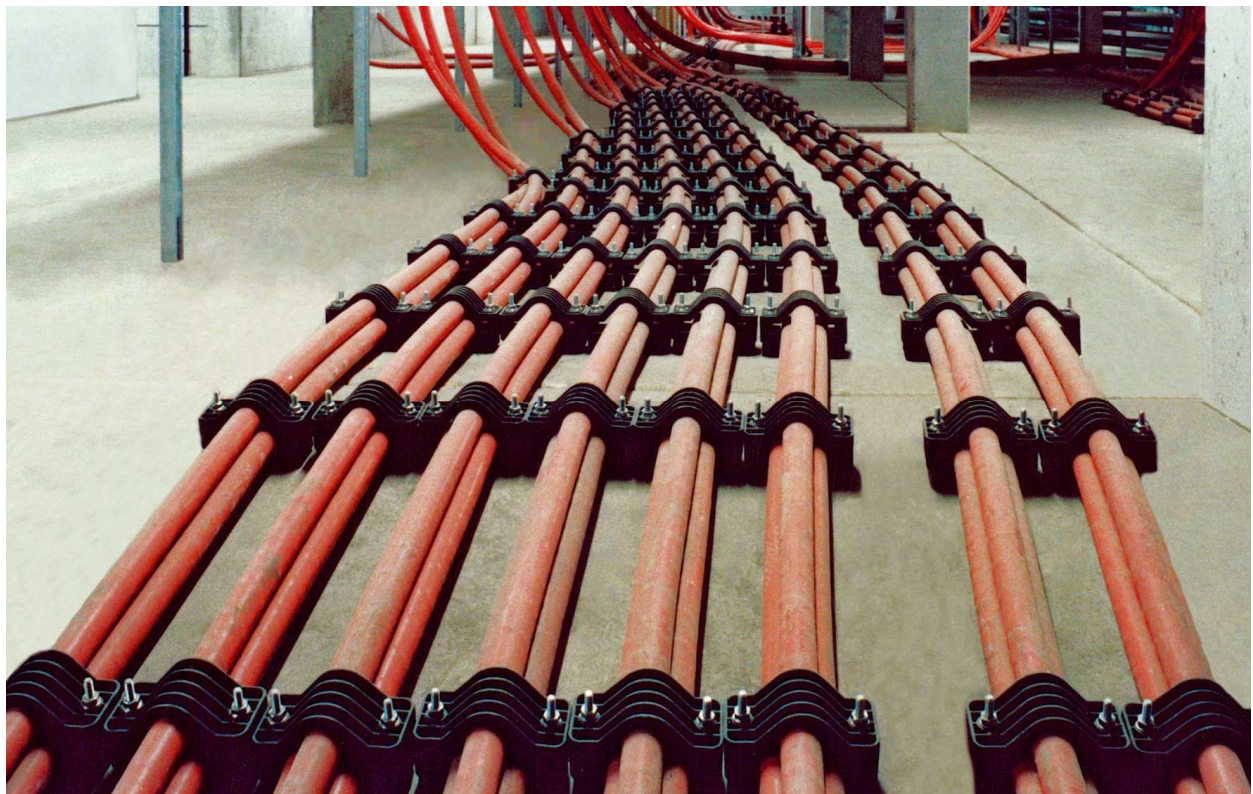




CABLE CLAMPS FOR LOW AND HIGH VOLTAGE CABLES



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îd-Technik – Company Profile

We are an electrical company developing and distributing fastening material for all types of single- and multi-conductor high, middle and low voltage power cables.

Since 1977, we deliver our Cable Clamps into more than 100 countries worldwide. Our customers include large German and international electric corporations and cable manufacturers as well as public companies, smaller municipal works and energy supply companies. From the beginning onwards, the best advertisement for us was and still is the high quality of our products accompanied by our reliable performance.

The good international reputation of îd-Technik is also based on our expertise to assist you in specific application problems. We find solutions by adjusting our products to your requirements or by developing new and innovative concepts.

The Idea

Our Cable Clamps are designed to fix, retain and support cables. It is absolutely necessary to adjust the fastening of the cables to dynamic short circuit forces. In case of short-circuit faults, correct clamping will keep the cables in place during the fault and enable the circuit to be restored once the fault has been repaired. îd-Technik Cable Clamps are designed and manufactured to ensure the safe fastening of cables, particularly during short circuit faults.

Development

During the design and development of the îd-Technik Cable Clamps, one major aspect is the mechanical resistance of our Clamps during short-circuits. Numerous short-circuit tests with currents up to 128 kA were successfully accomplished in order to prove the stability.

With the choice of material, great emphasis has been set – besides the chemical persistency – on a lifetime of more than 35 years.

Product Range

îd-Technik distributes Cable Clamps for every power cable of all voltage ranges (1 kV to 500 kV). The diameters range from 24 mm to 200 mm, however, with our Elastic Inlay it is possible to fix cables with diameters down to 18 mm. îd-Technik provides Clamps for fixing one cable (single- and multi-core) as well as Bundling Clamps for trefoil formation of single-core cables.

Fields of Application

îd-Technik Cable Clamps are developed for indoor and outdoor operations with no restrictions. Our Clamps are used under severe conditions:

- in areas with extreme temperatures like deserts, tropical climate, high mountains and coastal areas
- under cyclic alternation of load
- under radioactive radiation
- in ozone
- under water
- under exposure to oils, fuels, alkalines etc.

Quality

îd-Technik applies a Quality Management System, which is regularly certified according to DIN EN ISO 9001.

We continuously improve our products further – therefore our clamping systems have the highest quality you can get.

During the last 35 years no failures or impairment of any îd-Technik Cable Clamp occurred!

Service

- We offer fast and reliable delivery of customary quantities due to well sized stock.
- Our engineering department supports you with assistance for any issue regarding fastening of power cables.

For further information please visit our website www.id-technik.com or contact us at info@id-technik.com.

Properties Cable Clamps

Application:

Fastening of all types of single- and multi-conductor high and low voltage cables (1kV to 500 kV)

Especially suitable for fastening in single and trefoil formation of single-conductor cables

Material:

Polyamide, fibreglass-reinforced, coloured black,
flame resistant, special protection against ultraviolet rays,
free of halogens, non-toxic, fully recyclable

Properties:

Resistance to: ultraviolet rays, ozone, oils, fuels, alkalis, radioactive rays*
Flammability: UL94V-0
classification following DIN 5510, part 2, flammability class: S3
Thermal expansion: 0.01 % per 10 °C temperature increase
Tensile strength: 120 N/mm²
Flexural strength: 210 N/mm²

Temperature Range:

Ambient temperatures: down to -40 °C (For lower temperatures, please contact Dörrstein GmbH.)
Continuous operation: up to 120 °C
Permitted short-term heating: up to 220 °C
Operation life: more than 35 years of maintenance- and failure-free operation

Legal Compliance:

Directive 2002/95/EC (RoHS)
Regulation (EC) No. 1907/2006 (REACH)

Constructional Features:

- Particularly high mechanical strength and heat resistance due to fibreglass-reinforced polyamide
- Safe restraint of dynamic forces of high short-circuit currents
- Test reports from neutral laboratories regarding dynamic short-circuit currents, up to 128 kA, and the fire-resistance of the Cable Clamps
- Low mechanical pressure on the cables due to very wide clamping length
- Unrestricted application both indoor and outdoor in extreme climates such as deserts, tropics, high mountains, arctic climate, coastal salt fogs, flooding, ozone, due to special resistance to ageing, ozone and ultraviolet rays
- Secure fixation without damage to the cables at high short-circuit currents
- Easy to mount without special instruments and maintenance-free
- Fastening of Cable Clamps adaptable to all local conditions

* For further details, please contact Dörrstein GmbH.

