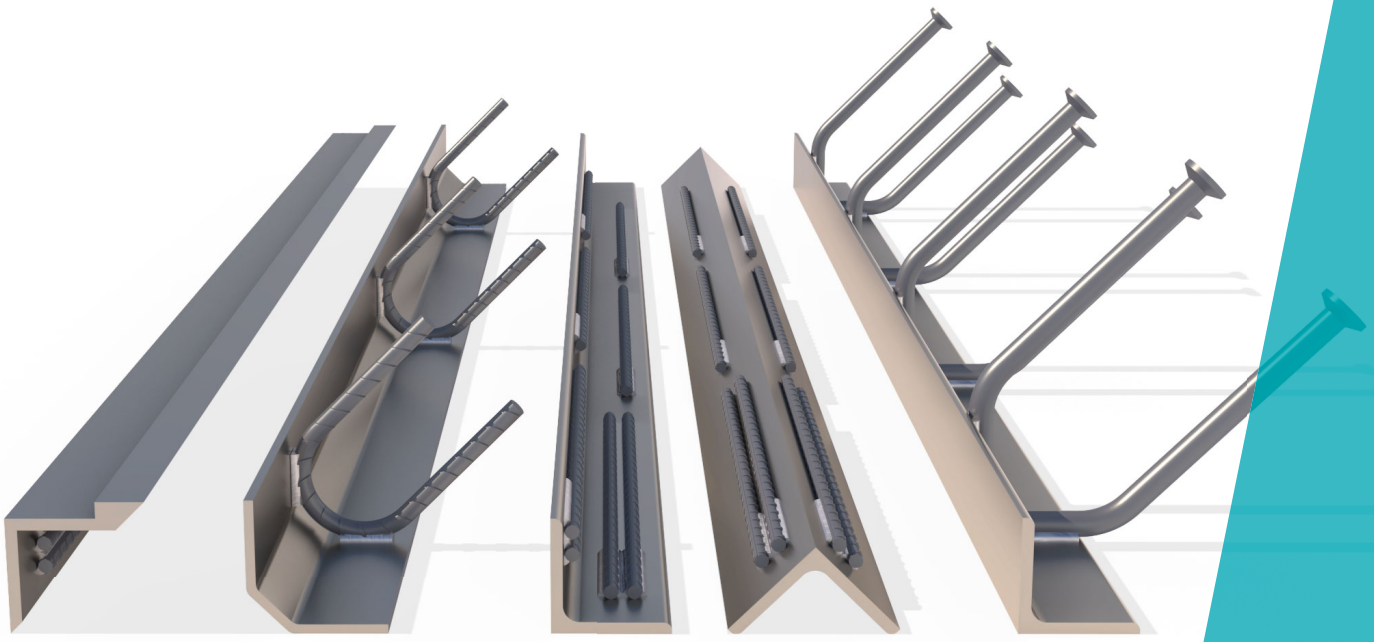
TECHNICAL MANUAL



Corner Protectors

For protection of concrete structures and welded connections

Version PEIKKO GROUP 09/2019

peikko®

Corner Protectors

For protection of concrete structures and welded connections

- Keeps the construction in good shape
- Precalculated capacities speed up the design work
- Multitude of material options and combinations enable use in even the most demanding cases
- More than 10 combinations of models and angle bar dimensions
- Standardized products enable fast deliveries directly from storage

Corner Protectors are used as a protecting profile for the corners of columns, walls and in slab structure edges. Load-bearing models allow transferring loads to concrete. Corner Protectors consist of a steel L-profile and headed studs or ribbed anchor bars embedded in concrete. The surface of the steel plate remains uncovered by concrete and thus creates a welding surface for concrete structures and keeps your investment in good condition throughout its lifetime.

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CONTENTS

About Corner Protectors

1. Product properties

Corner Protectors are structural elements embedded in concrete. They consist of a steel L-profile and either welded headed studs or ribbed anchor bars.

Corner Protectors are available in various models that are suitable for different applications.

Model KKT Corner Protector

KKT Corner Protector is designed for long fixing or several fixings on concrete edges. They are especially suited for heavy industrial constructions. They transfer loads to concrete by headed studs.

KKT

Model UKT Corner Protector

UKT Corner Protector is designed for use in the outer corner of concrete constructions, e.g. corners of stairs and expansion joints. They can transfer loads to concrete by rebar anchors, which are bent to the right position on site.

UKT

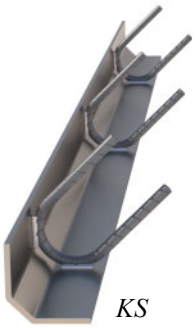
Model SKT Corner Protector

SKT Corner Protector is designed as a protective profile for the inner corner of concrete constructions or as assembly frames for grating. They can transfer loads to concrete by rebar anchors, which are bent to the right position on site.

SKT

Model KS Corner Protector

KS Corner Protector is recommended for keeping the corners of walls and columns in good condition during their lifetime. They do not transfer any structural loads to concrete.



