



Instructions for use

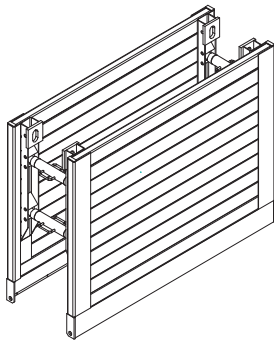
Edge-supported shoring units Krings

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System overview edge-supported shoring units (ES)

KVL

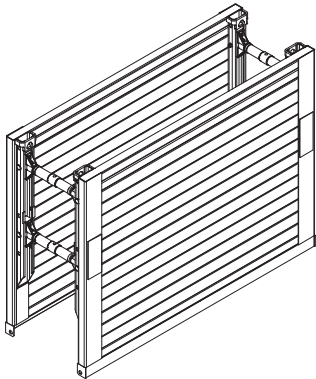


Shoring length	2,00 m - 3,50 m
Height base unit	1,50 m / 2,00 m / 2,40 m
Height top unit	0,48 m / 0,96 m
Pipe culvert height	0,72 m / 0,98 m / 1,30 m
Weight	489 kg - 1021 kg

Designation for base module B conforming to EN 13331-1:

ES - B - SV - C - XX - 2,00 / 3,50 x 1,50 / 2,40 x 0,06
- 0,47 / 1,89 - 0,72 / 1,30 - 18,6 / 27,9 - 0,49 / 1,02

KS 100

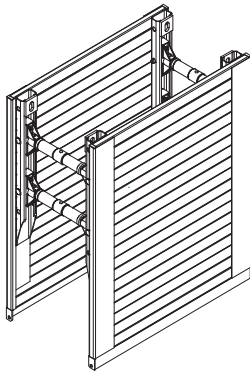


Shoring length	2,00 m - 4,00 m
Height base unit	2,40 m / 2,60 m
Height top unit	1,30 m
Pipe culvert height	1,52 m / 1,56 m
Weight	1398 kg - 2276 kg

Designation for base module B conforming to EN 13331-1:

ES - B - SV - C - XX - 2,00 / 4,00 x 2,40 / 2,60 x 0,10
- 0,81 / 4,81 - 1,52 / 1,56 - 33,02 / 77,15 - 1,40 / 2,28

KS 60

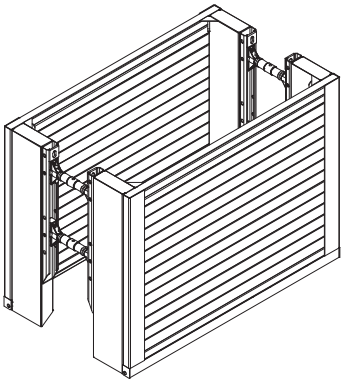


Shoring length	2,00 m - 3,50 m
Height base unit	2,00 m - 2,40 m
Height top unit	1,00 m - 1,30 m
Pipe culvert height	1,00 m - 1,36 m
Weight	1004 kg - 1532 kg

Designation for base module B conforming to EN 13331-1:

ES - B - SV - C - XX - 2,00 / 3,50 x 2,00 / 2,40 x 0,06
- 0,81 / 4,81 - 0,95 / 1,35 - 24,7 / 37,5 - 1,00 / 1,53

KS 100 Eck

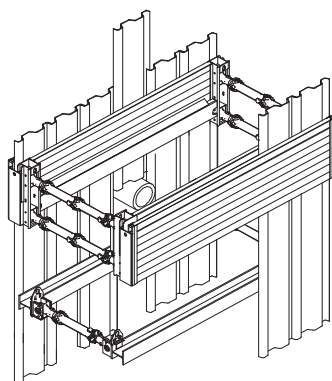


Shoring length	2,50 m - 4,00 m
Height base unit	2,40 m / 2,60 m
Height top unit	1,40 m
Pipe culvert height	1,50 m / 1,55 m
Weight	2124 kg - 2730 kg

Designation for base module B conforming to EN 13331-1:

ES - B - SV - C - XX - 2,50 / 4,00 x 2,40 / 2,60 x 0,10
- 1,82 / 5,82 - 1,50 / 1,55 - 44,12 / 61,61 - 2,12 / 2,73

Universal DKU piling frame element

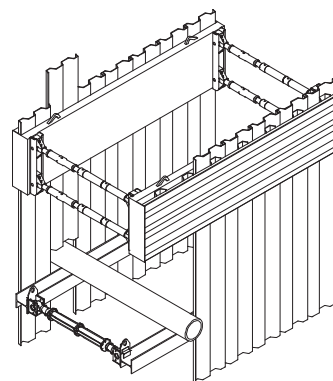


Shoring length	2,27 m / 3,81 m
Height sheet pile element	1,00 m
Pipe culvert height	variable
Weight	1490 kg - 2046 kg

Designation for base module B conforming to EN 13331-1:

GV - B - SV - C - XX - 2,27 / 3,81 x 1,00 x 0,31 - 1,27 / max. - 1,49 / 2,05

Sheet pile element KKP (before 09/2009)



Shoring length	2,84 m / 4,07 m
Height base unit	0,48 m / 1,00 m
Pipe culvert height	variable
Weight	239 kg - 1020 kg

Designation for base module B conforming to EN 13331-1:

GV - B - SV - C - XX - 2,84 / 4,07 x 0,48 / 1,00 x 0,21 / 0,31
- 0,77 / 4,81 - variable - 17,5 / 46,2 / 56,1 - 0,29 / 1,02

Occupational safety and general remarks according to DIN EN 13331-1/2

Lifting, handling, pulling, dragging



Handling should be carried out as close to the ground as possible.

Slings (chain type and thickness, load hooks) must be chosen to suit the weight being handled (e.g. trench box or slide rail).

To prevent the accidental detachment of the load during lifting, pulling or handling, only load hooks with safety catches may be used.



Particularly when pulling loads, the pulling forces defined in section 7.4.16 in DIN EN 13331/1 must be observed.

The load must be slung in such a way that the shoring is in a horizontal position and swinging during handling is reduced to a minimum.



The shoring must be lowered onto level and firm ground.

It is prohibited to stand within the pivoting range of the excavator/crane and beneath suspended loads.

A load operator may only stand to the front left of the excavator, in constant eye contact with the machine operator.

It is always prohibited to stand within the danger zone.

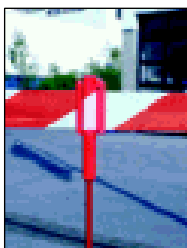
Observe the industrial safety ordinance and the accident prevention regulations for lifting gear.

Measures to reduce hazards



The safety of vehicles and persons on site must be ensured with the aid of cones, warning tape or safety staff specially deployed for this purpose.

The construction site should be sufficiently marked as such with the aid of warning signs, for instance.



The risk of instability as a consequence of wind loads when setting up the shoring on the edge of the trench must be considered.

The shoring should be secured against accidental impacts and set up in a sufficiently stable position (sufficient width and firm ground).

When handling, installing and removing shoring, watch out for overhead power cables.

On sloping or uneven ground, the shoring should be set up if possible at right angles to the slope.



Reasons for taking parts out of service and instructions for repair

Before use, all shoring components must be checked for their correct function.

Reasons for taking worn or damaged parts out of service include:

- Missing parts, such as nuts, screws, posts, pins and stabilizers.
- Broken parts such as spindles, pins and spreader systems in general.
- If parts are severely deformed or misshapen or if there are holes in panel bodies, for instance, the manufacturer should be consulted in cases of doubt.
- In all cases of doubt, always consult the manufacturer.

Faulty parts must be replaced or repaired.

Minor repairs can be carried out by the user, after consultation with the manufacturer.

Only original replacement parts from the manufacturer may be used.

There is no warranty on incorrectly performed repairs and the use of non-original parts.

The requirements of the industrial safety ordinance apply.

Procedure in the event of an accident



In the event of an accident, casualties must be given first aid immediately.

The scene of the accident must be cordoned off and left unchanged.

If the injured person is expected to be unfit for work, an accident insurance doctor must be consulted.

All accidents must be reported immediately to the superior or his deputy.

The accident must be entered in the accident record book.

The currently valid versions of the following documents apply:

- Provisions of the Civil Engineering Committee of the Accident Insurance Institution
- DIN 4124 "Baugruben und Gräben" (pits and trenches)
- DIN EN 13331, Part 1: Product Specifications, Part 2: Assessment by Calculation or Test
- General safety instructions and the relevant industrial safety ordinances

Our products bear the "Geprüfte Sicherheit" (GS) quality seal.

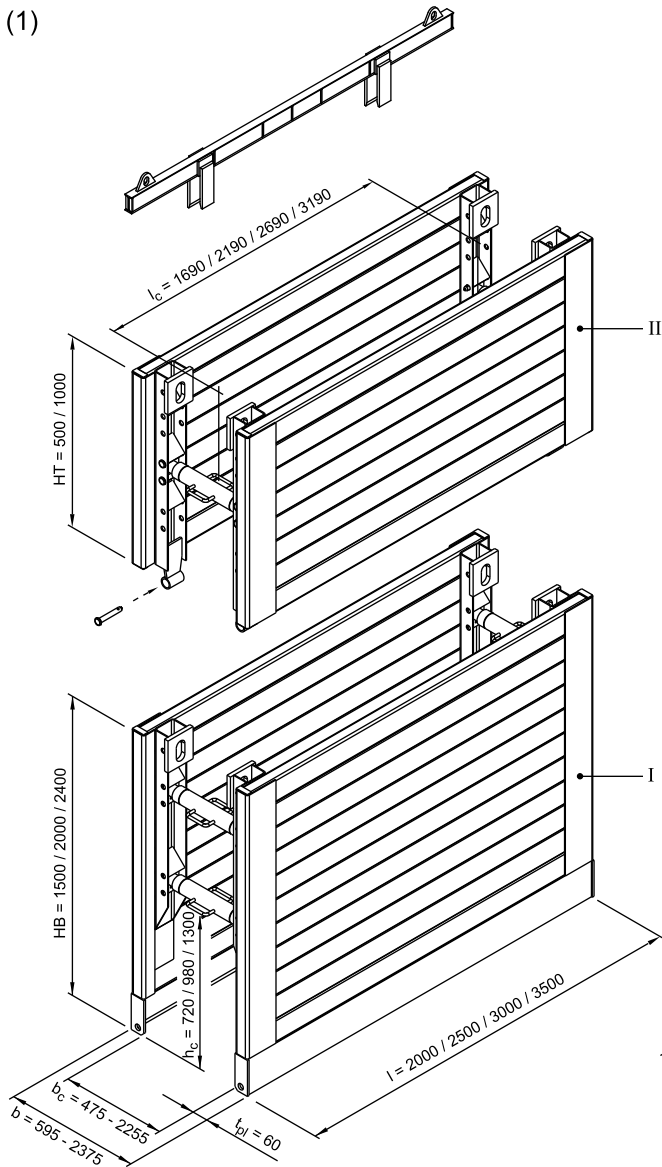
During installation, the instructions contained in the manufacturer's manual must be referred to and observed.