Cable Clamps

Series:

K

Application:

Fastening of single- and multi-conductor cables, unrestricted application indoors and outdoors

Material:

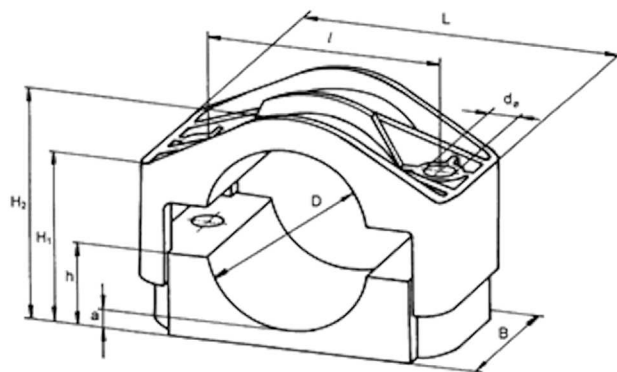
Polyamide, fibreglass-reinforced

Outer diameter of cables:

18 mm to 90 mm

Mechanical resistance to short circuits: 10,000 N

Max. torque for tightening screws: 5 Nm



Dimensions in mm

Type	D _ø	D _ø *	D _ø **	L	B	I	d _ø	H ₁	H ₂	h	a
K 26/38	24 - 38	21 - 35	18 - 32	91	60	60	12	36 - 47	46 - 57	19	7
K 36/52	36 - 52	33 - 49	30 - 46	108	60	75	12	43 - 56	56 - 72	24	8
K 50/75	50 - 75	47 - 72	44 - 69	126	60	95	12	51 - 77	74 - 98	30	9
K 66/90	66 - 90	63 - 87	60 - 84	158	70	120	14	65 - 89	91 - 115	42	10

D_ø: range of outer cable diameter

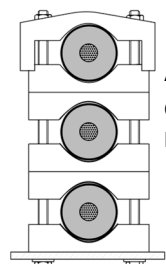
D_ø*: ~ with one Elastic Inlay

D_ø**: ~ with two Elastic Inlays

Application with Elastic Inlay:

- as padding of the cables (for diameters ≥ 60 mm) to avoid damage of the cables under strain and/or change of surrounding temperature
- as secure fixation of the cables and absorption of forces due to the weight of the cables at vertical sections in any height (wind turbine generators, masts, shafts)
- as extension of the clamping range for the fixation of cables with smaller outer diameters

Fastening example:

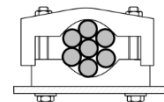
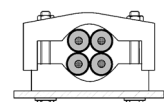
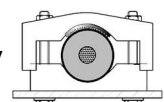


Additional bottom parts for the stacking of several cables (not K 66/90).

Example: Stack of three: 1 complete Cable Clamp plus 4 additional bottom parts

Stack of two: 1 complete Cable Clamp plus 2 additional bottom parts

Application with Elastic Inlay



Also suitable for bundled fastening of four or more cables (range of outer cable diameters upon request).

Cable Clamps

Series:

KT

Application:

Fastening of single- and multi-conductor cables for high short circuit forces, unrestricted application indoors and outdoors

Material:

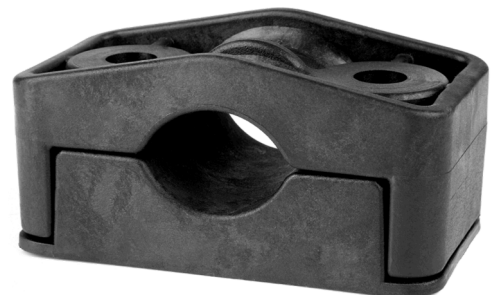
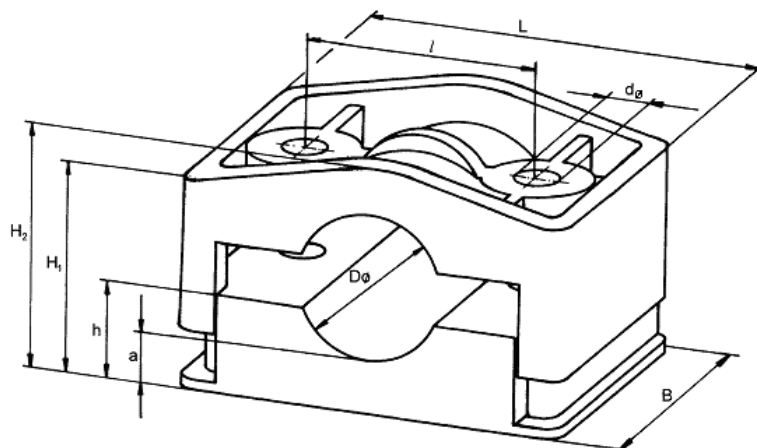
Polyamide, fibreglass-reinforced

Outer diameter of cables:

19 mm to 39 mm

Mechanical resistance to short circuits: 20,000 N

Max. torque for tightening screws: 5 Nm



Dimensions in mm

Type	D _ø	D _ø *	D _ø **	L	B	l	d _ø	H ₁	H ₂	h	a
KT 25/39	25 - 39	22 - 36	19 - 33	107	60	65	13	46 - 60	55 - 69	27	15

D_ø: range of outer cable diameter

D_ø*: ~ with one Elastic Inlay

D_ø**: ~ with two Elastic Inlays

Application with Elastic Inlay

- as secure fixation of the cables and absorption of forces due to the weight of the cables at vertical sections in any height (wind turbine generators, masts, shafts)
- as extension of the clamping range for the fixation of cables with smaller outer diameters

Cable Clamps

Series:

KR

Application:

Fastening of single- and multi-conductor cables for high short circuit forces, unrestricted application indoors and outdoors

Material:

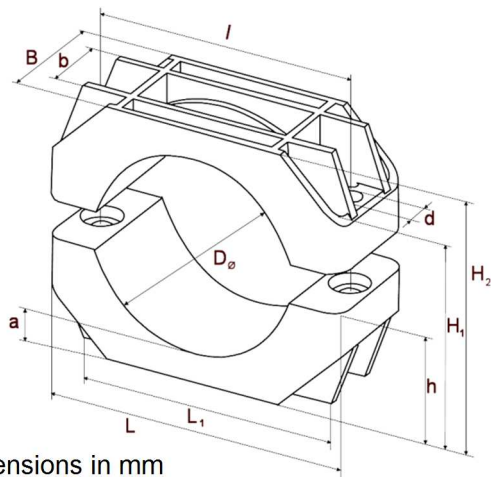
Polyamide, fibreglass-reinforced

Outer diameter of cables:

70 mm to 250 mm

Mechanical resistance to short circuits: 20,000 N

Max. torque for tightening screws: 8 Nm



Dimensions in mm

Type	D _ø	D _ø **	L	L ₁	B	b	l	d _ø	H ₁	H ₂	h	a
KR 75/100	75 - 100	70 - 95	180	172	77	44	150	14	71 - 97	109 - 134	52	17
KR 100/130	100 - 130	95 - 125	210	197	97	54	175	14	99 - 129	140 - 170	69	20
KR 130/160	130 - 160	125 - 155	250	213	97	54	210	18	116 - 146	176 - 206	87	23
KR 160/200	160 - 200	155 - 195	290	258	120	60	250	18	172 - 212	230 - 270	113	35
KR 200/250	200 - 250	195 - 245	340	300	120	61	300	18	190 - 240	280 - 330	130	40

D_ø: outer cable diameter

D_ø**: ~ with two Elastic Inlays

Also suitable for bundled fastening of four or more cables.