KS

Model RLRK Support

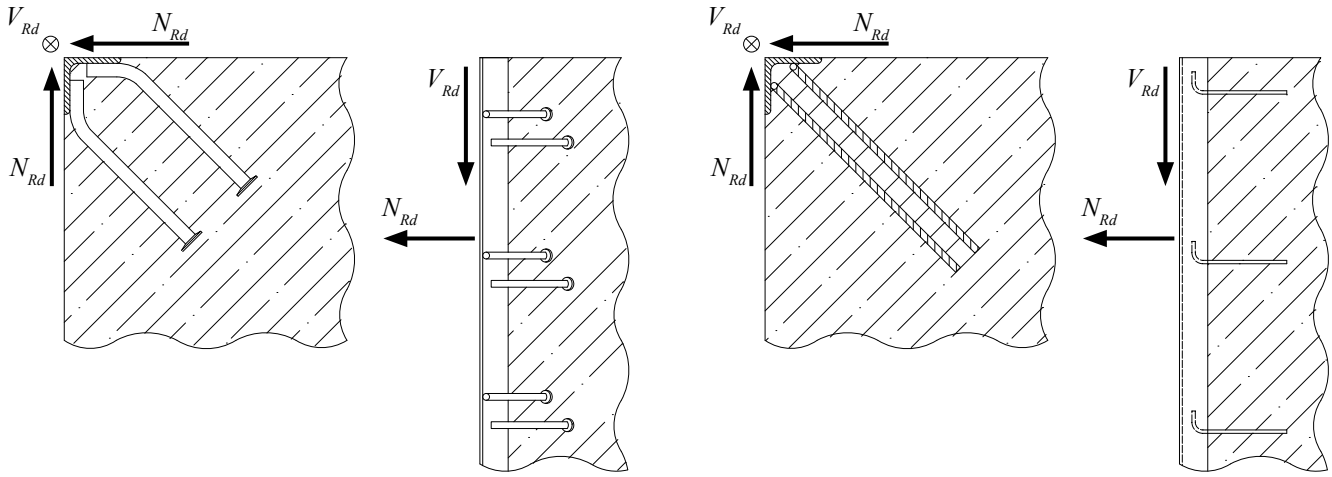
RLRK Support is designed for use in the outer corner of a concrete construction to support chequered plates covering openings in various passages.

RLRK

1.1 Structural behavior

Corner Protectors are designed to protect concrete structures against adverse effects especially in industrial constructions. They help to keep the construction in good shape during its entire lifetime. Models like KKT, UKT and SKT can also transfer tensile and shear forces into concrete. Loads from the welded profile are transferred through L-profile to the headed studs or anchor bars embedded in concrete.

Figure 1. Structural behavior of Corner Protectors.



1.2 Application conditions

Corner Protectors are designed to be used under the conditions stated in this chapter. If these conditions are not met, please contact Peikko Technical Support.

1.2.1 Loading and environmental conditions

Corner Protectors are intended for use in different environmental conditions depending on the materials of which they are manufactured. The selection of raw material or surface treatment must be in accordance with requirements for environmental exposure class and intended operating life. Peikko offers two standard surface coating options: Sandblasting (SA 2½) with A40µm coating and Hot-Dip Galvanizing. Other anti-corrosion methods, such as epoxy painting, can also be utilized. For further information, please contact Peikko Technical Support.
Hot-Dip Galvanizing is achieved through dipping the product completely into galvanizing material. The thickness is 80µm according to EN ISO 1461.

Examples for ordering Corner Protector:

- Sandblasted and coated ⇨ Name: KKT 80-6000
- Hot-Dip Galvanized ⇨ Name: KKT 80-6000 HDG

1.3 Materials and dimensions

Corner Protectors are designed to be used in reinforced concrete with minimum concrete grade C20/25 or higher. Corner Protector is made of ribbed anchor bars or headed studs and steel L-profile with the following properties:

Table 1. Types of materials used in Corner Protectors.

Part	Material	Standard
L-profile	S235JR	EN 10025-2
	1.4301	EN 10088
	1.4401	EN 10088
Headed stud	S235J2+N	EN 10025-2
Anchor bar	B500B	SFS 1300 / EN 10080
	B600XB	SFS 1259

The design values of tensile and shear resistances of load-bearing Corner Protectors (models KKT, UKT and SKT) are calculated based on the most unfavorable used materials for all parts of Corner Protectors.

Table 2. Production tolerances.

Part	Length tolerance
L-profile	± 15 mm
Headed stud	± 5 mm
Anchor bar	± 5 mm

1.3.1 KKT Corner Protector

1.3.1.1 Material

Table 3. Combination of materials in model KKT Corner Protector.

Model	L-profile	Anchor elements	Enviromental condition
KKT	S235JR	S235J2+N	Indoor
KKTR	1.4301	S235J2+N	Outdoor
KKTH	1.4401	S235J2+N	Outdoor

1.3.1.2 Dimensions

Figure 2. Dimensions of KKT Corner Protector.