Technical data sheet edge-supported shoring units (ES)

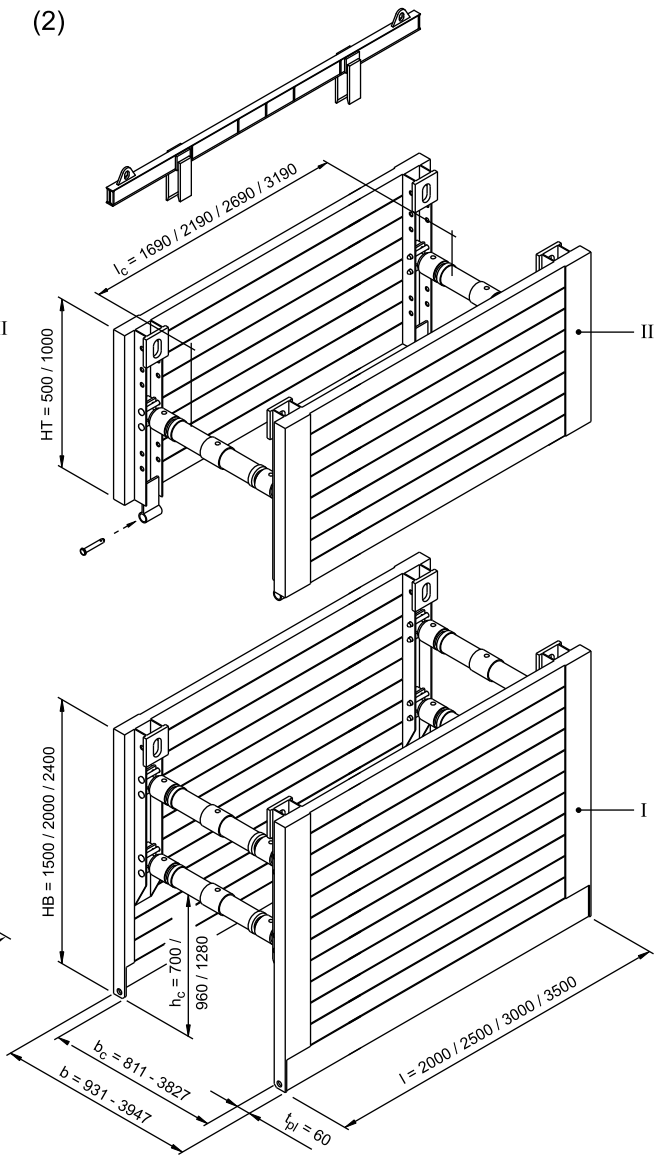


KVL

(1)



(2)



I	Base unit
II	Top unit
HB	Height base unit
HT	Height top unit
l	Length

l _c	Pipe culvert length
b	Shoring / trench width
b _c	Inner width
h _c	Pipe culvert height
t _{pl}	Thickness

↑ (1) KVL, (2) KVL with SP SB 98x550 or SP SB 98x700 and adapter

(All dimensions in mm)

KVL

Base panels

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
111 030	2,00	1,50	0,06	0,72	1,69	220,0	497,0 *	3,00	32,0
111 050	2,50	1,50	0,06	0,72	2,19	252,0	561,0 *	3,75	26,0
111 080	3,00	1,50	0,06	0,72	2,69	290,0	637,0 *	4,50	21,5
111 040	2,00	2,00	0,06	0,98	1,69	287,0	631,0 *	4,00	32,0
111 060	2,50	2,00	0,06	0,98	2,19	325,0	707,0 *	5,00	26,0
111 090	3,00	2,00	0,06	0,98	2,69	374,0	805,0 *	6,00	21,5
111 092	3,50	2,00	0,06	0,98	3,19	465,0	986,8 *	7,00	18,5
111 091	3,00	2,40	0,06	1,30	2,69	428,0	913,0 *	7,20	21,5
111 093	3,50	2,40	0,06	1,30	3,19	540,0	1.136,8 *	8,40	18,5

* with A-type spindle, SP KVL - 70x650

Top units

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
111 130	2,00	0,50	0,06	-	1,69	92,0	214,0 *	1,00	32,0
111 150	2,50	0,50	0,06	-	2,19	105,0	240,0 *	1,25	32,0
111 170	3,00	0,50	0,06	-	2,69	120,0	270,0 *	1,50	30,6
111 172	3,50	0,50	0,06	-	3,19	150,0	330,4 *	1,68	21,9
111 120	2,00	1,00	0,06	-	1,69	156,0	342,0 *	2,00	32,0
111 140	2,50	1,00	0,06	-	2,19	174,0	378,0 *	2,50	32,0
111 160	3,00	1,00	0,06	-	2,69	199,0	428,0 *	3,00	30,6
111 174	3,50	1,00	0,06	-	3,19	245,0	520,4 *	1,68	21,9

* with A-type spindle, SP KVL - 70x650

Extension bars

Art. No.	Short description	l [m]	G [kg]
118 050	KVL spindle Type A, SP KVL - 70x600	0,465 - 0,670	9,0
118 080	KVL spindle Type B, SP KVL - 70x800	0,665 - 1,070	13,1
118 010	KVL spindle Type C, SP KVL - 70x1180	1,065 - 1,870	18,3
118 060	KVL spindle Type A, SP KVL - 70x650	0,523 - 0,617	12,2
118 070	KVL spindle Type B, SP KVL - 70x740	0,613 - 0,797	13,4
118 090	KVL spindle Type C, SP KVL - 70x920	0,799 - 1,161	15,8
118 020	KVL spindle Type D, SP KVL - 70x1280	1,153 - 1,878	20,5
118 100	KVL spindle Type E, SP KVL - 70x1470	1,339 - 2,254	25,4

Trench widths

Strut	Stroke [m]	b _c [m]	b [m]
KVL Strut Typ A, SP KVL - 70x600	0,205	0,475 - 0,680	0,595 - 0,800
KVL Strut Typ B, SP KVL - 70x800	0,405	0,675 - 1,080	0,795 - 1,200
KVL Strut Typ C, SP KVL - 70x1180	0,805	1,075 - 1,880	1,195 - 2,000
KVL Strut Typ A, SP KVL - 70x650	0,094	0,533 - 0,627	0,653 - 0,747
KVL Strut Typ B, SP KVL - 70x740	0,184	0,623 - 0,807	0,743 - 0,927
KVL Strut Typ C, SP KVL - 70x920	0,362	0,809 - 1,171	0,929 - 1,291
KVL Strut Typ D, SP KVL - 70x1280	0,725	1,163 - 1,888	1,283 - 2,008
KVL Strut Typ E, SP KVL - 70x1470	0,915	1,340 - 2,255	1,460 - 2,375

Different and larger widths are possible by combining different spacer bars.

KVL

Shoring widths of SP SB 98x550 with adapter

Extension bar	l	b _c	b
	[m]	[m]	[m]
	without	0,811 - 1,011	0,931 - 1,131
139 430	0,30	1,111 - 1,311	1,231 - 1,431
139 445	0,50	1,311 - 1,511	1,431 - 1,631
139 385	1,00	1,811 - 2,011	1,931 - 2,131
139 400	1,50	2,311 - 2,511	2,431 - 2,631
139 420	2,00	2,811 - 3,011	2,931 - 3,131
139 425	2,50	3,311 - 3,511	3,431 - 3,631

Shoring widths of SP SB 98x700 with adapter

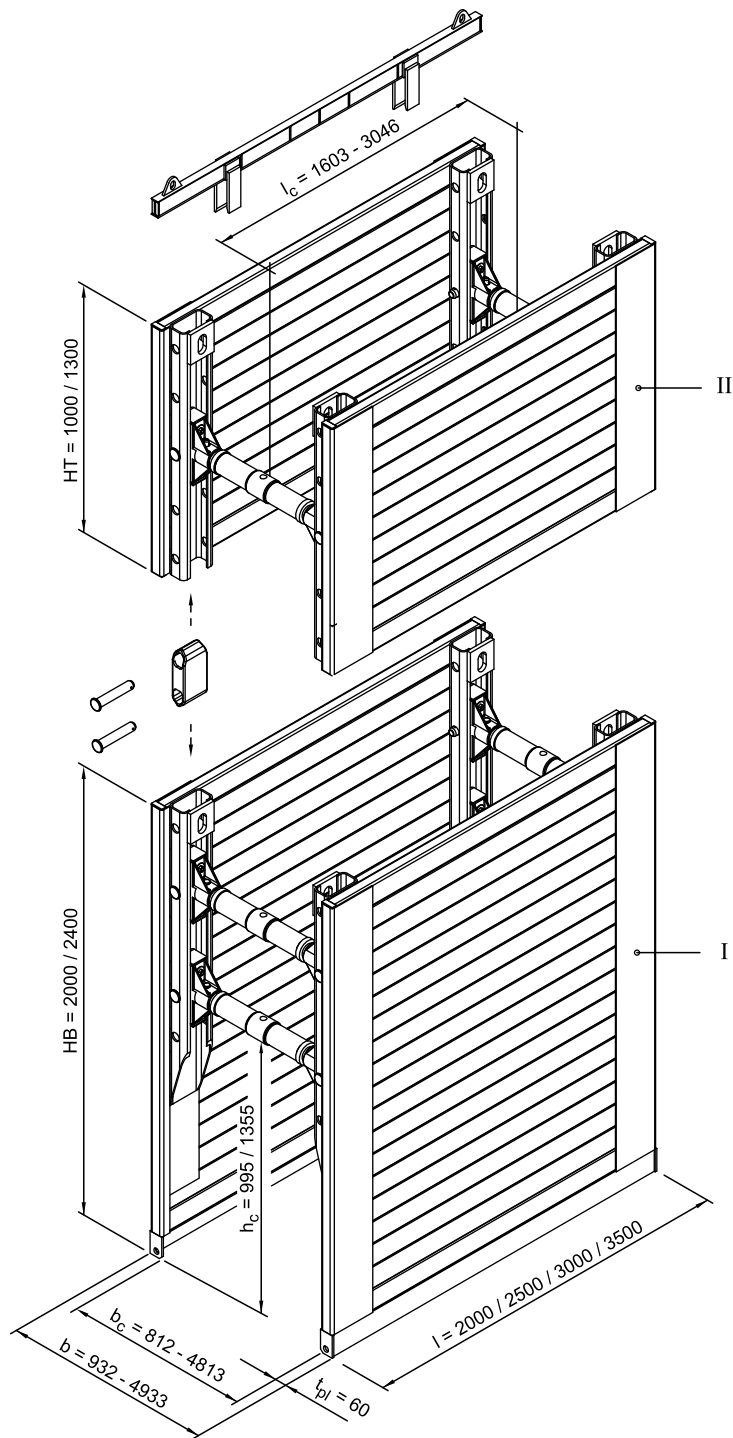
Extension bar	l	b _c	b
	[m]	[m]	[m]
	without	0,987 - 1,327	1,107 - 1,447
139 430	0,30	1,287 - 1,627	1,407 - 1,747
139 445	0,50	1,487 - 1,827	1,607 - 1,947
139 385	1,00	1,987 - 2,327	2,107 - 2,447
139 400	1,50	2,487 - 2,827	2,607 - 2,947
139 420	2,00	2,987 - 3,327	3,107 - 3,447
139 425	2,50	3,487 - 3,827	3,607 - 3,947

Accessories / Spares

see Accessories / Spares Krings compact shoring systems (page 26)

l	Length	t _{pl}	Thickness
l _c	Pipe culvert length	A	Area
b	Shoring / trench width	G	Weight
b _c	Inner width	G / VP	Weight per shoring panel
h	Height	G / Box	Weight per shoring box
h _c	Pipe culvert height	eh	Earth pressure max.