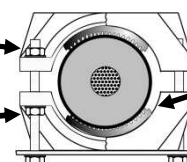
Application with Elastic Inlay

- as padding of the cables (for diameters ≥ 60 mm) to avoid damage of the cables under strain and/or change of surrounding temperature
- as secure fixation of the cables and absorption of forces due to the weight of the cables at vertical sections in any height (wind turbine generators, masts, shafts)
- for KR 75/100, KR 100/130 and KR 130/160 Elastic Inlay 100 mm x 100 mm
- for KR 160/200 and KR 200/250 Elastic Inlay 150 mm x 140 mm

Fastening Example:

Torque for fixing screws: max. 8 Nm

Important:
Counter nut with washer
(necessary for KR-Clamp)



Elastic Inlay

Block Clamp

Type:

RS3

Application:

Parallel fastening of single- and multi-conductor cables
in three group block,
unrestricted application indoors and outdoors

Material:

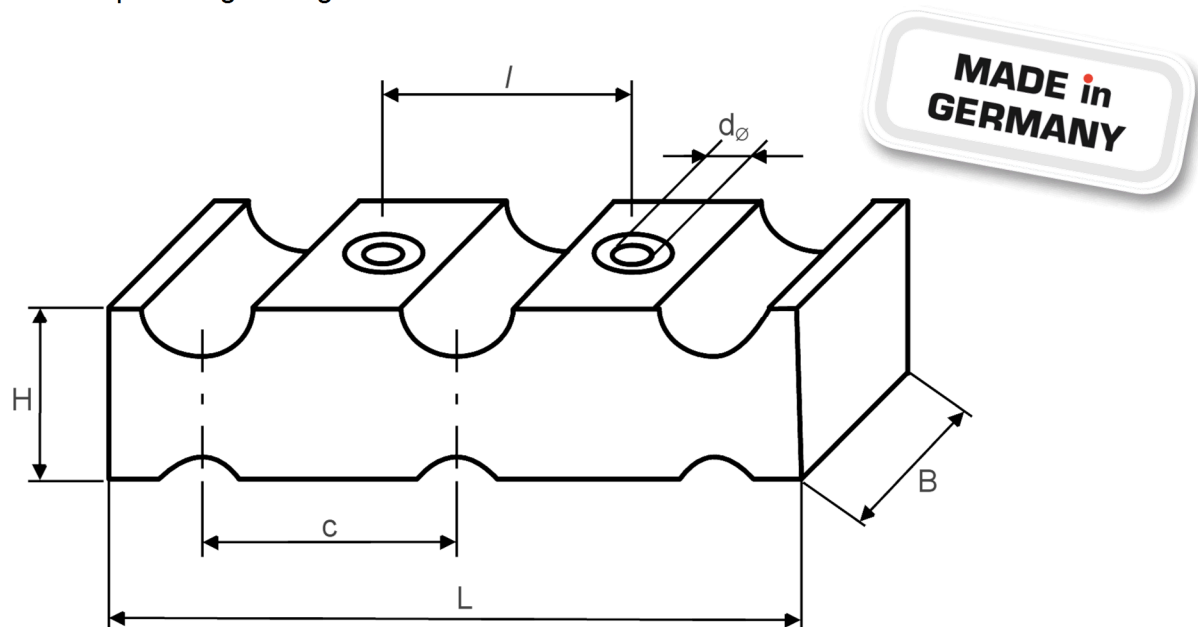
Polyamide

Outer diameter of cables:

12 mm to 32 mm

Mechanical resistance to short circuits: 10,000 N

Max. torque for tightening screws: 8 Nm



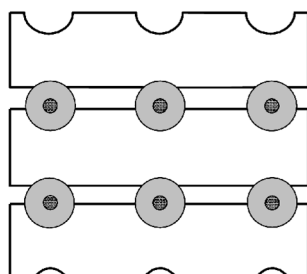
Dimensions in mm

Type	D_{\emptyset}	L	B	I	d_{\emptyset}	H	c
RS3 - 12/32	12 - 32	202	53	75	13	51	75

D_{\emptyset} : outer cable diameter

Minimum order quantity and delivery time upon request

Fastening example:



Block Clamp

Series:

RS4

Application:

Parallel fastening of single- and multi-conductor cables
in four group block,
unrestricted application indoors and outdoors

Material:

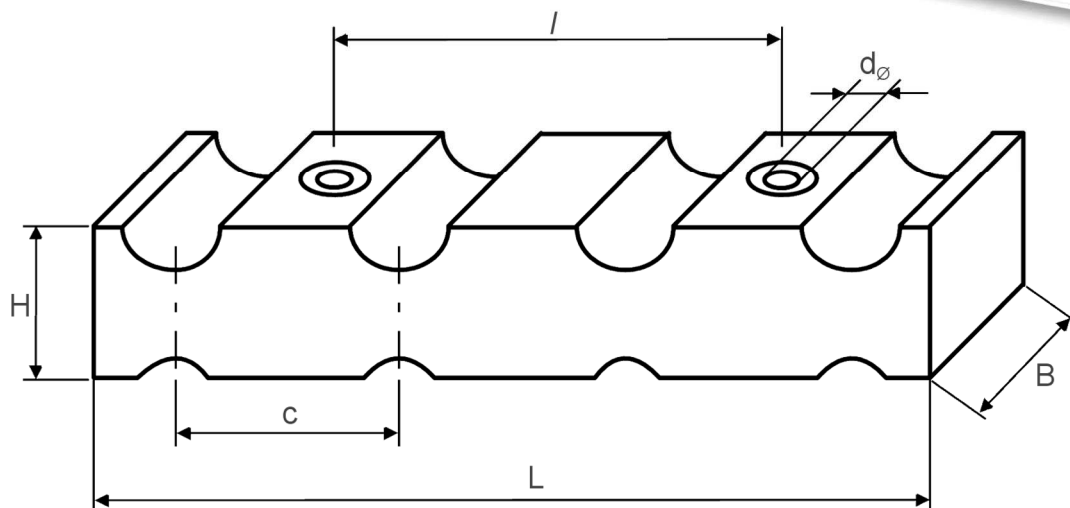
Polyamide

Outer diameter of cables:

12 mm to 32 mm

Mechanical resistance to short circuits: 10,000 N

Max. torque for tightening screws: 8 Nm

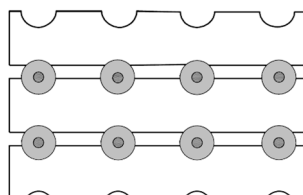


Dimensions in mm

Type	D _ø	L	B	l	d _ø	H	c
RS4 - 12/32	12 - 32	275	53	150	13	51	75

D_ø: outer cable diameter

Fastening example:



Block Clamp

Type:

RS5

Application:

Parallel fastening of single- and multi-conductor cables
in five group block,
unrestricted application indoors and outdoors

Material:

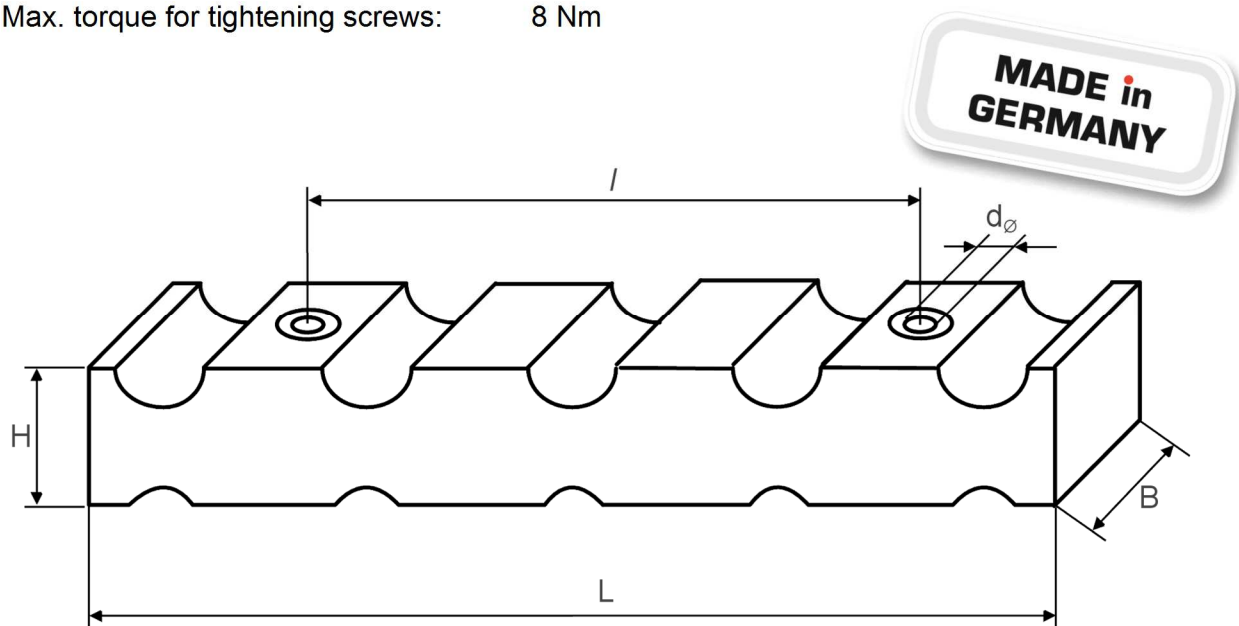
Polyamide

Outer diameter of cables:

12 mm to 32 mm

Mechanical resistance to short circuits: 10,000 N

Max. torque for tightening screws: 8 Nm



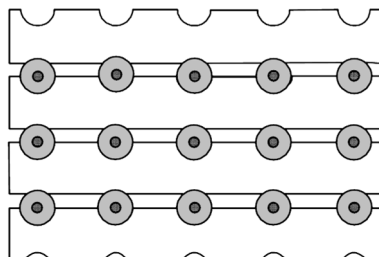
Dimensions in mm

Type	D _ø	L	B	l	d _ø	H
RS5 - 12/32	12 - 32	350	53	225	13	51

D_ø: outer cable diameter

Minimum order quantity and delivery time upon request

Fastening example:



Cable Clamps

Series:

KS

Application:

Fastening of single-conductor cables in trefoil formation,
unrestricted application indoors and outdoors

Material:

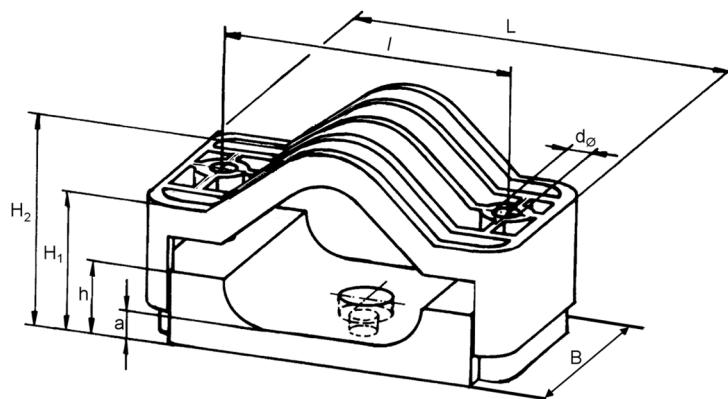
Polyamide, fibreglass-reinforced

Outer diameter of cables:

22 mm to 46 mm

Mechanical resistance to short circuits: 12,500 N

Max. torque for tightening screws: 5 Nm



The assembly hole in the bottom part of series KS permits direct fastening to lattice, concrete and wooden masts, suitable for M 10 bolts.

Dimensions in mm

Typ	D _ø	D _ø *	L	B	I	d _ø	H ₁	H ₂	h	a
KS 25/36	25 - 36	22 - 33	150	80	110	12	55 - 75	77 - 97	35	19
KS 33/46	33 - 46	30 - 43	170	80	130	12	55 - 85	85 - 115	35	15

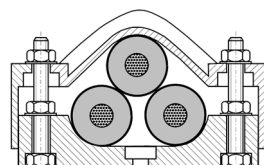
D_ø: outer cable diameter

D_ø*: ~ with Elastic Inlays

Application with Elastic Inlay:

- as secure fixation of the cables and absorption of forces due to the weight of the cables at vertical sections in any height (wind turbine generators, masts, shafts)
- as extension of the clamping range for the fixation of cables with smaller outer diameters

Fastening example:



Cable Clamps

Series:

KP

Application:

Fastening of single-conductor cables in trefoil formation for high short circuit forces, unrestricted application indoors and outdoors

Material:

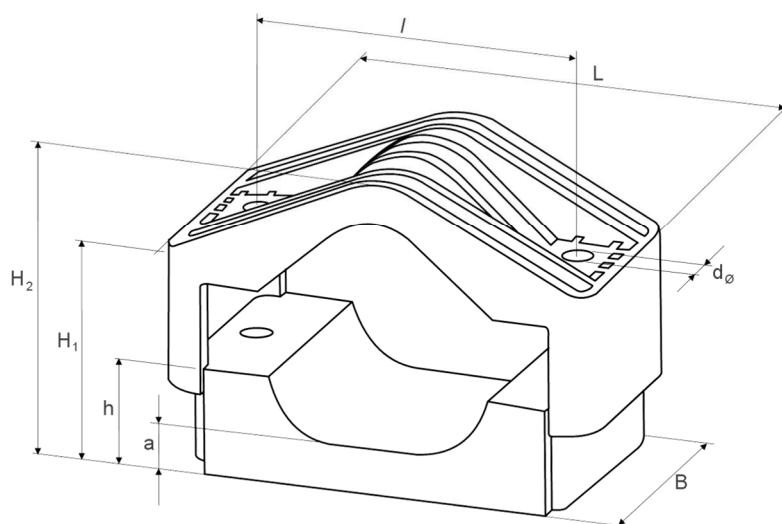
Polyamide, fibreglass-reinforced

Outer diameter of cables:

26 mm to 64 mm

Mechanical resistance to short circuits: 25,000 N

Max. torque for tightening screws: 8 Nm



Dimensions in mm

Type	D_{\emptyset}	D_{\emptyset}^*	L	B	I	d_{\emptyset}	H_1	H_2	h	a
KP 29/41	29 - 41	26 - 38	172	80	125	14	60 - 90	81 - 111	40	20
KP 39/53	39 - 53	36 - 50	190	80	145	14	63 - 93	101 - 131	45	20
KP 51/64	51 - 64	48 - 61	205	90	160	14	95 - 123	130 - 158	70	25

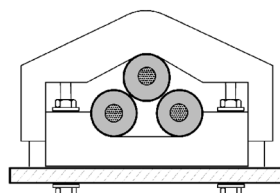
D_{\emptyset} : outer cable diameter

D_{\emptyset}^* : ~ with Elastic Inlay

Application with Elastic Inlay

- as secure fixation of the cables and absorption of forces due to the weight of the cables at vertical sections in any height (wind turbine generators, masts, shafts)
- as extension of the clamping range for the fixation of cables with smaller outer diameters

Fastening example:



Cable Clamps

Series:

KH

Application:

Fastening of single-conductor cables in trefoil formation for high short circuit forces, unrestricted application indoors and outdoors

Material:

Polyamide, fibreglass-reinforced

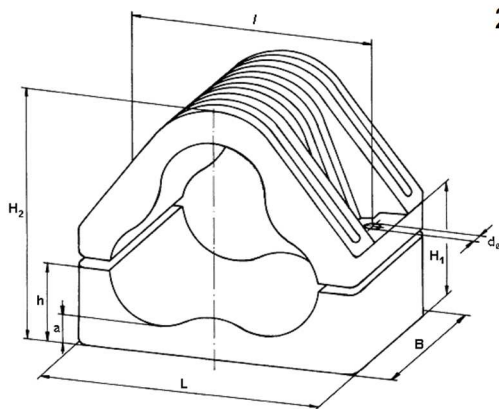
Outer diameter of cables:

59 mm to 165 mm

Mechanical resistance to short circuits: 25,000 N

Max. torque for tightening screws:

8 Nm without Elastic Inlay
20 Nm with Elastic Inlay



MADE in GERMANY

Dimensions in mm

Type	D _ø	D _ø *	L	B	I	d _ø	H ₁	H ₂	h	a
KH 62/75	62 - 75	59 - 72	225	90	185	18	114 - 142	172 - 200	80	30
KH 73/86	73 - 86	70 - 83	250	100	210	18	119 - 147	192 - 220	85	30
KH 84/97	84 - 97	81 - 94	270	100	230	18	128 - 156	214 - 242	95	30
KH 95/107	95 - 107	92 - 104	290	100	250	18	136 - 164	244 - 262	103	30
KH 105/117	105 - 117	103 - 114	310	100	270	18	144 - 178	248 - 282	108	30
KH 115/140	115 - 140	112 - 137	365	120	320	18	182 - 242	270 - 330	145	35
KH 138/165	138 - 165	135 - 162	500	140	420	20	215 - 310	295 - 390	165	40

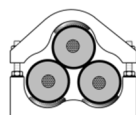
D_ø: outer cable diameter

D_ø*: ~ with Elastic Inlays

Application with Elastic Inlay

- as padding of the cables (for diameters ≥ 60 mm) to avoid damage of the cables under strain and/or change of surrounding temperature
- as secure fixation of the cables and absorption of forces due to the weight of the cables at vertical sections in any height (wind turbine generators, masts, shafts)
- for KH 115/140 and KH 138/165 Elastic Inlay 150 mm x 140 mm
- for all other KH-types Elastic Inlay 100 mm x 100 mm

Fastening example:



Additionally, the Distance Wedge is needed for cables with impregnated paper insulation for high- and extra high-voltage and at vertical installations. For the range of outer cable diameter check Distance Wedge data sheet.

