UCHWYTY KABLOWE do kabli nn, SN, WN f-my **îd-Technik GmbH**

CHARAKTERYSTYKA OGÓLNA

Zastosowanie:

Mocowanie kabli jedno- i wielożyłowych wszystkich typów oraz na wszystkie napięcia. Szczególnie polecane do mocowania pojedyńczo lub jednocześnie trzech kabli jednożyłowych o izolacji z polwinitu lub polietylenu usieciowanego.

Tworzywo:

- Poliamid w kolorze czarnym, wzmocniony włóknem szklanym
- Ognioodporne, ze specjalną ochroną przed promieniami UV
- Nie zawiera halogenów, w pełni podlega recyclingowi

Charakterystyka:

- Wytrzymałość na rozciąganie 120 N/mm^2
- Wytrzymałość na zginanie 210 N/mm^2
- Rozszerzalność cieplna 0,01 % na każde 10°C wzrostu temperatury
- Ognioodporność UL. 94 V-0 oraz zestopniowanie wg DIN 5510, część 2, klasa palności S3
- Trwałość - promieniowanie UV, ozon, oleje, paliwa, alkale, promieniowanie radioaktywne
- Zakres temperaturowy:
    - Temperatura otoczenia do 40 ^0C
    - Praca ciągła do 120 ^0C
    - Dopuszczalne podgrzanie krótkotrwałe do 220 ^0C

Cechy konstrukcyjne wyrobu:

- Wzmocniony włóknem szklanym poliamid wyróżnia się wysoką wytrzymałością mechaniczną i temperaturową.
- Dzięki odporności na starzenie, ozon oraz promieniowanie UV uchwyty mogą być przeznaczone zarówno do zastosowań wnętrzowych, jak i napowietrznych.
- Na życzenie dysponujemy raportami z próbi typu przeprowadzonych przez niezależne instytuty odnośnie zachowania uchwytów przy dynamicznych prądach zwarciowych do 110 kA oraz wytrzymałości ogniowej materiału.
- Dzięki odporności na promieniowanie radioaktywne można je stosować także w elektrowniach jądrowych (przy dawce promieniowania 100 MRAD utrata wytrzymałości uchwytu nie przekracza 20 %).
- Żadnych znaczących zmian w wytrzymałości uchwytów w zakresie temperaturowym od - 40°C do 120°C. Dlatego też szczególnie polecane do mocowania kabli o izolacji z polietylenu usieciowanego parcujących w trybie awaryjnym.
- Niewielki nacisk na umocowany w uchwycie kabel.
- Bardzo dobra reakcja na dynamiczne prądy zwarciowe.
- Polecane tam, gdzie nawet przy dużych mocach prądów zwarciowych potrzebne jest trwałe i pewne mocowanie.

TABELA DOBORU UCHWYTÓW KABLOWYCH

Średnica zewnętrzna kabla (mm)	Wytrzymałość mechaniczna (kN)	Oznaczenie uchwytu
1 x (25 ÷ 38)	10	K 26 / 38
1 x (36 ÷ 52)	10	K 36 / 52
1 x (50 ÷ 75)	10	K 50 / 75
1 x (66 ÷ 90)	10	K 66 / 90
3 x (25 ÷ 36)	12,5	KS 25 / 36
3 x (33 ÷ 46)	12,5	KS 33 / 46
1 x (25 ÷ 39)	20	KT 25 / 39
1 x (75 ÷ 100)	20	KR 75 / 100
1 x (100 ÷ 130)	20	KR 100 / 130
1 x (130 ÷ 160)	20	KR 130 / 160
3 x (29 ÷ 41)	25	KP 29 / 41
3 x (39 ÷ 53)	25	KP 39 / 53
3 x (51 ÷ 64)	25	KP 51 / 64
3 x (62 ÷ 75)	25	KH 62 / 75
3 x (73 ÷ 86)	25	KH 73 / 86
3 x (84 ÷ 97)	25	KH 84 / 97
3 x (95 ÷ 107)	25	KH 95 / 107

Uwaga !

Dobór uchwytu zależny jest od średnicy zewnętrznej (na powłoce) kabla. Przy doborze uchwytu należy również uwzględnić wymagania mechaniczne oraz sposób mocowania uchwytu do podłoża.

PRZYKŁADY ZASTOSOWAŃ :

a) kable nn:

Oznaczenia kabli	Napięcie znamionowe (kV)	Przekrój żyły roboczej (mm^2)	Oznaczenie uchwytu
YAKY, YKY, YAKXS, YKXS	0,6 / 1	1 x (240 ÷ 300)	K 26 / 38
		4 x (50 ÷ 120 SE) 5 x (25 ÷ 70)	K 26 / 38
		4 x (120 ÷ 185) 5 x (70 ÷ 120)	K 36 / 52
		4 x (240 ÷ 300) 5 x (120 ÷ 240)	K 50 / 75
		3 x [1 x (240 ÷ 300)]	KS 25 / 36 KS 33 / 46