KS 60



I	Base unit
II	Top unit
HB	Height base unit
HT	Height top unit
l	Length

l_c	Pipe culvert length
b	Shoring / trench width
b_c	Inner width
h_c	Pipe culvert height
t_{pl}	Thickness

KS 60

(All dimensions in mm)

KS 60

Base panels

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
131 060	3,00	2,00	0,06	0,995	2,61	460,0	1.185,0 *	6,00	27,0
131 080	3,50	2,00	0,06	0,995	3,05	430,0	1.125,0 *	7,00	26,5
131 040	2,00	2,40	0,06	1,355	1,61	380,0	1.025,0 *	4,80	40,0
131 050	2,50	2,40	0,06	1,355	2,11	465,0	1.195,0 *	6,00	32,0
131 070	3,00	2,40	0,06	1,355	2,61	482,0	1.229,0 *	7,20	27,0
131 090	3,50	2,40	0,06	1,355	3,05	643,0	1.551,0 *	8,40	26,5

* with struts SP SB 98x700

Top units

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
131 140	3,00	1,00	0,06	-	2,61	178,0	531,0 *	3,00	27,0
131 160	3,50	1,00	0,06	-	3,05	333,0	841,0 *	3,50	26,5
131 120	2,00	1,30	0,06	-	1,61	245,0	665,0 *	2,60	40,0
131 130	2,50	1,30	0,06	-	2,11	300,0	775,0 *	3,25	32,0
131 150	3,00	1,30	0,06	-	2,61	330,0	835,0 *	3,90	27,0
131 170	3,50	1,30	0,06	-	3,05	392,0	959,0 *	4,55	26,5

* with struts SP SB 98x700

Struts / Extensions

see Accessories / Spares Krings compact shoring systems (page 26)

Shoring width SP SB 98x550

Extension bar	l [m]	b _c [m]	b [m]
	without	0,812 - 1,012	0,932 - 1,132
139 430	0,30	1,112 - 1,312	1,232 - 1,432
139 445	0,50	1,312 - 1,512	1,432 - 1,632
139 385	1,00	1,812 - 2,012	1,932 - 2,132
139 400	1,50	2,313 - 2,512	2,432 - 2,632
139 420	2,00	2,812 - 3,012	2,932 - 3,132
139 425	2,50	3,312 - 3,512	3,432 - 3,632

Shoring width SP SB 98x700

Extension bar	l [m]	b _c [m]	b [m]
	without	0,988 - 1,328	1,108 - 1,448
139 430	0,30	1,288 - 1,628	1,408 - 1,748
139 445	0,50	1,488 - 1,828	1,608 - 1,948
139 385	1,00	1,988 - 2,328	2,108 - 2,448
139 400	1,50	2,488 - 2,828	2,608 - 2,948
139 420	2,00	2,988 - 3,328	3,108 - 3,448
139 425	2,50	3,488 - 3,828	3,608 - 3,948

KS 60

Shoring width SP SB 98x817

Extension bars	l	b _c	b
	[m]	[m]	[m]
0	0,00	0,913 - 1,313	1,033 - 1,433
1	0,50	1,413 - 1,813	1,533 - 1,933
2	1,00	1,913 - 2,313	2,033 - 2,433
3	1,50	2,413 - 2,813	2,533 - 2,933
4	2,00	2,913 - 3,313	3,033 - 3,433
5	2,50	3,413 - 3,813	3,533 - 3,933
6	3,00	3,913 - 4,313	4,033 - 4,433
7	3,50	4,413 - 4,813	4,533 - 4,933

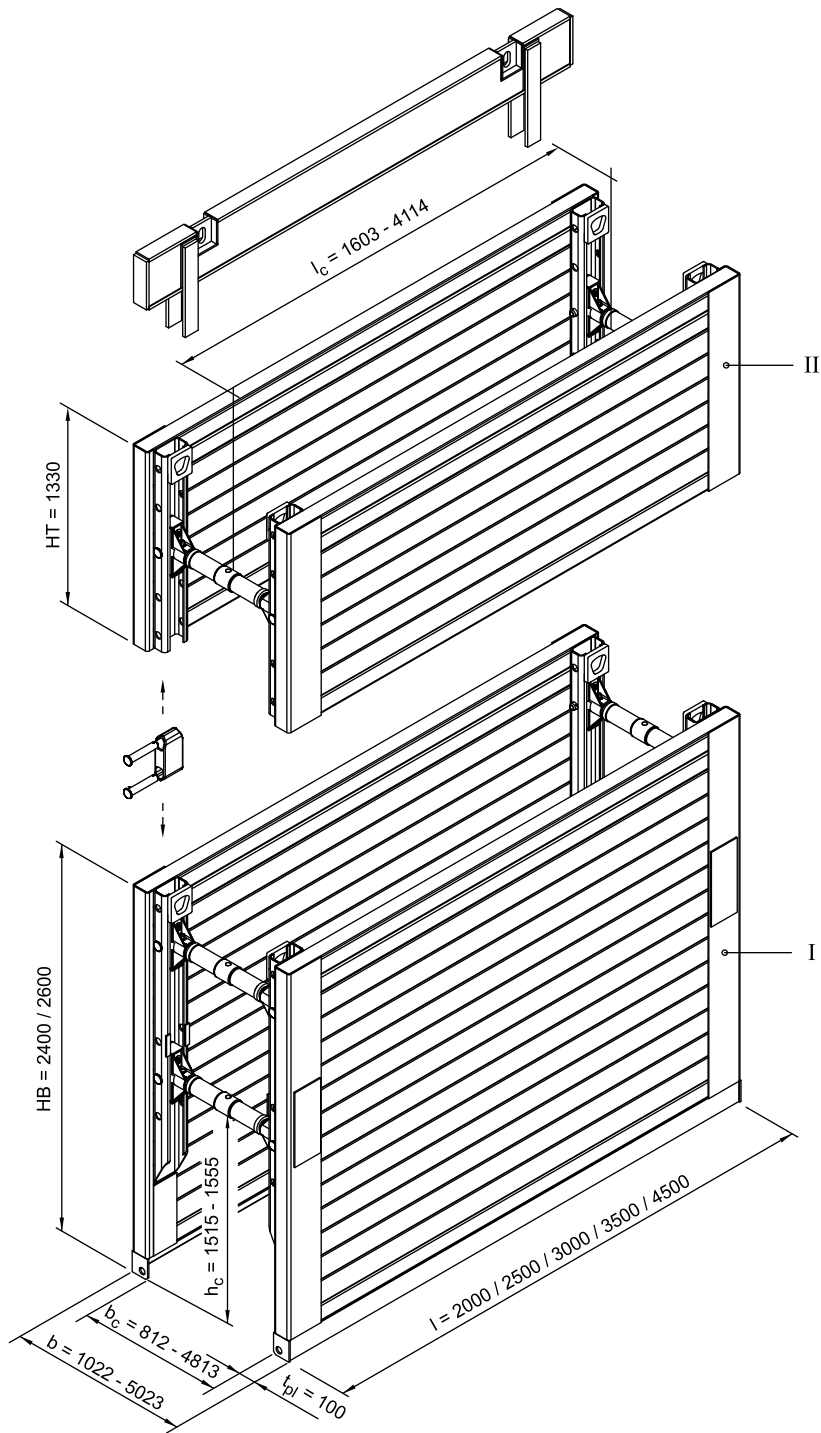
A maximum of 7 extension bars with a length of 500 mm may be used.

Accessories / Spares

see Accessories / Spares Krings compact shoring systems (page 26)

l	Length	A	Area
l _c	Pipe culvert length	G	Weight
b	Shoring / trench width	G / VP	Weight per shoring panel
b _c	Inner width	G / Box	Weight per shoring box
h _c	Pipe culvert height	eh	Earth pressure max.
t _{pl}	Thickness		

KS 100



I	Base unit
II	Top unit
HB	Height base unit
HT	Height top unit
l	Length

l _c	Pipe culvert length
b	Shoring / trench width
b _c	Inner width
h _c	Pipe culvert height
t _{pl}	Thickness

KS 100

(All dimensions in mm)

KS 100

Base panels

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
132 030	2,00	2,40	0,10	1,52	1,614	530,0	1.325,0 *	4,80	70,5
132 050	2,50	2,40	0,10	1,52	2,114	620,0	1.505,0 *	6,00	56,4
132 070	3,00	2,40	0,10	1,52	2,614	705,0	1.675,0 *	7,20	47,4
132 090	3,50	2,40	0,10	1,52	3,114	820,0	1.905,0 *	8,40	41,3
132 140	4,00	2,40	0,10	1,52	3,614	995,0	2.255,0 *	9,60	35,2
132 156	4,50	2,40	0,10	1,52	4,114	1.105,0	2.475,0 *	10,80	31,6
132 040	2,00	2,60	0,10	1,56	1,614	570,0	1.405,0 *	5,20	70,5
132 060	2,50	2,60	0,10	1,56	2,114	670,0	1.605,0 *	6,50	56,4
132 080	3,00	2,60	0,10	1,56	2,614	765,0	1.795,0 *	7,80	47,4
132 100	3,50	2,60	0,10	1,56	3,114	870,0	2.005,0 *	9,10	41,3
132 150	4,00	2,60	0,10	1,56	3,614	1.085,0	2.435,0 *	10,40	35,2
132 121	4,50	2,60	0,10	1,56	4,114	1.220,0	2.705,0 *	11,70	31,6

* with struts SP SB 98x700

Top units

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
132 190	2,00	1,30	0,10	-	1,614	365,0	905,0 *	2,60	70,5
132 200	2,50	1,30	0,10	-	2,114	425,0	850,0 *	3,25	56,4
132 210	3,00	1,30	0,10	-	2,614	482,0	1.139,0 *	3,90	47,4
132 220	3,50	1,30	0,10	-	3,114	562,0	1.299,0 *	4,55	41,3
132 260	4,00	1,30	0,10	-	3,614	655,0	1.485,0 *	5,20	35,2
132 261	4,50	1,30	0,10	-	4,114	725,0	1.625,0 *	5,85	31,6

* with struts SP SB 98x700

Struts / Extensions

see Accessories / Spares Krings compact shoring systems (page 26)

Shoring width SP SB 98x550

Extension bar	l [m]	b _c [m]	b [m]
	without	0,812 - 1,012	1,022 - 1,222
139 430	0,30	1,112 - 1,312	1,322 - 1,522
139 445	0,50	1,312 - 1,512	1,522 - 1,722
139 385	1,00	1,812 - 2,012	2,022 - 2,222
139 400	1,50	2,312 - 2,512	2,522 - 2,722
139 420	2,00	2,812 - 3,012	3,022 - 3,222
139 425	2,50	3,312 - 3,512	3,522 - 3,722

Shoring width SP SB 98x700

Extension bar	l [m]	b _c [m]	b [m]
	without	0,988 - 1,328	1,198 - 1,538
139 430	0,30	1,288 - 1,628	1,498 - 1,838
139 445	0,50	1,488 - 1,828	1,698 - 2,038
139 385	1,00	1,988 - 2,328	2,198 - 2,538
139 400	1,50	2,488 - 2,828	2,698 - 3,038
139 420	2,00	2,988 - 3,328	3,198 - 3,538
139 425	2,50	3,488 - 3,828	3,698 - 4,038

KS 100

Shoring width SP SB 98x817

Extension bars	l	b _c	b
	[m]	[m]	[m]
0	0,00	0,913 - 1,313	1,123 - 1,523
1	0,50	1,413 - 1,813	1,623 - 2,023
2	1,00	1,913 - 2,313	2,123 - 2,523
3	1,50	2,413 - 2,813	2,623 - 3,023
4	2,00	2,913 - 3,313	3,123 - 3,523
5	2,50	3,413 - 3,813	3,623 - 4,023
6	3,00	3,913 - 4,313	4,123 - 4,523
7	3,50	4,413 - 4,813	4,623 - 5,023