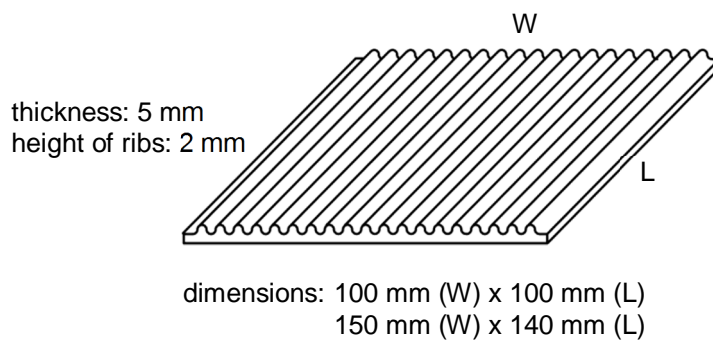
Elastic Inlay

Application: Padding of cables (for outer cable diameters ≥ 60 mm) for elastic compression of diameter variations to avoid damaging of cables caused by changes of load and ambient temperature

Fixation of the cables and absorption of forces due to the weight of the cables in vertical sections at any height (wind turbine generators, masts, shafts)

Fixation of cables with small outer diameters to enlarge the clamping range

Material: One-side ribbed EPDM

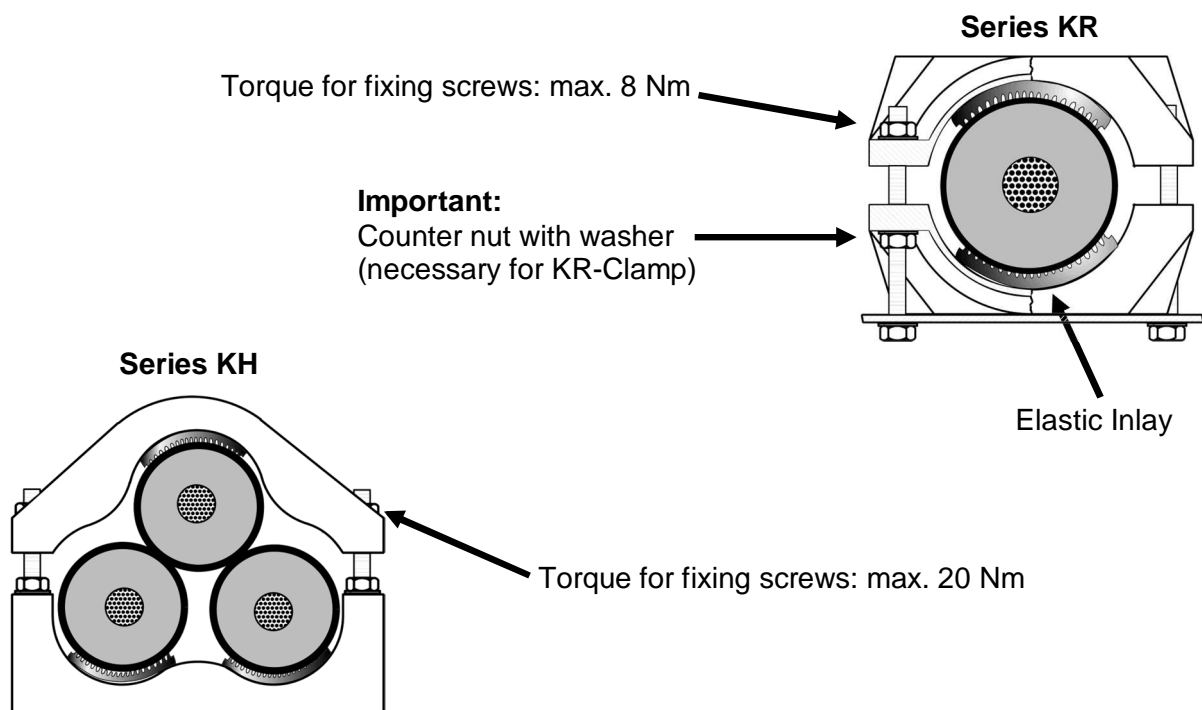


also available in rolls
dimensions: 100 mm (W) x 3 m (L)
150 mm (W) x 3 m (L)

Elastic Inlay 150 mm x 140 mm for KR 160/200, KR 200/250,
KH 115/140 and KH 138/165

Elastic Inlay 100 mm x 100 mm for all other Cable Clamps

Application examples:



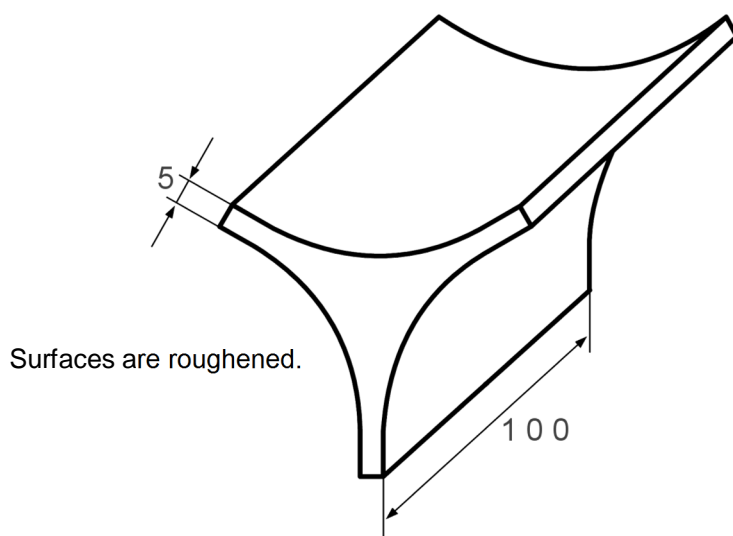
Distance Wedge

For Cable Clamp series KH:

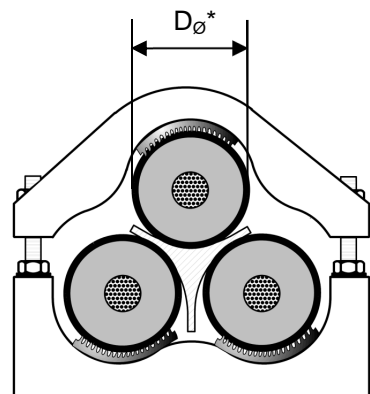
Application: Additional fixation of cables for high- and extra high-voltage in trefoil formation, especially with impregnated paper insulation and at vertical installations