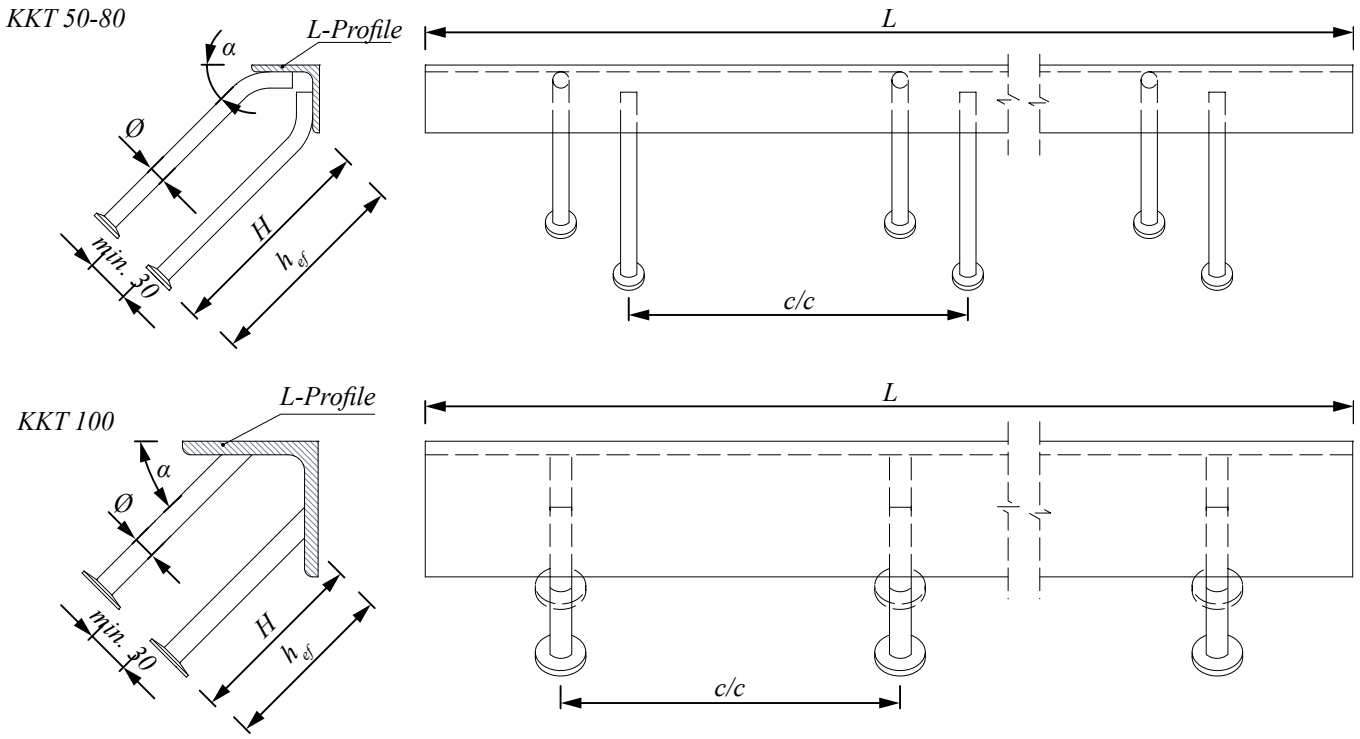


Table 4. Dimensions of model KKT Corner Protector.

Type	L-profile [mm]	Length of Corner Protector *L* [mm]*	Diameter Ø [mm]	Effective embedment depth *H* [mm]	Distance between headed studs *c/c* [mm]	Angle of headed studs *α* [°]	Number of headed studs in one row *n* [-]	Weight [kg/m]
KKT/KKTR/KKTH 50	50×50×5	6000	12	160	250	45	2	5.3
KKT/KKTR/KKTH 60	60×60×6	6000	12	160	250	45	2	6.95
KKT/KKTR/KKTH 70	70×70×7	6000	12	160	250	45	2	8.95
KKT/KKTR/KKTH 80	80×80×8	6000	12	160	250	45	2	11.2
KKT/KKTR/KKTH 100	100×100×10	6000	16	134	200	45	2	18.0

* The maximum length of Corner Protector is 6 m. It can be easily cut to the required length on building site.

1.3.2 UKT Corner Protector

1.3.2.1 Materials

Table 5. Combination of materials in model UKT Corner Protector.

Model	L-profile	Anchor elements	Enviromental condition
UKT	S235JR	B500B	Indoor
UKTRr	1.4301	B600XB	Outdoor

1.3.2.2 Dimensions

Figure 3. Dimensions of UKT Corner Protector.