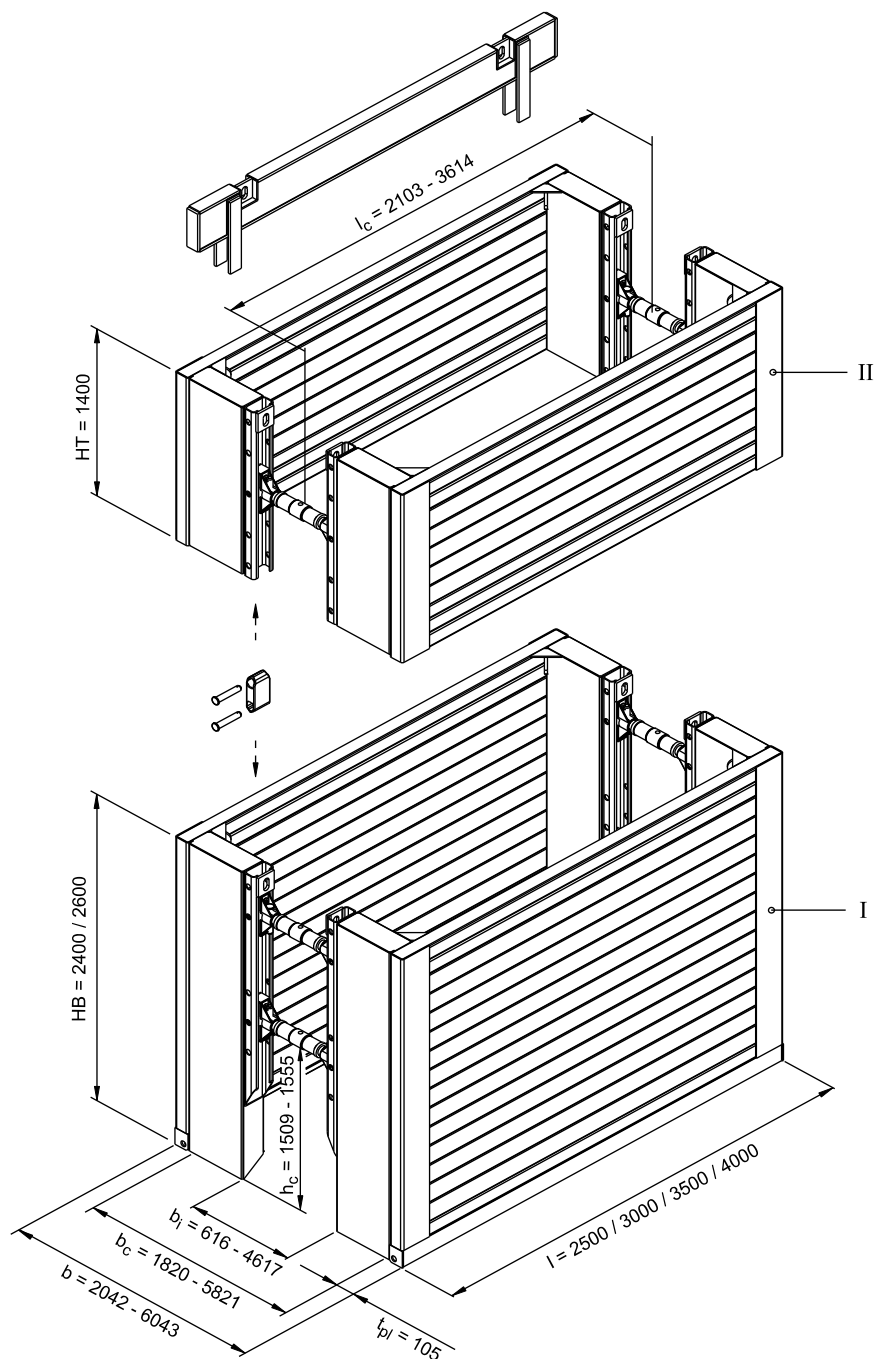
A maximum of 7 extension bars with a length of 500 mm may be used.

Accessories / Spares

see Accessories / Spares Krings compact shoring systems (page 26)

l	Length	t _{pl}	Thickness
l _c	Pipe culvert length	A	Area
b	Shoring / trench width	G	Weight
b _c	Inner width	G / VP	Weight per shoring panel
h	Height	G / Box	Weight per shoring box
h _c	Pipe culvert height	eh	Earth pressure max.

KS 100 Eck



I	Base unit
II	Top unit
HB	Height base unit
HT	Height top unit
l	Length
l _c	Pipe culvert length

b	Shoring / trench width
b _c	Inner width
b _i	Inner culvert width
h _c	Pipe culvert height
t _{pl}	Thickness

KS 100 Eck

(All dimensions in mm)

KS 100 Eck

Base panels

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
135 120	3,50	2,40	0,105	1,52	3,114	1.068,0	2.401,0 *	8,40	44,12
135 100	2,50	2,60	0,105	1,56	2,114	940,0	2.145,0 *	6,50	61,61
135 110	3,00	2,60	0,105	1,56	2,614	1.025,0	2.315,0 *	7,80	51,34
135 130	3,50	2,60	0,105	1,56	3,114	1.340,0	2.945,0 *	9,10	44,12
135 140	4,00	2,60	0,105	1,56	3,614	1.243,0	2.571,0 *	10,40	33,02

* with struts SP SB 98x700

Top units

Art. No.	l [m]	h [m]	t _{pl} [m]	h _c [m]	l _c [m]	G / VP [kg]	G / Box [kg]	A [m²]	eh [kN/m²]
135 240	2,50	1,40	0,105	-	3,614	655,0	1.485,0 *	3,50	61,61
135 250	3,00	1,40	0,105	-	3,614	668,0	1.511,0 *	4,20	51,34
135 260	3,50	1,40	0,105	-	3,614	733,0	1.641,0 *	4,90	44,12
135 270	4,00	1,40	0,105	-	3,614	935,0	2.045,0 *	5,60	33,02

* with struts SP SB 98x700

Struts / Extensions

see Accessories / Spares Krings compact shoring systems (page 26)

Shoring width SP SB 98x550

Extension bar	lh	b _i	b _c	b
	[m]	[m]	[m]	[m]
	without	0,616 - 0,816	1,820 - 2,020	2,042 - 2,242
139 430	0,30	0,916 - 1,116	2,120 - 2,320	2,342 - 2,542
139 445	0,50	1,116 - 1,316	2,320 - 2,520	2,542 - 2,742
139 385	1,00	1,616 - 1,816	2,820 - 3,020	3,042 - 3,242
139 400	1,50	2,116 - 2,316	3,320 - 3,520	3,542 - 3,742
139 420	2,00	2,616 - 2,816	3,820 - 4,020	4,042 - 4,242
139 425	2,50	3,116 - 3,316	4,320 - 4,520	4,542 - 4,742

Shoring width SP SB 98x700

Extension bar	l	b _i	b _c	b
	[m]	[m]	[m]	[m]
	without	0,792 - 1,132	1,996 - 2,336	2,218 - 2,558
139 430	0,30	1,092 - 1,432	2,296 - 2,636	2,518 - 2,858
139 445	0,50	1,292 - 1,632	2,496 - 2,836	2,718 - 3,058
139 385	1,00	1,792 - 2,132	2,996 - 3,336	3,218 - 3,558
139 400	1,50	2,292 - 2,632	3,496 - 3,836	3,718 - 4,058
139 420	2,00	2,792 - 3,132	3,996 - 4,336	4,218 - 4,558
139 425	2,50	3,292 - 3,632	4,496 - 4,836	4,718 - 5,058

KS 100 Eck

Shoring width SP SB 98x817

Extension bars		b_i	b_c	b
n	[m]	[m]	[m]	[m]
0	0,00	0,717 - 1,117	1,921 - 2,321	2,143 - 2,543
1	0,50	1,217 - 1,617	2,421 - 2,821	2,643 - 3,043
2	1,00	1,717 - 2,117	2,921 - 3,321	3,143 - 3,543
3	1,50	2,217 - 2,617	3,421 - 3,821	3,643 - 4,043
4	2,00	2,717 - 3,117	3,921 - 4,321	4,143 - 4,543
5	2,50	3,217 - 3,617	4,421 - 4,821	4,643 - 5,043
6	3,00	3,717 - 4,117	4,921 - 5,321	5,143 - 5,543
7	3,50	4,217 - 4,617	5,421 - 5,821	5,643 - 6,043

A maximum of 7 extension bars with a length of 500 mm may be used.

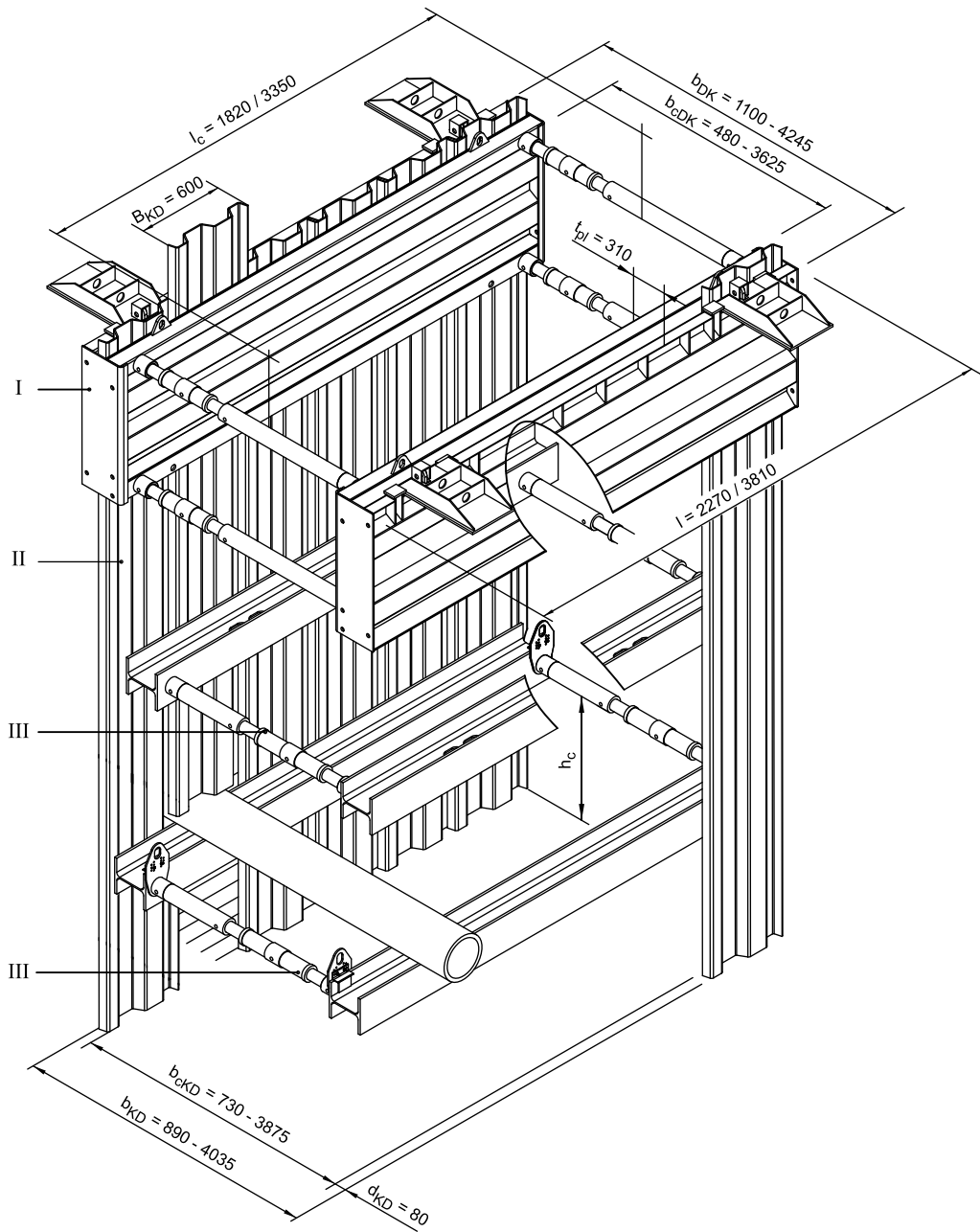
Accessories / Spares

see Accessories / Spares Krings compact shoring systems (page 26)

l	Length	t_{pl}	Thickness
l_c	Pipe culvert length	A	Area
b	Shoring / trench width	G	Weight
b_c	Inner width	G / VP	Weight per shoring panel
h	Height	G / Box	Weight per shoring box
h_c	Pipe culvert height	eh	Earth pressure max.