Range of outer cable diameter: 57 mm to 112 mm

Material: Polyamide, fibreglass-reinforced



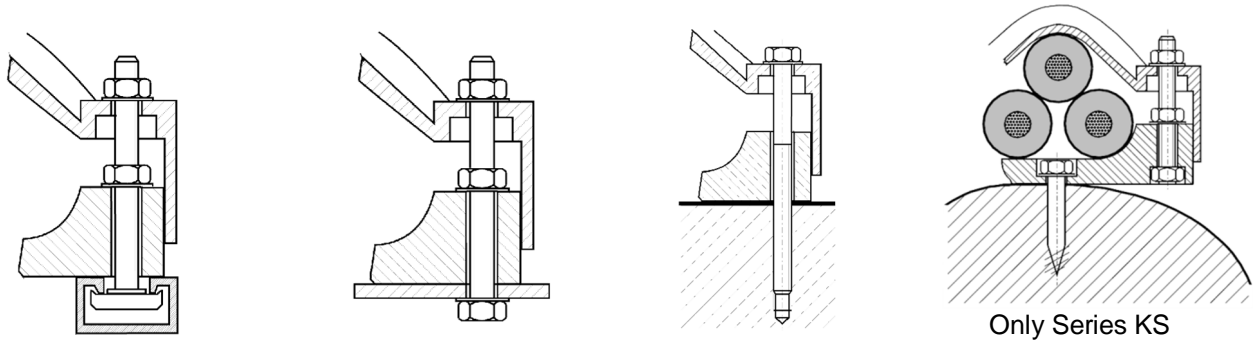
Wedge Type	D _Ø	Clamp Type
S 57/92	57 - 70	KH 62/75
	68 - 81	KH 73/86
	79 - 92	KH 84/97
S 90/112	90 - 102	KH 95/107
	100 - 112	KH 105/117



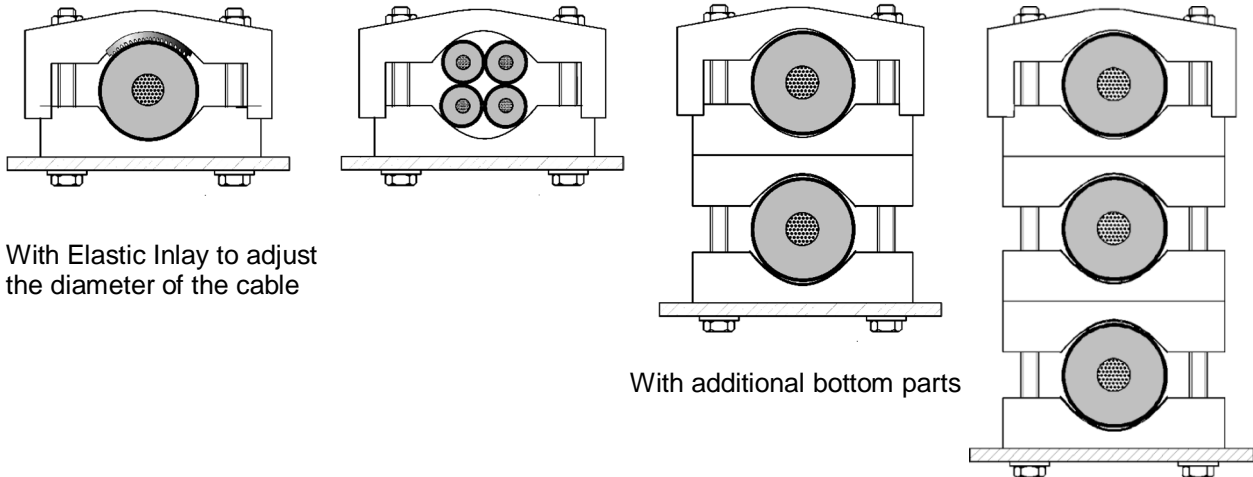
D_Ø: outer diameters of the single cables using Distance Wedge and Elastic Inlays

Fastening Examples

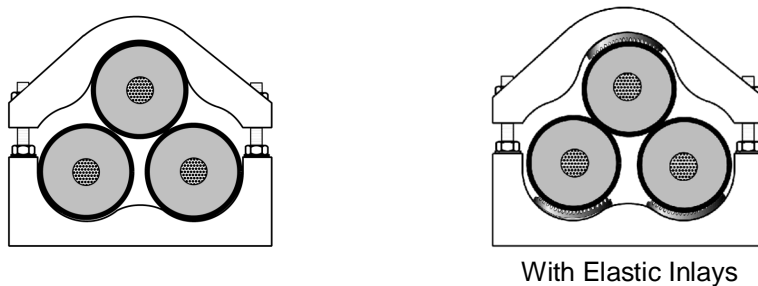
All series



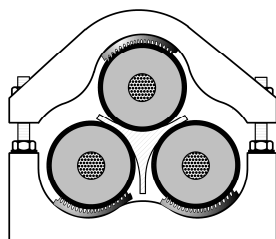
Series K



Series KS, KP, KH

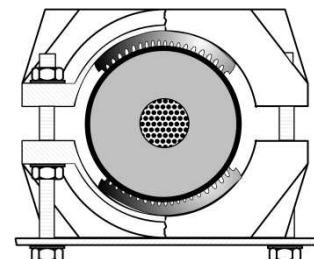


Series KH



With Elastic Inlays and additional Distance Wedge for cables with impregnated paper insulation and at vertical installations

Series KR



With Elastic Inlays

Application examples

20 kV-Cable:

Bundling with fibre-glass reinforced bundling tapes

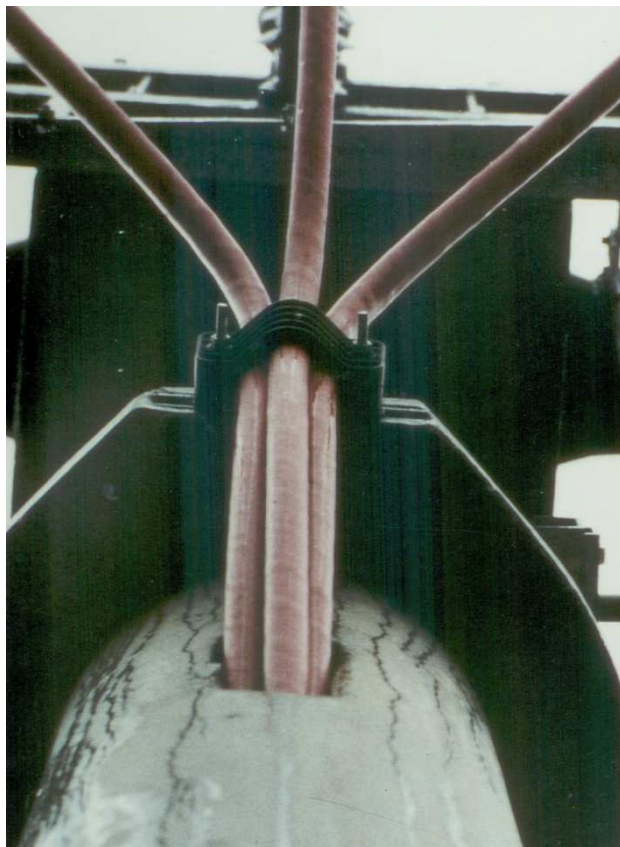
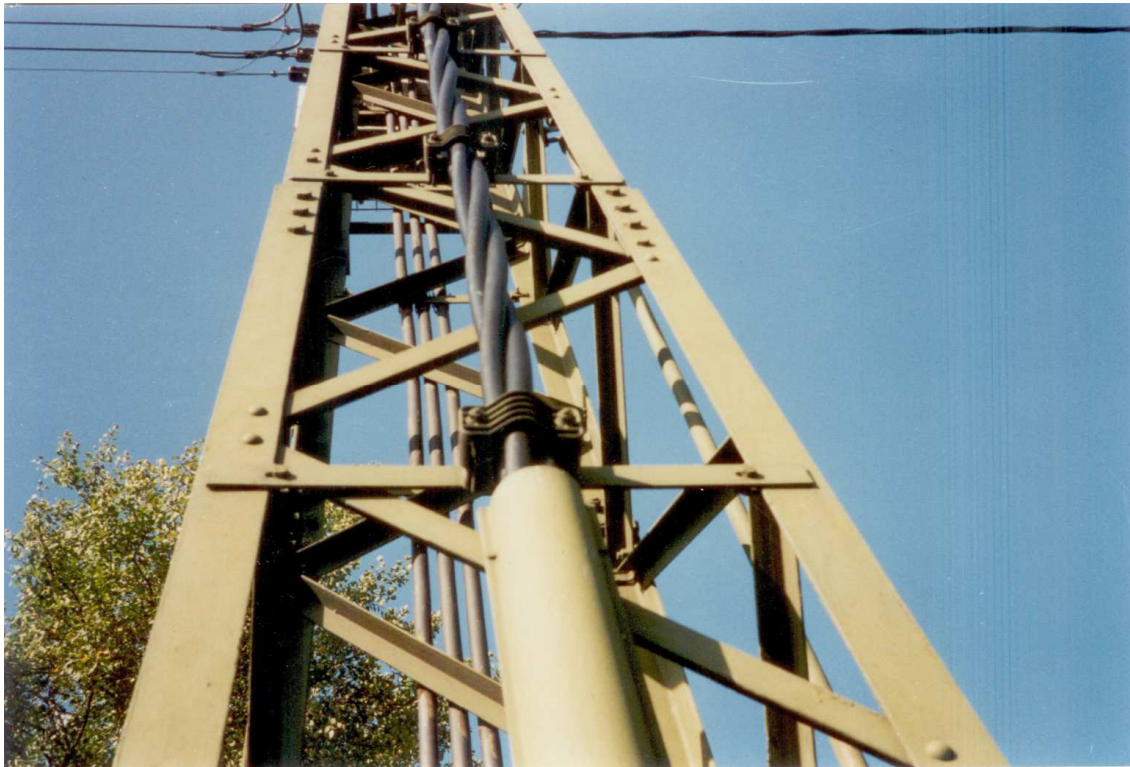