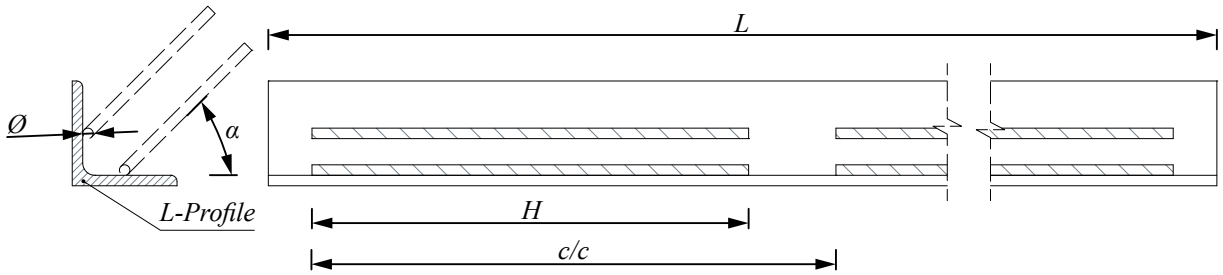


Table 6. Dimensions of model UKT Corner Protector.

Type	L-profile [mm]	Length of Corner Protector *L* [mm] *	Diameter Ø [mm]		Length of anchor bar *H* [mm]	Distance between anchor bars *c/c* [mm]	Angle of anchor bars *α* [°]	Number of anchor bars in one row *n* [-]	Weight [kg/m]
			UKT	UKTRr					
UKT/UKTRr 40	40×40×4	6000	6	5	250	300	45	2	2.8
UKT/UKTRr 50	50×50×5	6000	6	5	250	300	45	2	4.2
UKT/UKTRr 60	60×60×6	6000	6	5	250	300	45	2	5.9
UKT/UKTRr 70	70×70×7	6000	6	5	250	300	45	2	7.8
UKT/UKTRr 80	80×80×8	6000	6	5	250	300	45	2	10.2
UKT/UKTRr 100	100×100×10	6000	6	5	250	300	45	2	16.0
UKT/UKTRr 100×50	100×50×8	6000	6	5	250	300	45	2	9.6

* The maximum length of Corner Protector is 6 m. It can be easily cut to the required length on building site.

1.3.3 SKT Corner Protector

1.3.3.1 Materials

Table 7. Combination of materials in model SKT Corner Protector.

Model	L-profile	Anchor elements	Enviromental condition
SKT	S235JR	B500B	Indoor
SKTRr	1.4301	B600XB	Outdoor

1.3.3.2 Dimensions

Figure 4. Dimensions of SKT Corner Protector.

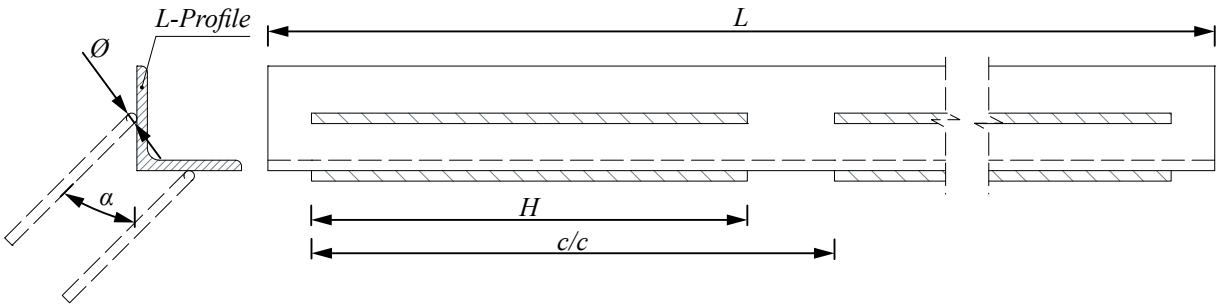


Table 8. Dimensions of model SKT Corner Protector.

Type	L-profile [mm]	Length of Corner Protector *L* [mm] *	Diameter Ø [mm]		Length of anchor bar *H* [mm]	Distance between anchor bars *c/c* [mm]	Angle of anchor bars *α* [°]	Number of anchor bars in one row *n* [-]	Weight [kg/m]
			SKT	SKTRr					
SKT/SKTRr 50	50×50×5	6000	6	5	250	300	45	2	4.2
SKT/SKTRr 70	70×70×7	6000	6	5	250	300	45	2	7.8

* The maximum length of Corner Protector is 6 m. It can be easily cut to the required length on building site.

1.3.4 KS Corner Protector

1.3.4.1 Materials

Table 9. Combination of materials in model KS Corner Protector.

Model	L-profile	Anchor elements	Enviromental condition
KS	S235JR	B500B	Indoor
KSR	1.4301	B500B	Outdoor
KSRr	1.4301	B600XB	Outdoor

1.3.4.2 Dimensions

Figure 5. Dimensions of KS Corner Protector.