Universal DKU piling frame element (Krings)

Universal DKU piling frame element with Krings system spreaders



I	Universal DKU piling frame element	I	Length
II	Sheet pile	l_c	Pipe culvert length
III	Waling strut	h_c	Pipe culvert height
HB	Height base unit	b_{cKD}	Sheet pile clear width
b_{KD}	Sheet pile width	b_{KD}	Sheet pile shoring width
d_{KD}	Sheet pile thickness	b_{cDK}	Piling frame clear width
t_{pl}	Thickness	b_{DK}	Piling frame shoring width

Universal DKU piling frame element with Krings system spreaders

(All dimensions in mm)

Universal DKU piling frame element (Krings)

Universal DKU piling frame element with Krings system spreaders (height 1.00 m)

Art. No.	Short description	l [m]	l _c [m]	G / VP [kg]	G / Box [kg]	KD / Box
842 671	Universal DKU piling frame element	2,27	1,82	510,0	1.320,0	8
842 674	Universal DKU piling frame element	3,81	3,35	785,0	1.870,0	14

You can find further piling frame elements at our website www.es-verbau.com

Struts / Extensions

see Accessories / Spares Krings compact shoring systems (page 26)

Trench widths

	SP SB 98x550		SP SB 98x700	
l _{ZwSt} [m]	b _{cKD} [m]	b _{DK} [m]	b _{cKD} [m]	b _{DK} [m]
0,00	0,86 - 1,06	0,61 - 0,81	1,04 - 1,38	0,79 - 1,13
0,30	1,16 - 1,36	0,91 - 1,11	1,34 - 1,68	1,09 - 1,43
0,50	1,36 - 1,56	1,11 - 1,31	1,54 - 1,88	1,29 - 1,63
1,00	1,86 - 2,06	1,61 - 1,81	2,04 - 2,38	1,79 - 2,13
1,50	2,36 - 2,56	2,11 - 2,31	2,54 - 2,88	2,29 - 2,63
2,00	2,86 - 3,06	2,61 - 2,81	3,04 - 3,38	2,79 - 3,13
2,50	3,36 - 3,56	3,11 - 3,31	3,54 - 3,88	3,29 - 3,63
	b _{KD} = b _{cKD} + 0,16 m	b _{DK} = b _{DK} + 0,62 m	b _{KD} = b _{cKD} + 0,16 m	b _{DK} = b _{DK} + 0,62 m

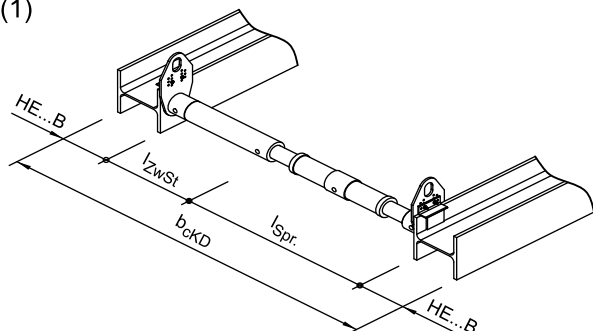
Waler struts

l_{Spr} (SP SB 98x550) = 620 mm to 820 mm

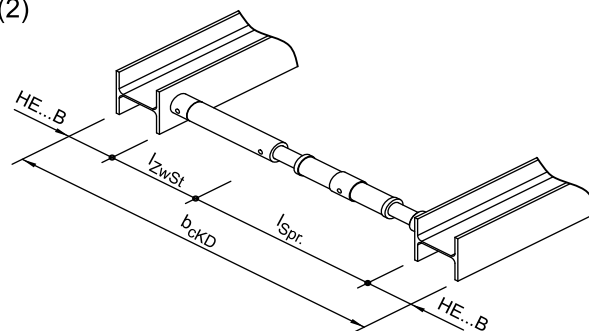
l_{Spr} (SP SB 98x700) = 796 mm to 1136 mm

l_{ZwSt} = b_{cKD} - 2 x HE...B - 2 x l_{Spr}

(1)



(2)



↑ (1) HEB girder with suspended bearing block, (2) HEB girder with strut holder

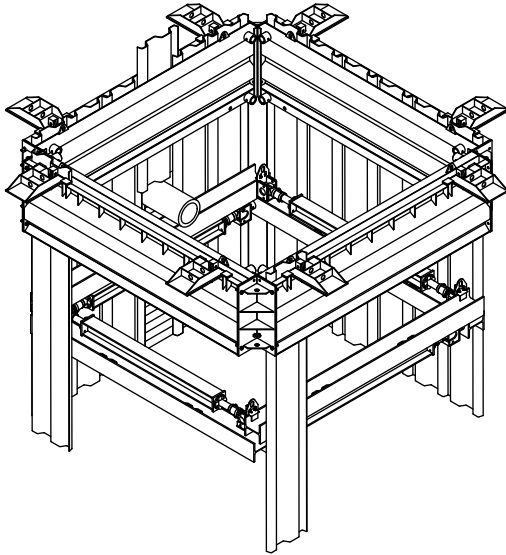
Accessories / Spares

see Accessories / Spares Krings compact shoring systems (page 26)

l	Length	b _{cDK}	Piling frame clear width
l _c	Pipe culvert length	b _{DK}	Piling frame shoring width
l _{Spr}	Spreader length	KD / Box	Number of piles / box
l _{ZwSt}	Length extension bar	A	Area
b _{cKD}	Sheet pile clear width	G / VP	Weight per shoring panel
b _{KD}	Sheet pile shoring width	G / Box	Weight per shoring box

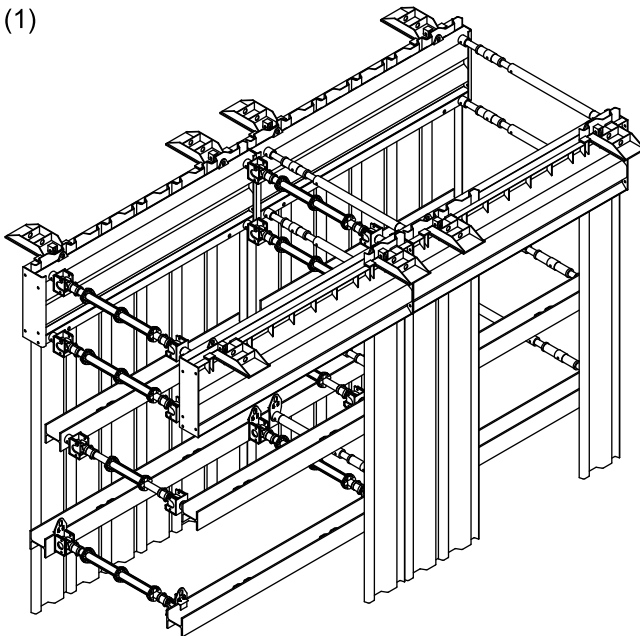
Universal DKU piling frame element (Krings)

Examples of additional possible technical solutions

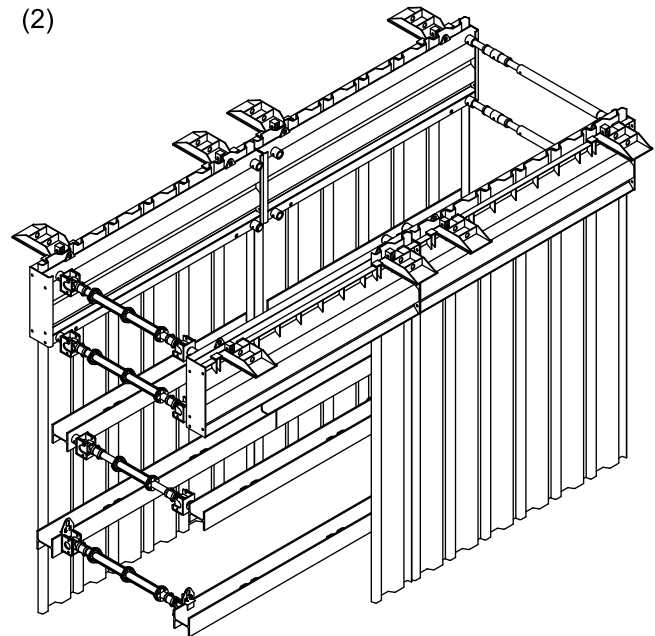


↑ Piling frame shoring with corner connector

(1)



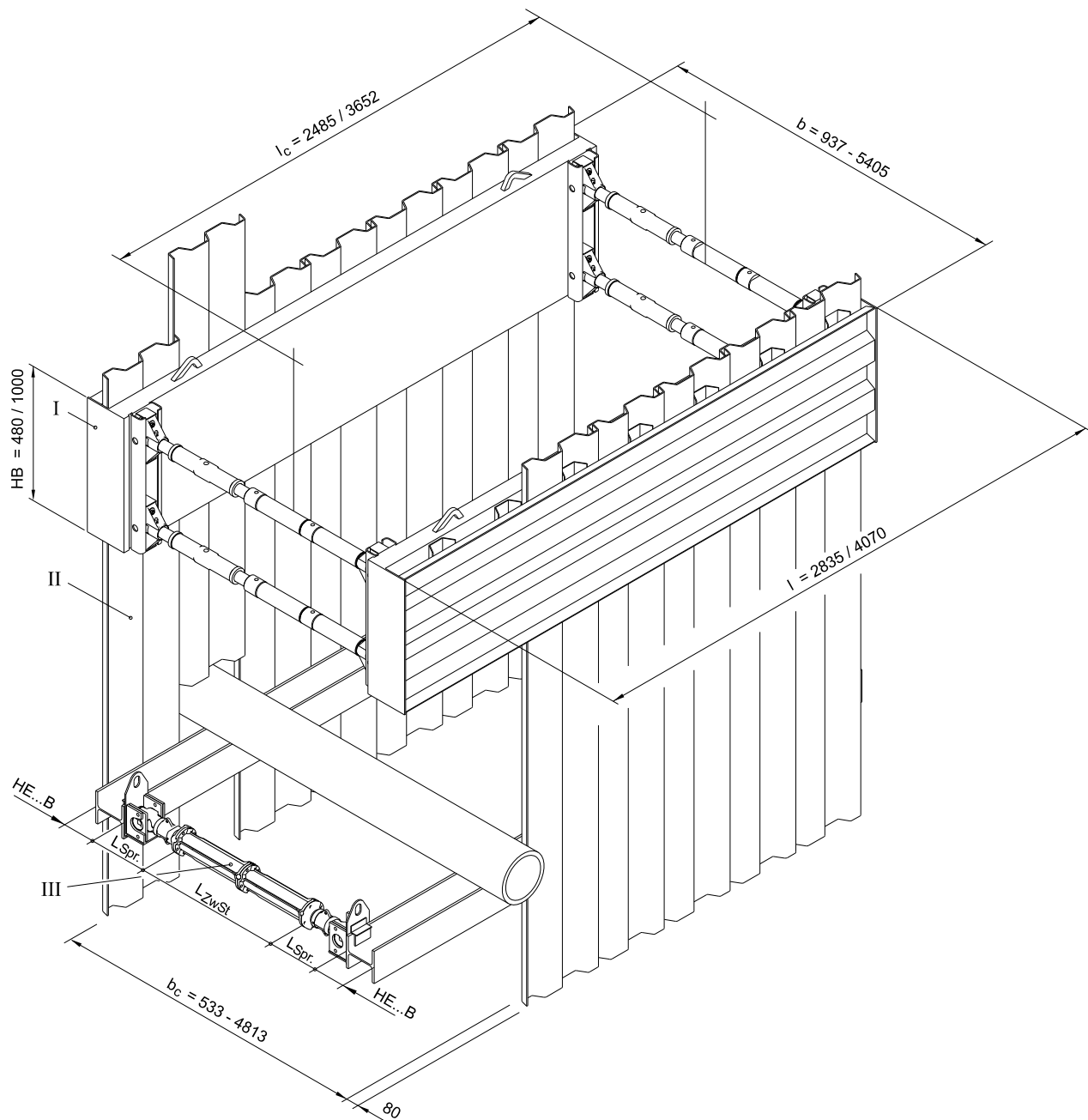
(2)



↑ (1) DKU piling frame shoring in series, (2) DKU piling frame shoring with installation window

Strut removal in accordance with static requirements

Sheet pile element KKP (before 09/2009)



I	Sheet pile element
II	Sheet pile
III	Strut
HB	Height base unit
I	Length

l_c	Pipe culvert length
b	Shoring / trench width
b_c	Inner width
h_c	Pipe culvert height
t_{pl}	Thickness

Sheet pile element KKP

(All dimensions in mm)

Sheet pile element KKP (before 09/2009)

Base panels

Art. No.	Short description	l [m]	h [m]	t _{pl} [m]	l _c [m]	G [kg]	A [m²]	Section load [kN/m²]
181 050	Sheet pile panel KKP ST KD4 UP - 2835x500	2,835	0,48	0,208	2,485	293,0	1,42	17,5
181 100	Sheet pile panel KKP ST KD6 CP - 4070x1000	4,070	1,00	0,305	3,652	938,0	4,07	56,1
185 020	Sheet pile panel KKP ST KD6 CPS - 4070x1000	4,144	1,00	0,305	3,652	1020,0	4,07	46,2

181 050 can only be used with KVL-struts.