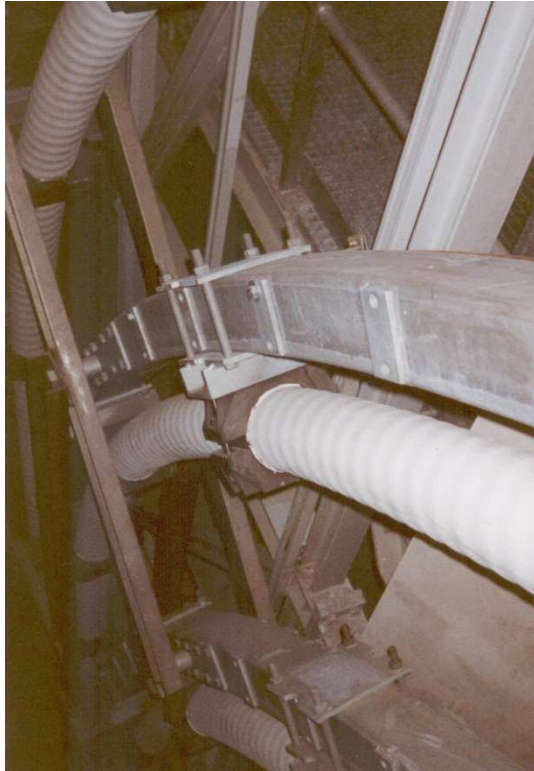
Because of evaporation of the glue and rotting of the bundling tapes replacement with îd-Technik Cable Clamps serie KP



Fastening on lattice and concrete masts

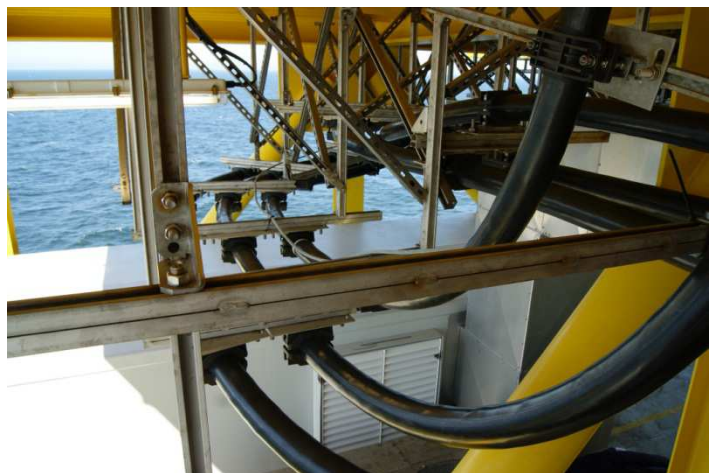
Serie KS





380 kV Installation Berlin
Serie KR

Off-Shore-Transformation Platform
Baltic I
Serie KR



Switch gear connection
Serie K

Short Circuit Tests

Test Institute: Forschungsgemeinschaft für Hochspannungs- und Hochstromtechnik e.V.
Hallenweg, 68219 Mannheim, Deutschland

Date of Test: June 29, 1979

Parts tested: Cable Clamp Type K 36/52 Fastening of individual single-core cables
Cable Clamp Type KP 39/53 Joint fastening of trefoils of single-core cables

Test: Experiments were meant to define the behaviour of Cable Clamps under dynamic strain applied by maximum short-circuit currents up to 110 kA.

The following figures were assumed as admissible strain on Cable Clamps:

Type K 36/52 maximum admissible strain = 10,000 N

Type KP 39/53 maximum admissible strain = 25,000 N

The resulting forces on the Cable Clamps were calculated according to the following formula for a three-pole short circuit.

$$F = 17,75 \cdot l \cdot \frac{I_s^2}{a}$$

Herein are:

F force applied by short circuit [N]
l distance between clamps [m]
a center-to-center distance between cables [cm]
I_s maximum short circuit [kA]

Test: Cable Clamp K 36/52

Three 10-kV single-core cables with cross-linked polyethylene insulation and cross sections of 400 mm² were laid out in parallel and fastened to a frame using the Cable Clamps in question.

Test No.	I _s kA	a cm	l m	F N
189-79/73	65.3	11.5	0.9	5,900
189-79/74	80.2	11.5	0.9	8,950

Findings:

Cable Clamps withstood forces of 5,900 N and 8,950 N without any damage.

However, considerable bending of cables was observed.

Photographs 1 and 2 show test set-up before and after testing.

Test: Cable Clamp KP 39/53

Three twisted 20 kV single-core cables with cross-linked polyethylene insulation and cross sections of 300 mm² were laid out in a U-shape and held in trefoil arrangement by the Cable Clamps.

Test No.	I _s [kA]	a [cm]	l [m]	F [N]
189-79/71	64.9	4.3	1.05	18,250
189-79/72	64.3	4.3	1.31	22,350
189-79/75	80.0	4.3	0.84	22,200
189-79/76	81.3	4.3	1.05	28,650
189-79/78	110	4.3	0.44	22,000
189-79/79	111	4.3	0.44	22,400

Findings:

Cable Clamps withstood short-circuit forces of 18,250 N to 28,560 N without damage. Photographs 3 to 6 show the behaviour of the trefoil during and after the surge. Tests revealed that closer spacing of clamps slightly reduces heights cable jump to.

Considerable bending of cables between clamps was observed.

Photographs 7 and 8 show the trefoil before and after tests 189-79/78 and 189-79/79. Here, as well, there is considerable bending of cables after two 110 kA surges, although the 44 centimetres between clamps is the spacing normally used in practice. In these tests, the cables jumped to heights of only 0.2 to 0.3 m.

Result of the tests:

Besides the fact that the tested Cable Clamps meet the requirements placed on them, these experiments show that:

When using single-core cable, we recommend that the dynamic forces of the short-circuit current be considered as well, not only its thermic effects.

In order to prevent excessive bending of cables between clamps, the latter may have to be spaced closer together for high short-circuit currents than their maximum admissible strain would normally dictate.

With high short-circuit currents, simply arranging the cables in trefoil and laying them on racks, for instance, is not enough. As photographs 3 to 6 show, the bundled cables can be damaged during jumps, or they may damage other system parts. In such cases, it appears expedient to connect the trefoil to the rack at appropriate intervals, bearing in mind that the rack itself must be able to withstand a certain amount of strain. However, these tests do not allow us to state how high such strain may be.