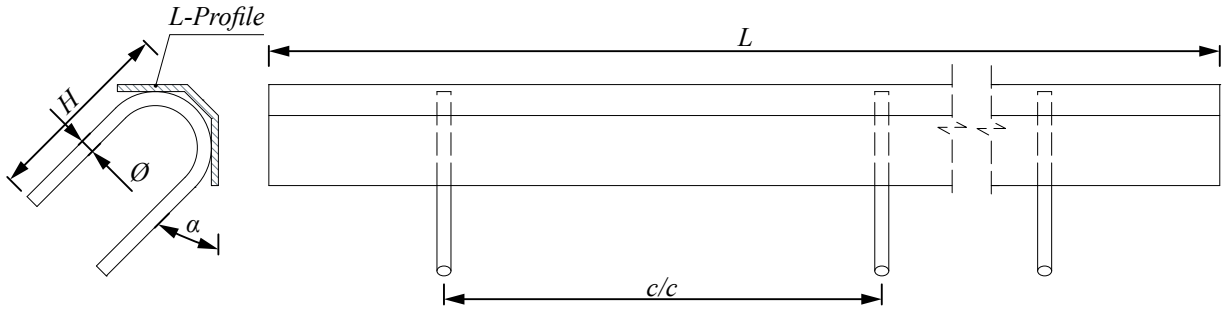


Table 10. Dimensions of KS Corner Protector.

Type	L-profile [mm]	Length of Corner Protector L [mm] *	Diameter Ø [mm]	Length of anchor bar H [mm]	Distance between anchor bars c/c [mm]	Angle of anchor bars α [°]	Number of anchor bars in one row n [-]	Weight [kg/m]
KS/KSR	PL4×100	2000	8	110	360	45	2	3.5
KSRr	PL4×100	2000	7	110	360	45	2	3.4

* The maximum length of Corner Protector is 2 m. It can be easily cut to the required length on building site.

1.3.5 RLRK Support

1.3.5.1 Materials

Table 11. Combination of materials in model RLRK Support.

Model	L-profile	Anchor elements	Enviromental condition
RLRK	S235JR	B500B	Indoor
RLRKr	1.4301	B600XB	Outdoor

1.3.5.2 Dimensions

Figure 6. Dimensions of RLRK Support.

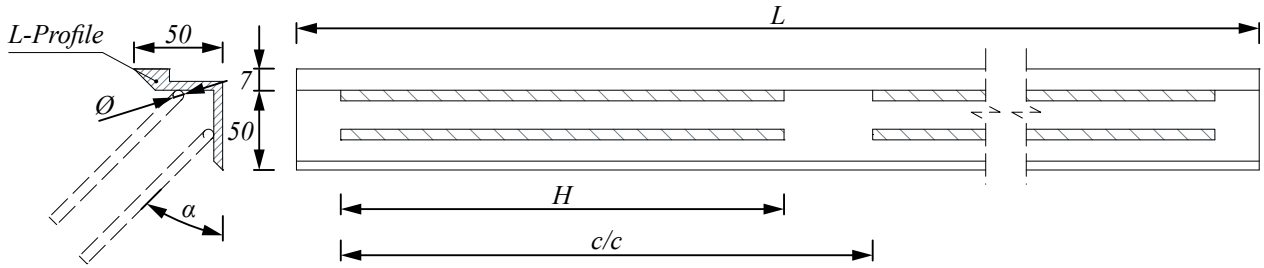


Table 12. Dimensions of RLRK Support.

Type	L-profile [mm]	Length of Corner Protector *L* [mm] *	Diameter Ø [mm]	Length of anchor bar *H* [mm]	Distance between anchor bars *c/c* [mm]	Angle of anchor bars *α* [°]	Number of anchor bars in one row *n* [-]	Weight [kg/m]
RLRK	50×57×5	6000	6	250	300	45	2	4.4
RLRKr	50×56×5	6000	5	250	300	45	2	5.1

* The maximum length of Corner Protector is 6 m. It can be easily cut to the required length on building site.

Peikko Group's production units are externally controlled and periodically audited on the basis of production certifications and product approvals by various independent organizations.

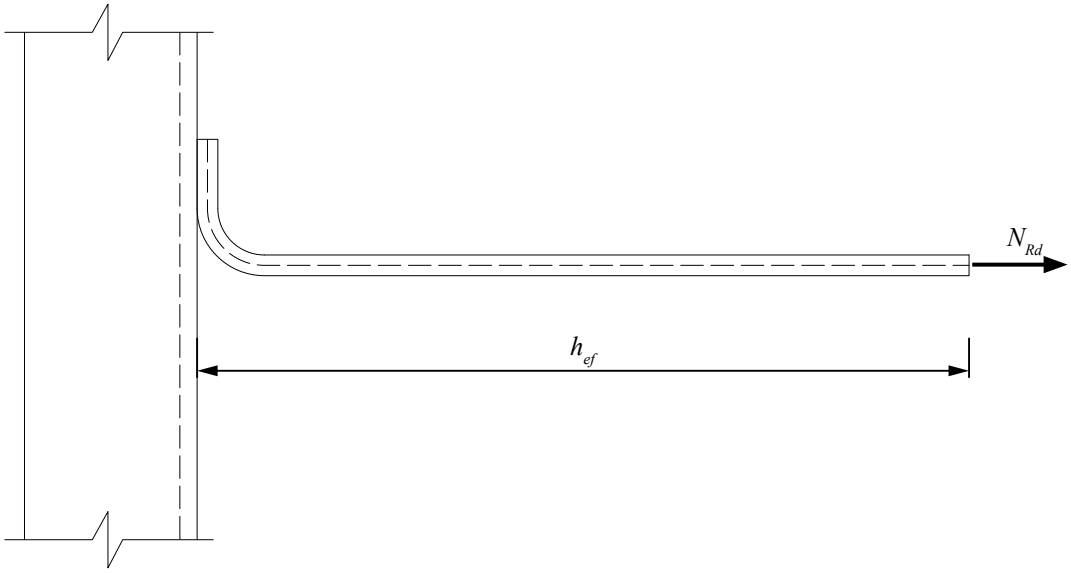
The products bear the certification mark, the emblem of Peikko Group, the type of the product, and date and place of manufacturing.