All pipe culvert heights with strut SP SB 98x550 / 700.

The pipe culvert height depends on the static system.

Shoring width SP KVL

Art. No.	Description	Inner width b _c [m]	Trench width b [m]
118 060	SP KVL 70x650	0,533 - 0,627	0,937 - 1,031
118 070	SP KVL 70x740	0,623 - 0,807	1,027 - 1,211
118 090	SP KVL 70x920	0,809 - 1,171	1,213 - 1,575
118 020	SP KVL 70x1280	1,163 - 1,888	1,567 - 2,292

Shoring widths of SP SB 98x550

Extension bar	Length [m]	Inner width b _c [m]	Trench width b [m]
	without	0,765 - 0,965	1,404 - 1,604
139 430	0,30	1,065 - 1,265	1,704 - 1,904
139 445	0,50	1,265 - 1,465	1,904 - 2,104
139 385	1,00	1,765 - 1,965	2,404 - 2,604
139 400	1,50	2,265 - 2,465	2,904 - 3,104
139 420	2,00	2,765 - 2,965	3,404 - 3,604
139 425	2,50	3,265 - 3,465	3,904 - 4,104

Shoring widths of SP SB 98x700

Extension bar	Length [m]	Inner width b _c [m]	Trench width b [m]
	without	0,941 - 1,281	1,580 - 1,920
139 430	0,30	1,241 - 1,581	1,880 - 2,220
139 445	0,50	1,441 - 1,781	2,080 - 2,420
139 385	1,00	1,941 - 2,281	2,580 - 2,920
139 400	1,50	2,441 - 2,781	3,080 - 3,420
139 420	2,00	2,941 - 3,281	3,580 - 3,920
139 425	2,50	3,441 - 3,781	4,080 - 4,420

Sheet pile element KKP (before 09/2009)

Shoring width SP SB 98x817

Extension bar	Length [m]	Inner width b_c [m]	Trench width b [m]
	without	0,913 - 1,313	1,505 - 1,905
139 510	1 x 0,50	1,413 - 1,813	2,005 - 2,405
139 510	2 x 0,50	1,913 - 2,313	2,505 - 2,905
139 510	3 x 0,50	2,413 - 2,813	3,005 - 3,405
139 510	4 x 0,50	2,913 - 3,313	3,505 - 3,905
139 510	5 x 0,50	3,413 - 3,813	4,005 - 4,405
139 510	6 x 0,50	3,913 - 4,313	4,505 - 4,905
139 510	7 x 0,50	4,413 - 4,813	5,005 - 5,405

Accessories / Spares

see Accessories / Spares Krings compact shoring systems (page 26)

l	Length	t_{pl}	Thickness
l_c	Pipe culvert length	d	Diameter
b	Trench width	A	Area
b_c	Inner width	G	Weight
h_c	Pipe culvert height	eh	Earth pressure max.

Accessories / Spares Krings compact shoring systems

Struts / Extensions

Art. No.	Short description	l [m]	G [kg]
139 385	Plug-in adapter pipe, ZW SB - 108x1000	1,00	28,0
139 400	Plug-in adapter pipe, ZW SB - 108x1500	1,50	37,4
139 420	Plug-in adapter pipe, ZW SB - 108x2000	2,00	47,3
139 425	Plug-in adapter pipe, ZW SB - 108x2500	2,50	60,0
139 430	Plug-in adapter pipe, ZW SB - 108x300	0,30	13,8
139 445	Plug-in adapter pipe, ZW SB - 108x500	0,50	17,7
139 470	Plug-in adapter pipe, ZW SB - 121x1000	1,00	36,3
139 510	Plug-in adapter pipe, ZW SB - 121x500	0,50	25,1
108 950	Spindle -heavy duty design- left hand, SP SB 98x817		32,0
108 960	Spindle -heavy duty design- right hand, SP SB 98x817		33,0
138 260	Spindle to stick, SP SB 98x392		15,7
138 280	Spindle to stick, SP SB 98x550		22,0
138 290	Spindle to stick, SP SB 98x700		34,0
138 300	Spindle to stick, SP SB 98x817, complete		76,9

Accessories / Spares

Art. No.	Short description	l [m]	G [kg]	d [m]	Standard
842 753	Adapter for DKU piling frame corner shoring		94,0		
119 011	Adapter for KVL		6,5		
336 960	Bearing claw		40,0		
138 030	Bolt 125 x 20	0,125	0,4	0,020	
138 040	Bolt 140 x 20	0,140	0,4	0,020	
138 070	Bolt 212 x 43	0,212	2,5	0,043	
139 070	Chain sling connection, 4-leg, 2300 x 13	2,30	45,0		
139 080	Chain sling connection, 4-leg, 2800 x 13	2,80	57,0		
139 100	Connection stanchion 290 x 145		5,5		
842 099	DKU piling frame guide frame	2,27	105,0		
842 100	DKU piling frame guide frame	3,81	175,0		
842 724	DKU piling frame waling soldier	2,16	165,0		
842 727	DKU piling frame waling soldier	3,70	355,0		
138 020	Fixing for pressure spring 100 x 85	0,100	0,8	0,085	
302 125	Locating plate -closed-		4,2		
138 170	Mushroom FP 80		13,0		
IA 0120 F	Nut M 16		0,03		DIN 934
IA 0130 F	Nut M 20		0,03		DIN 934
861 076	Pressure beam E+S / Krings (GLS, Medium, Magnum shoring, KS 100)	1,60	175,5		
861 074	Pressure beam E+S / Krings (GLS, Medium, Magnum shoring, KS 100)	2,35	236,0		
861 070	Pressure beam E+S / Krings (GLS, Medium, Magnum shoring, KS 100)	2,80	271,0		
861 071	Pressure beam E+S / Krings (GLS, Medium, Magnum shoring, KS 100)	3,40	318,0		
861 077	Pressure beam E+S / Krings (Lightweight shoring, KS 60, KVL)	1,80	117,0		
861 078	Pressure beam E+S / Krings (Lightweight shoring, KS 60, KVL)	2,30	138,0		
861 079	Pressure beam E+S / Krings (Lightweight shoring, KS 60, KVL)	2,80	161,0		
861 080	Pressure beam E+S / Krings (Lightweight shoring, KS 60, KVL)	3,30	183,0		
138 160	Pressure spring FP 80	0,084	0,8	0,054	
100 690	Rubber parts GPU 30 x 40		0,1		
IB 0310 F	Screw M 16 x 55		0,11		DIN 933
IB 0360 F	Screw M 20 x 45		0,17		DIN 933
138 200	Spring cotter 92 x 5	0,092	0,1	0,005	
ID 0160 F	Spring ring A 20		0,01		DIN 127

Accessories / Spares Krings compact shoring systems

Accessories / Spares (contd.)

Art. No.	Short description	l [m]	G [kg]	d [m]	Standard
139 125	Strut key (curved)		5,0		
139 130	Strut key (straight)		5,0		
842 982	Suspended bearing block, adjustable		12,0		
139 110	Wire rope 4-legs, 1800 x 20	1,80	40,0		
139 115	Wire rope 4-legs, 2300 x 20	2,30	44,0		
139 120	Wire rope 4-legs, 2800 x 20	2,80	46,0		

l	Length	G	Weight
d	Diameter		

Assembly instructions

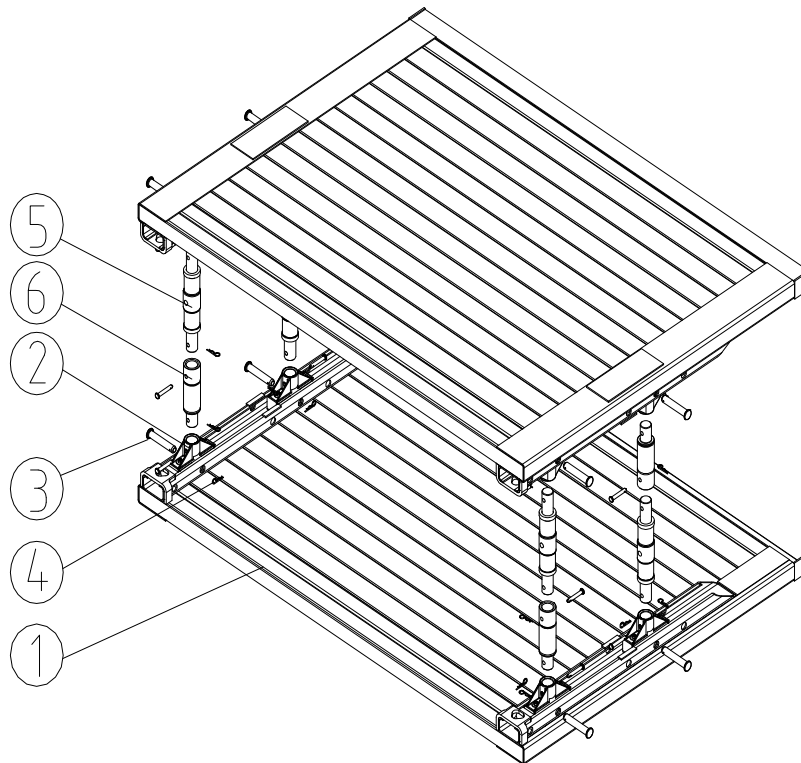
Assembly

Lay the basic module (1) on level ground with the guide post pointing upwards. Insert the preloaded spring unit (2) into the guide post, insert the bolts (3) into the holes provided in the guide post and in the spring unit and secure with spring pins (4). Relieve the spring unit by releasing the nuts.

Insert the struts (5) into the spring units, insert the bolts and secure with spring pins.

Depending on trench width, a maximum of seven spacer bars (6) can be used per strut unit. These are fastened with bolts to the struts (5), in an offset arrangement for structural reasons, and secured with spring pins.

Place the second base module fitted with spring units onto the struts/spacer bars and secure with bolts and spring pins in the manner described above. Please refer to the data sheets for the weights.



Keep out of trenches with a depth < 1.25 m which are not secured or sloped. It is also prohibited to stand or work with heavy equipment in the danger zone, e.g. at the edge of the trench.

During all work, the relevant provisions of DIN, EN, the accident prevention regulations and the statutory accident insurance institution of the building industry must be observed (see also "Occupational safety and general remarks").

Installation instructions for edge-supported shoring units

Note: According to DIN EN 13331, edge-supported shoring units are abbreviated with the abbreviation ES.

