetration depth in the narrow faces of the cross laminated timber: 10d= 100 mm

For load components perpendicular to the wide faces (see Figure A.2.2 right) the tensile stresses perpendicular to the grain should be transferred by reinforcing screws.

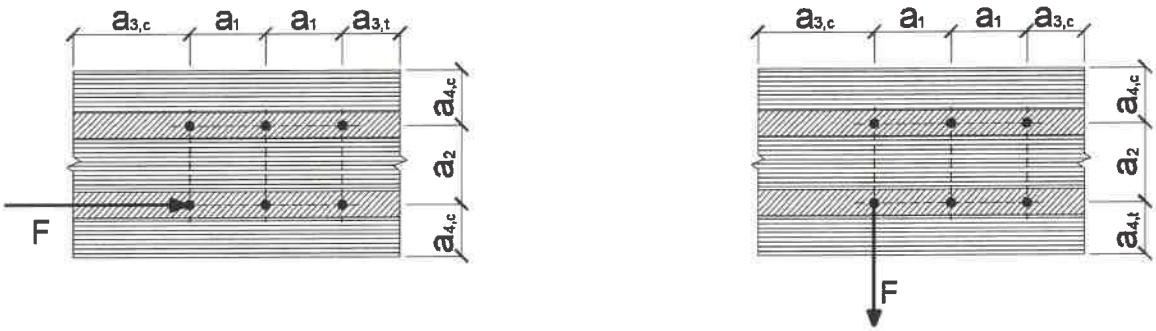
Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

A.2.3

d=10	a1	a3,t	a3,c	a2	a4,t	a4,c
A2.1	40	60	60	25	60	25
A2.2	100	120	70	40	60	30



A.2.1 Definition of spacing, end and edge distances in the plane surface of the cross laminated timber.



A.2.2 Definition of spacing, end and edge distances in the edge surface of the cross laminated timber. For screws in the edge surface, a1 and a3 are parallel to the CLT plane face, a2 and a4 perpendicular to CLT plane face.

Essential characteristic	Performance/s		Technical specification
Safety in case of fire (BWR2)			
Reaction to fire	Euroclass A1		ETA-18/0817 - 7/06/2023

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **not applicable**

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Kuźnica Kiedrzyńska
12-06-2023

[place]
[date of issue]

Kierownik działu technicznego
Adam Szczepanowski
- 415 -
[name]
[signature]

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

- Solid timber (softwood) according to EN 14081-1;
- Glued laminated timber (softwood) according to EN 14080;
- Laminated veneer lumber LVL made of softwood according to EN 14374, arrangement of the screws only perpendicular to the plane of the veneers;
- Glued solid timber according to EN 14080;

- Cross-laminated timber made from softwood according to European Technical Assessments.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636 and EN 13986;
- Oriented Strand Board, OSB according to EN 300 and EN 13986;
- Particleboard according to EN 312 and EN 13986;
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986;
- Cement-bonded particle boards according to EN 634-2 and EN 13986;
- Solid-wood panels according to EN 13353 and EN 13986.

Wood-based panels are only be arranged on the side of the screw head. KLIMAS screws with an outer thread diameter of at least 6 mm can be used for the fixing of thermal insulation material on top of rafters or on wood-based members in vertical facades.

WKFC and WKFS screws are used for compression and tension reinforcing of timber structures perpendicular to the grain.