2. Resistances

The design values of tensile and shear resistances of load-bearing Corner Protectors (models KKT, UKT, SKT) are determined according to following standards:

- EN 1992-1-1:2004
- EN 1992-4:2018
- EN 1993-1-1:2005
- EN 1993-1-8:2005
- EN 1993-1-4:2006

Figure 7. Minimum anchorage length of bended anchor bars of models UKT Corner Protector and SKT Corner Protector.

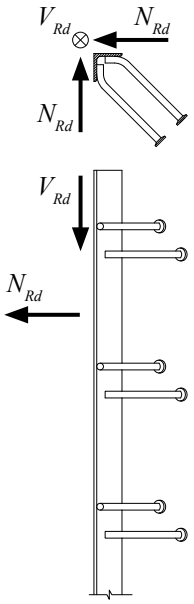


The tensile resistance of models UKT Corner Protector and SKT Corner Protector is calculated with a minimum anchorage length of anchor bars h_{ef} = 210 mm.

The resistances of Corner Protectors against tensile and shear force for all models which transfer loads are summarized in *Table 13*. Resistances are per one row of anchors.

Table 13. Tensile and shear resistance of Corner Protectors.

Model type		N_{Rd} [kN] / row	V_{Rd} [kN] / row
KKT/KKTR/KKTH	50	14.2	16.1
	60	14.2	16.1
	70	14.2	16.1
	80	14.2	16.1
	100	12.0	28.7
UKT/UKTRr	40	10.5	4.2
	50	10.5	4.2
	60	10.5	4.2
	70	10.5	4.2
	80	10.5	4.2
	100	10.5	4.2
	100x50	10.5	4.2
SKT/SKTRr	50	10.5	4.2
	70	10.5	4.2



Selecting Corner Protectors

The following aspects must be considered when selecting the appropriate Corner Protector model for a project:

- Properties of the concrete elements
- External load
- Environmental class

The method that should be applied to verify the load-bearing capacity of Corner Protector:

- $N_{Ed} \leq N_{Rd}$
- $V_{Ed} \leq V_{Rd}$

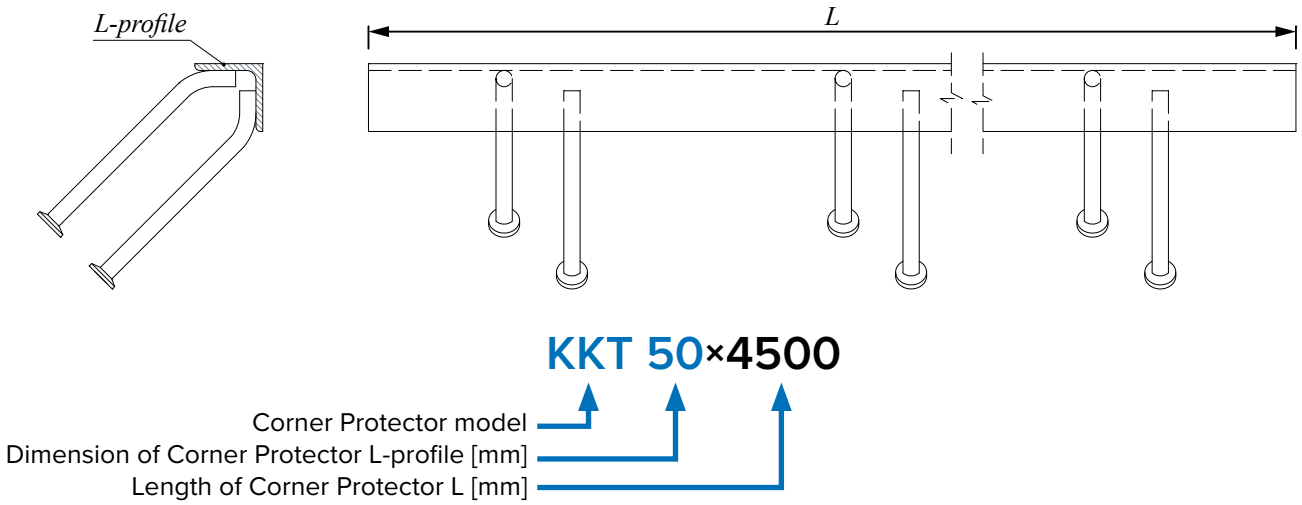
Where:

N_{Ed} is the design value of tensile load
V_{Ed} is the design value of shear load
N_{Rd} is the design value of tensile resistance from *Table 13*
V_{Rd} is the design value of shear resistance from *Table 13*

The material of Corner Protector is selected based on environmental class to fulfill requirements for intended operating life.