1. Insertion process

1.1 Preconditions

In the insertion process, trench shoring equipment is inserted into a section of trench which has already been excavated to its final depth. The insertion process is only permissible if the following preconditions have been fulfilled:

- Temporarily firm ground
- Vertical trench walls
- Same trench width for the entire length of the shoring unit
- Keep out of the trench until the shoring equipment has been inserted into it.
- There must be no pipes/cables, buildings or other structures or traffic areas within the range of the trench.
- Acceptable degree of anticipated settlement, loosening and displacement of soil within the range of the trench

The ground is considered temporarily firm if no major crumbling is noted in the period from the start of excavation until the insertion of the shoring.

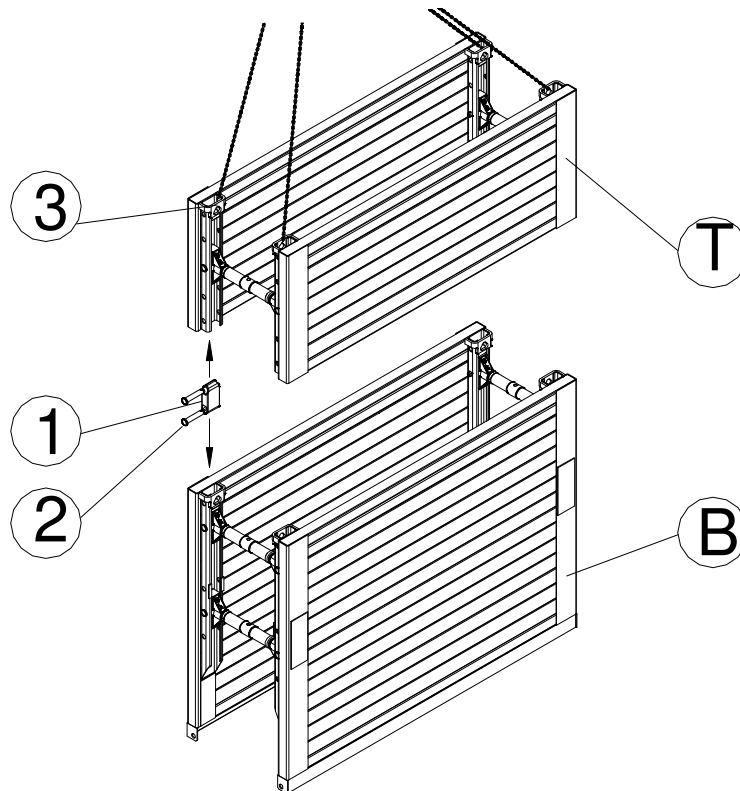


Figure 1: System overview of edge-supported shoring units

1.2 Use of top panels (edge-supported shoring units)

For the insertion process, the base (B) and top modules (T) must be assembled outside the trench and the system inserted as a single unit into the trench if trench boxes with top boxes are required to secure deeper trenches (Figure 1).

The base and top modules are connected with the aid of connectors (1) and bolts (2) with spring pins.

The system is assembled with the aid of lifting gear and suitable slings (GS-approved).

The sling must be exclusively attached to the envisaged attachment holes (3, erector heads (see Figure 1)) at at least four points (ES).

1.3 Installation (edge-supported shoring units)

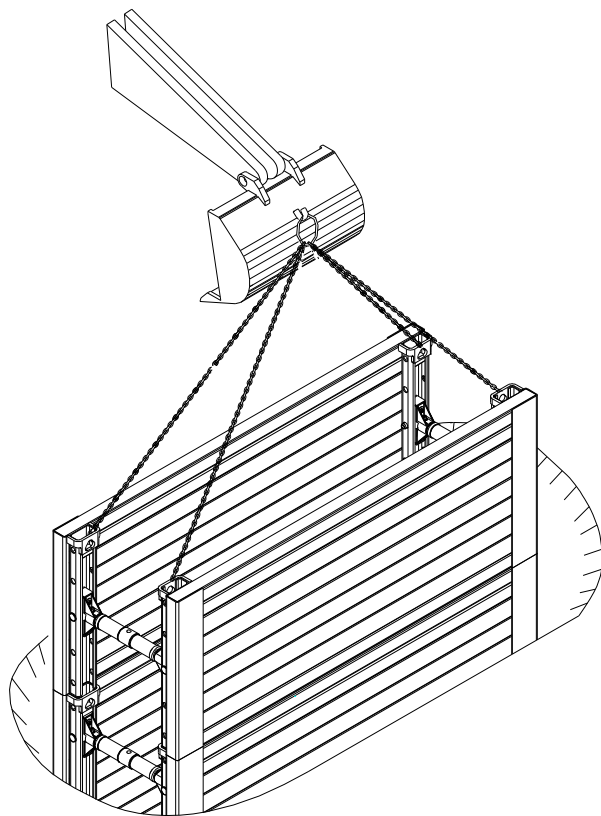


Figure 2: Insertion of the shoring unit fully assembled outside the trench

The shoring unit prepared outside the trench is inserted with the aid of lifting gear and a suitable sling (GS-approved) into the trench fully excavated to its final depth for the length and width of a trench box (Figure 2). The length of the excavated and unsecured section of trench must be no more than that required for the insertion of a single trench shoring unit. The gap between the trench wall and the inserted shoring unit must be backfilled right up to the top. In addition, the shoring unit must be pressed against the trench wall by extending the struts.

The permitted load values in accordance with the technical data of the shoring unit employed must be observed at all times. The details regarding trench depth can be found in DIN 4124.

2. Lowering process

2.1 General remarks

During the lowering process, the trench shoring equipment or parts of it are pressed vertically into the ground.

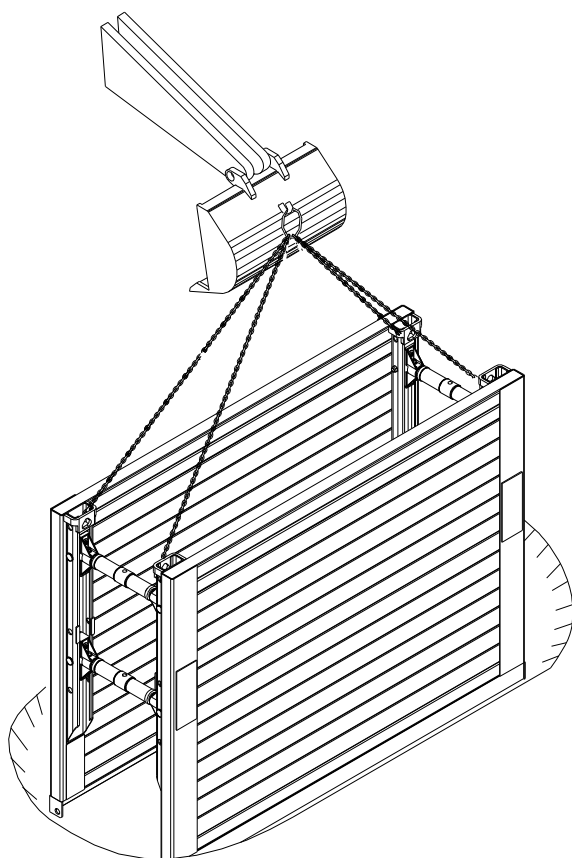
The lowering process is only permitted for edge-supported shoring units. **Center-supported trench shoring units must not be inserted by lowering!**

2.2 Pre-adjustment of the shoring units

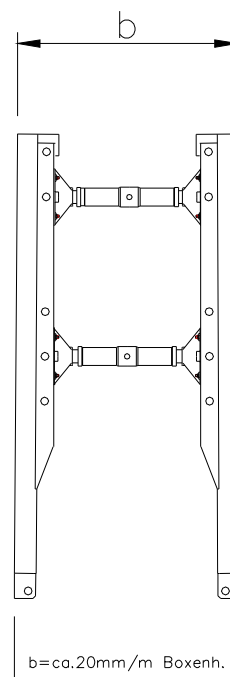
Before inserting the shoring unit in question, its struts must be adjusted by turning the spindles so that **the distance between the shoring panels of a shoring unit is greater at the bottom than at the top**. This so-called **A-form** is achieved by extending the spindles of the bottom strut by about 20 mm per meter of box height more than the spindles of the top strut.

2.3 Initial excavation and insertion and alignment of the shoring unit

When the line of the trench has been measured, advance excavation for insertion of the first shoring unit is carried out. Using lifting gear and a sling (GS-approved, connection points), the shoring unit is inserted in the center of the trench and aligned parallel with the trench axis. When the shoring has been inserted, all the screw joints must be tightened (Figure 3).



A - Form



$b = \text{approx. } 20 \text{ mm/n box h}$

Figure 3: Insertion and alignment of the shoring unit/A-shape

2.4 Lowering the shoring unit

Lowering and soil excavation are performed alternately. During the lowering process, advance soil excavation beneath the panels must not exceed 0.5 m, depending on soil conditions. When pressing down the shoring walls on one side and then the other, make sure that the possible angle of rotation in a vertical plane between the strut and shoring wall does not exceed $\delta = \pm 8^\circ$. For the lowering process, pressure panels and/or pressure beams (D) must be used. Make sure that the shoring panels are not used as chisels.

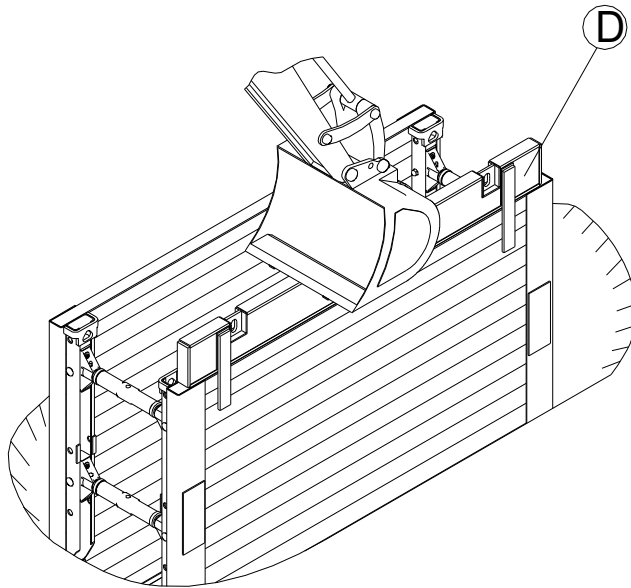


Figure 4: Lowering the shoring unit

2.5 Top panel

Depending on the required trench depth, top modules (T) are mounted on the base modules (B) (Figure 5). The base and top modules are connected with connectors (1) and bolts (2). Here again, pressure panels and/or pressure beams must be used for the ongoing lowering process.

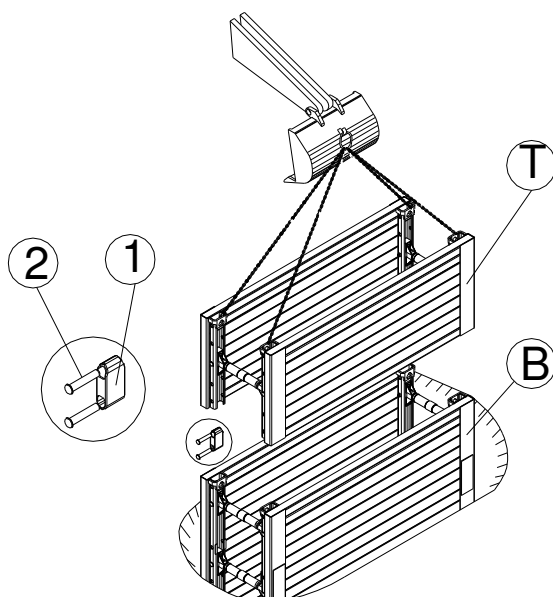


Figure 5: Fitting the top panel

2.6 Installing the next shoring unit

The next shoring unit is installed as soon as the previous unit has been fully lowered to the base of the trench. Installation is carried out in the manner described above.

Shoring must be continuous. Wall sections that are not secured with shoring units, e.g. due to lines crossing the trench, must be shored separately.