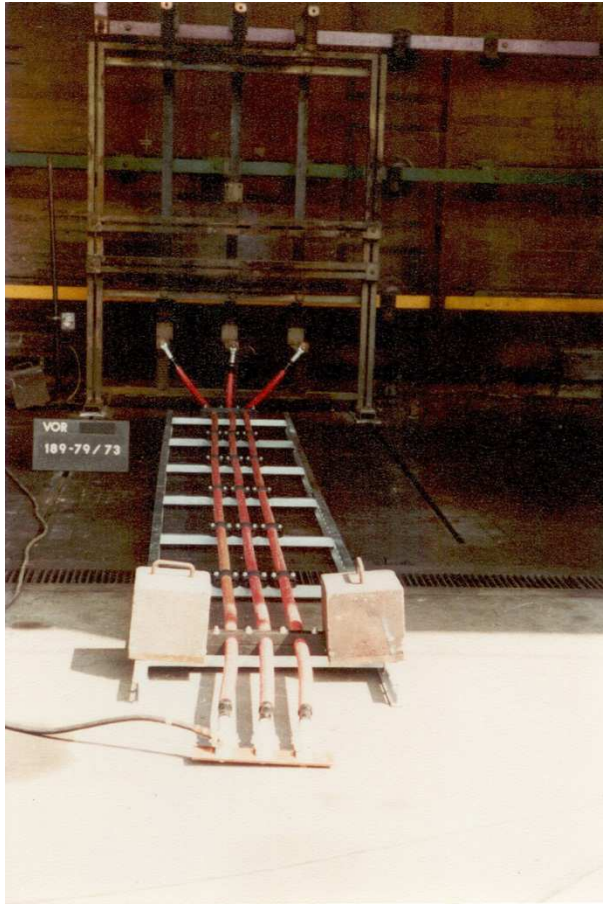


Photo 1

Set-up for the tests

189-79/73, 74 and 80

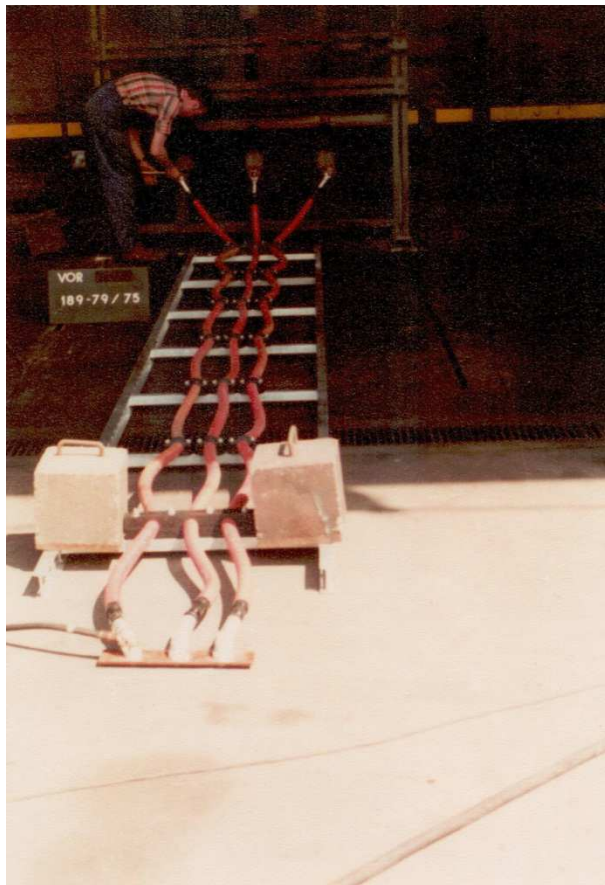


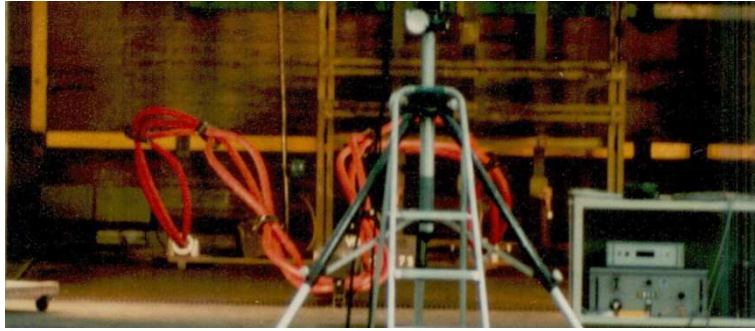
Photo 2

After the tests 189-79/73 and 74

Max. short circuit current: 80.2 kA

Short circuit force: 8,950 N

Distance between clamps: 0.9 m

**Photo 3**

Test 189-79/72

During surge

Max. short circuit current: 64.3 kA

Short circuit force: 22,350 N

Distance between clamps: 1.31 m

**Photo 4**

Test 189-79/75

During surge

Max. short circuit current: 80.0 kA

Short circuit force: 22,200 N

Distance between clamps: 0.84 m

**Photo 5**

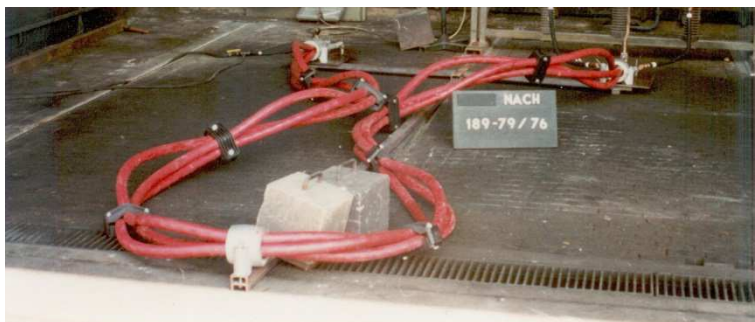
Test 189-79/76

During surge

Max. short circuit current: 81.3 kA

Short circuit force: 28,650 N

Distance between clamps: 1.05 m

**Photo 6**

Test 189-79/76

After the test

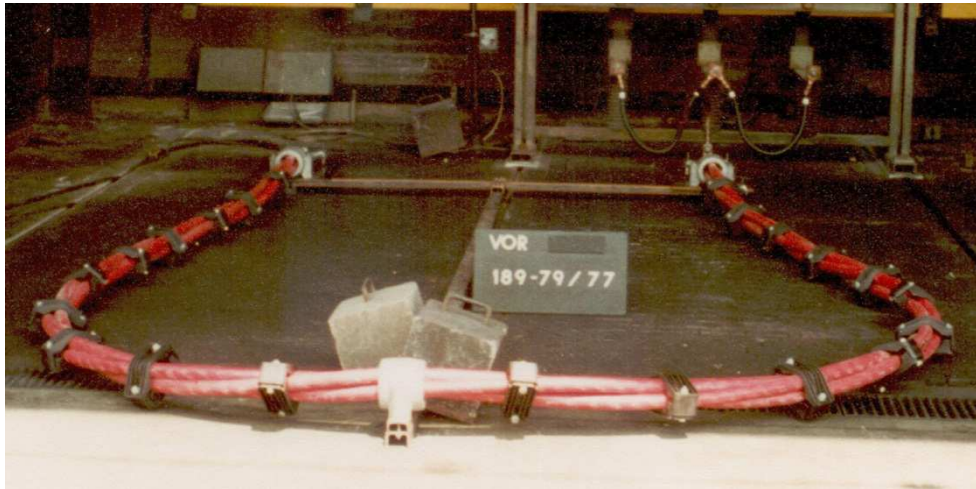


Photo 7

Ste-up for the tests 189-79/78 and 79



Photo 8

After the tests 189-79/78 and 79

Max. short circuit current: 110.0 kA

Short circuit force: 22,000 N

Distance between clamps: 0.44 m

ISO-Certificate

<h1>Certificate</h1>	
Standard	ISO 9001:2008
Certificate Registr. No. 01 100 83059	
TÜV Rheinland Cert GmbH certifies:	
Certificate Holder:	id-Technik GmbH Hohe Straße 34-36 D - 68526 Ladenburg
Scope:	development and distribution of fixings for power cables and accessories for cable connections and cable laying
An audit was performed, Report No. 83059. Proof has been furnished that the requirements according to ISO 9001:2008 are fulfilled. The due date for all future audits is 31-12 (dd.mm).	
Validity:	The certificate is valid from 2011-07-14 until 2013-12-31. First certification 1998 2011-07-14
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