After selecting the suitable Corner Protector model, a product code describing the product may be defined according to the description in *Figure 8*. Please use this in drawings and when ordering the product from Peikko's Sales Service.

Figure 8. Product code of Corner Protectors.

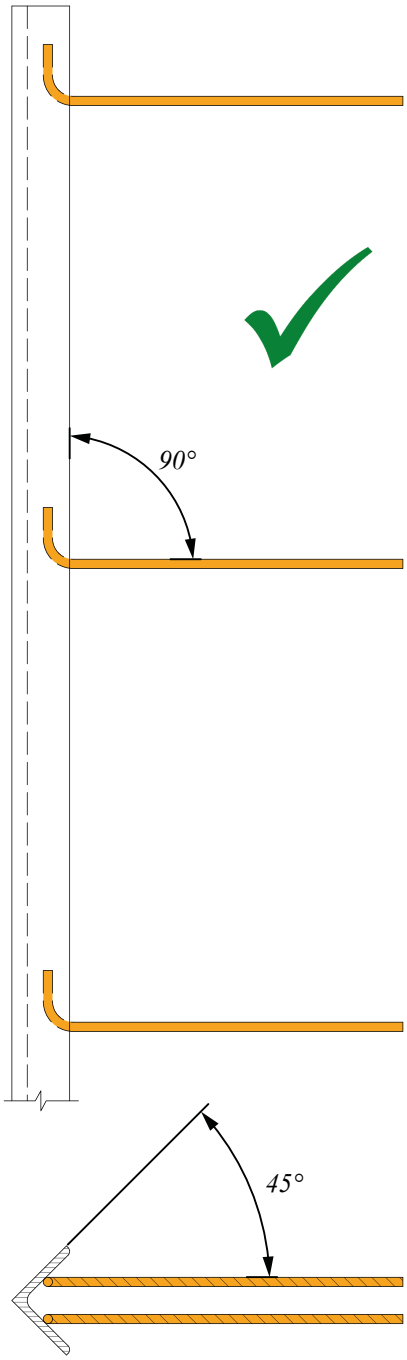


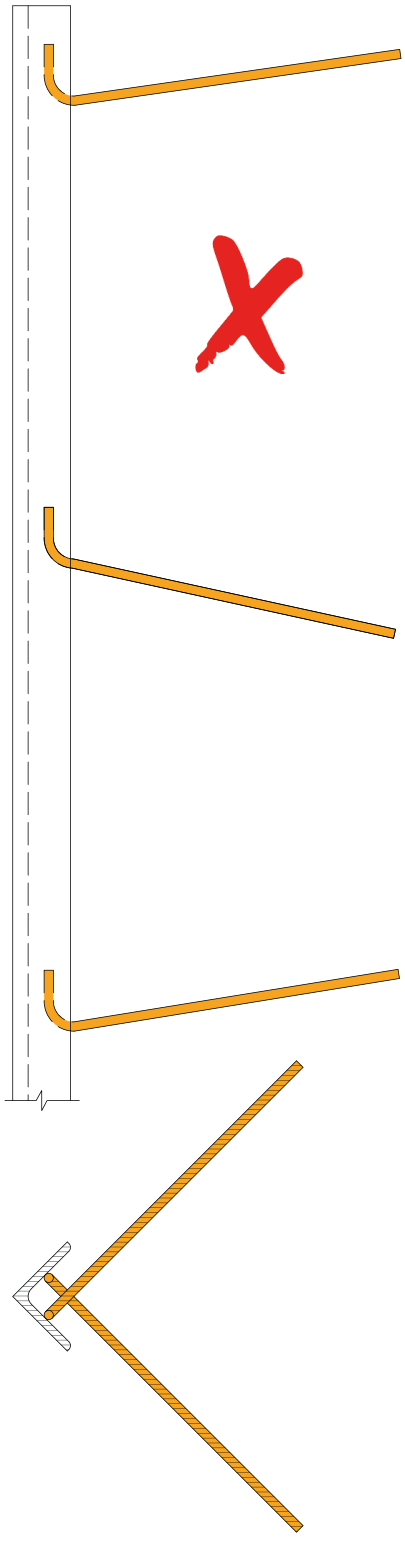
Installing Corner Protectors

Installation of Corner Protectors at the precast factory or on the construction site

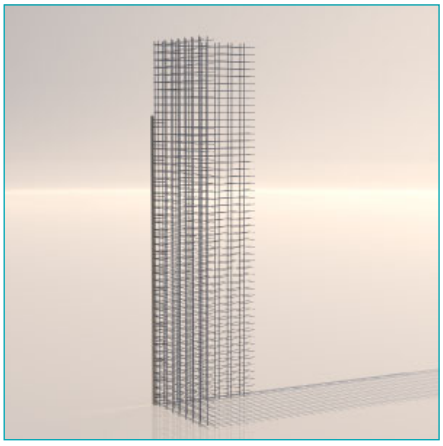
During transportation, the elements may experience some deformation, in which case the user needs to straighten them to ensure that they do not negatively impact the straightness of the concrete edge.