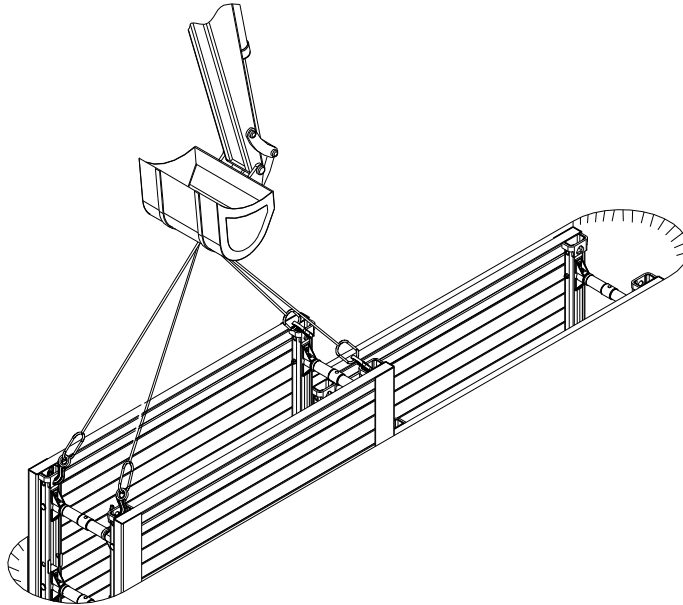


Figure 6: Installing the next shoring unit

2.7 Pipe laying

After installing the shoring in accordance with the instructions given above, pipe-laying work can start in accordance with the instructions of the pipe manufacturer.

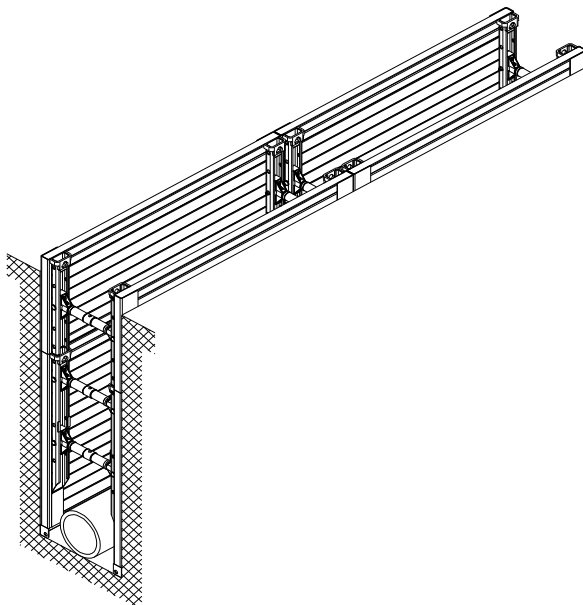


Figure 7: Pipe laying

Instructions for removing edge-supported shoring systems

1. Removal, backfilling, compacting

At the end pipe-laying work, the shoring is removed with layer-by-layer backfilling and compacting. To this end, the shoring is extracted step-by-step in accordance with the instructions of the project manager on site and the expert's specifications and the backfilling material returned to the trench is compacted against the existing soil.

Slings may only be attached to the envisaged attachment points.

During removal, the angle of the struts must not exceed $\delta = \pm 8^\circ$.

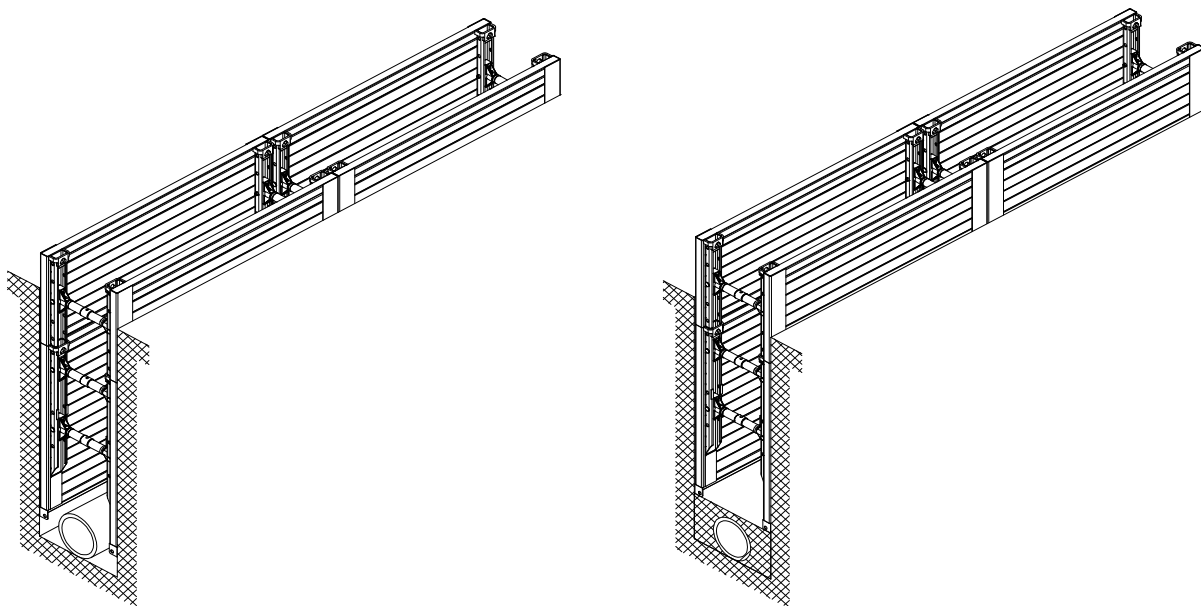


Figure 1: Extracting the shoring with backfilling and compacting of the trench

2. Servicing and maintenance

Before re-use in further shoring fields, all shoring components must be checked for correct function.

Faulty parts must be replaced or repaired.

Minor repairs, **subject to consultation with the manufacturer**, may be carried out by the user.

Only use the manufacturer's original replacement parts!

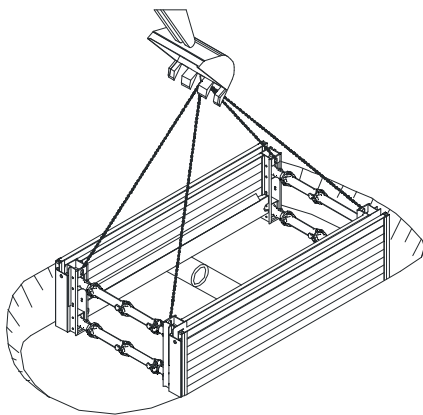
There is no warranty on incorrectly performed repairs and non-original parts (see also section "Occupational safety and general remarks").

Installation instructions for sheet piling element shoring

1. General remarks

Sheet piling element shoring is a universal and cost-effective shoring method in inner-city areas, particularly in cases where pipes and cables cross the trench. The two sheet piling elements on either side of the trench, propped against each other with struts, serve as the upper guide for sheet piles inserted vertically into the soil. Sheet piles can be pressed into the ground with an excavator bucket or by vibration. Sheet piling elements are assembled and pre-adjusted in the same way as edge-supported shoring systems.

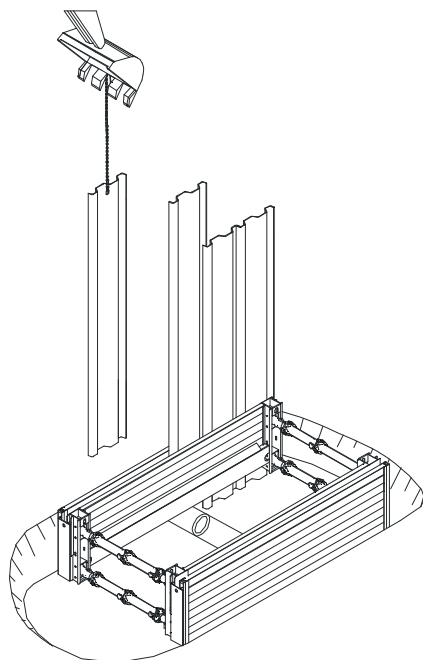
2. Advance excavation and insertion and alignment of the shoring unit



After measurement of the line of the trench, advance excavation for the insertion of the sheet piling element can take place.

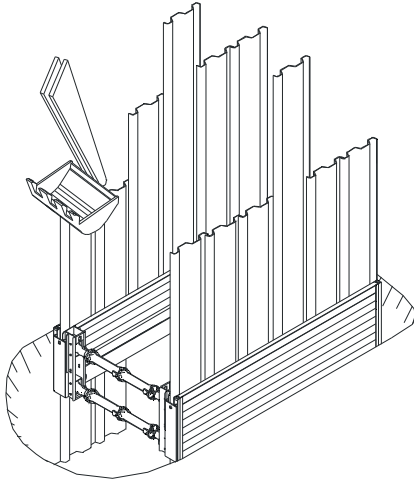
The sheet piling element is usually installed with its top edge flush with the working level, and advance excavation in this case is to a depth of approximately 1 meter. The gap between the trench wall and sheet piling element must be filled right up to the top. Furthermore, the sheet piling element must be pressed against the trench wall by extending the struts.

3. Inserting the sheet piles



The sheet piles can now be inserted into the slot formed by the double panel walls of the sheet piling elements and pressed into the ground with the excavator bucket. To make this process easier, and particularly in cases of sheet piles longer than 4 meters, it is advisable to use a sheet pile grab. The basic equipment of sheet piling elements from E+S does not include a vertical guide for the sheet piles. The advantage of this is that the piles can be inserted in any desired position. The piles can also overlap. If desired, a frame can nevertheless be supplied for vertical pile guidance. Lightweight sections KD VI/8 are used as the sheet piles.

4. Lowering the shoring system



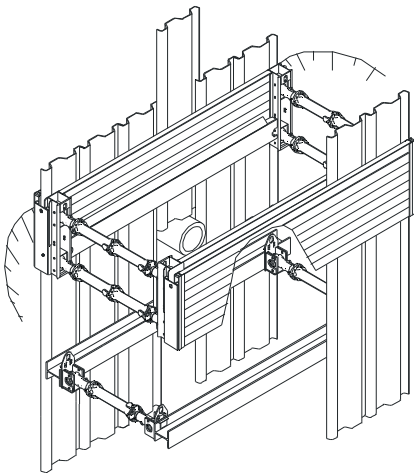
After inserting the sheet piles, the unit is lowered as soil excavation proceeds.

During the lowering process, the advance soil excavation beneath the sheet piles must not exceed 0.5 meters, depending on soil conditions. Any pipes or cables crossing the trench must be exposed beforehand and the sheet pile above them must be secured to prevent it dropping any further. It is beneficial in such cases to use shorter sheet piles.

The area beneath the cable or pipe crossing the trench is conventionally secured with horizontal wooden trench sheeting. This can be fastened to the neighboring sheet piles.

Make sure that the sheet piles are not used as chisels. Solid obstacles (e.g. unnatural fill, rocks) must be removed manually. To prevent settlement, make sure that the elements and sheet piles are backfilled with soil. In soils amenable to a driving, it is possible to drive the sheet piles to their final depth. The soil is then subsequently excavated with grab equipment or a backhoe.

5. Additional walings



Depending on the required trench depth, it may be necessary for structural reasons to take measures to ensure the stability of the shoring system. Proof of structural strength for the specific project is required as for all trench shoring systems conforming to DIN 4124.

Longitudinal waling girders must be fitted at a depth of roughly 2 meters from the surface of the ground. These are secured to the sheet piling element with chains to prevent them from falling and propped against each other with E+S waling struts. These waling girders must be lowered together with the sheet piles to the structurally required depth.

The next shoring unit is installed as soon as the preceding system has been fully lowered to the base of the trench. Depending on site conditions, this can be another piling element or a different shoring system. When the pipes have been laid, the system is removed by proceeding in reverse order.

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