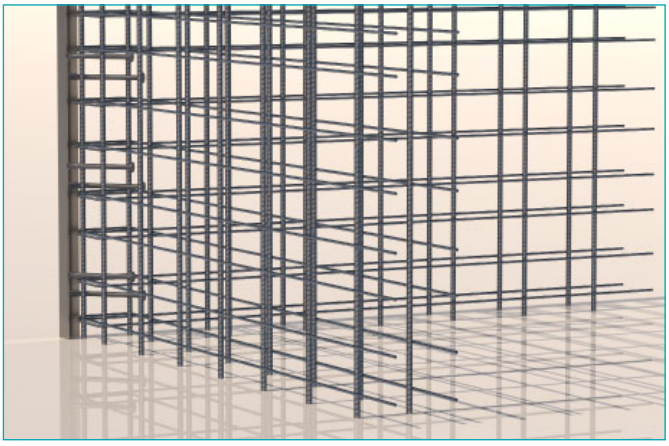
Corner Protectors are installed to planned positions before casting of concrete. The precise position of Corner Protector is indicated in the installation drawings. Before installing SKT Corner Protector and UKT Corner Protector models to the formwork, rebar anchor bars must be bent out first.

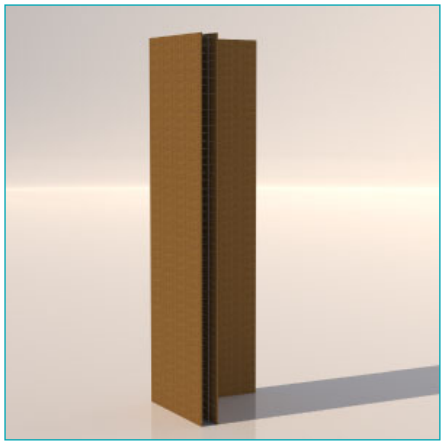


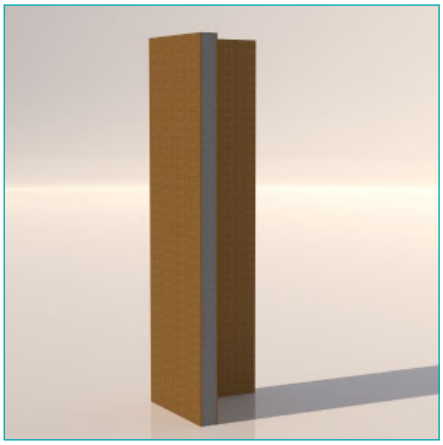


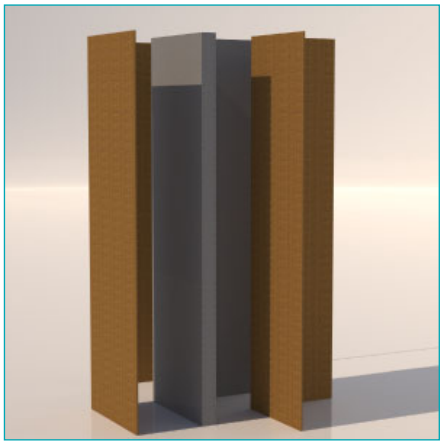
Corner Protector can be attached to the formwork first or it can be attached to the reinforcement cage before installation to formwork. It must be fixed without any possible displacement during casting. Corner Protector can be fixed to the formwork with nails, glue, screws, and double-sided tape. Corner Protectors can be supplied upon request with nail holes for easy fixing.











It is prohibited to bend and cut the headed studs or cut the anchor bars to make the angle bar fit the reinforcement.

The anchoring length of headed studs or anchor bars is based on the design. Bending or cutting the headed studs or anchor bars reduces the capacities of Corner Protectors.

The concrete under the heads of headed studs or anchor bars, as well as under the angle bar, should be properly compacted. If a vibrator is used for compacting, contact between the angle bar and the vibrator must be avoided.

NOTES

NOTES

Technical Manual Revisions

Version: PEIKKO GROUP 09/2019. Revision: 001

- First publication

Resources

DESIGN TOOLS

Use our powerful software every day to make your work faster, easier, and more reliable. Peikko design tools include design software, 3D components for modeling programs, installation instructions, technical manuals, and product approvals of Peikko's products.

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Approvals, certificates, and documents related to CE-marking (DoP, DoC) can be found on our websites under each products' product page.

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Environmental Product Declarations and management system certificates can be found at the quality section of our websites.

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