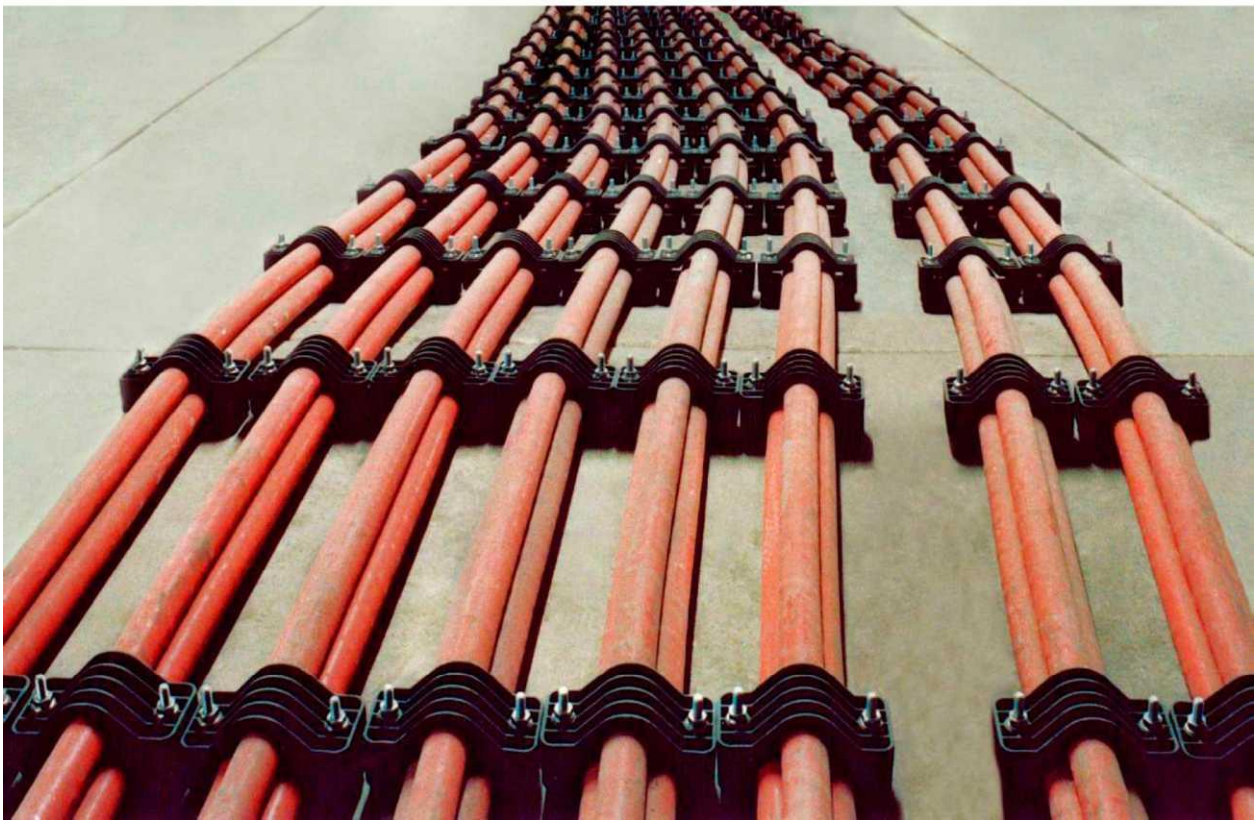
b) kable SN:

Oznaczenia kabli	Napięcie znamionowe (kV)	Przekrój żyły roboczej (mm^2)	Oznaczenie uchwytu
YHAKXS, YHKXS X(R)UHAKXS, X(R)UHKXS	8,7 / 15 lub 12 / 20	1 x (35 ÷ 120)	K 26 / 38
YHAKXS, YHKXS X(R)UHAKXS, X(R)UHKXS		1 x (150 ÷ 240)	K 36 / 52
H(A)KnFtA, H(A)KnFtY, H(A)KnY		3 x (35 ÷ 185)	K 50 / 75
H(A)KnFtA, H(A)KnFtY, H(A)KnY		3 x (185 ÷ 240)	K 66 / 90
YHAKXS, YHKXS X(R)UHAKXS, X(R)UHKXS		3 x [1 x (35 ÷ 95)]	KS 25 / 36
YHAKXS, YHKXS X(R)UHAKXS, X(R)UHKXS		3 x [1 x (120 ÷ 240)]	KS 33 / 46

Uwaga !

Wymiary kabli (obliczeniowe średnice zewnętrzne na powłoce kabla) przyjęto wg katalogu Tele-Fonika Kable SA: „Kable i przewody elektroenergetyczne - edycja sierpień 2004”.

CABLE CLAMPS FOR SINGLE- AND MULTI-CORE CABLES



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Wersja Sierpień 2014 / Version August 2014

îd-Technik – All-Purpose Cable Clamps for Power Cables

Since 1977 îd-Technik develops and distributes fastening material for all types of single- and multi-conductor high, middle and low voltage power cables.

We deliver our Cable Clamps to more than 100 countries worldwide. Among our national and international customers are large electric corporations, cable manufacturers, public companies, smaller municipal works and energy supply companies as well as manufacturers of wind turbines (on- and offshore). Apart from the energy industry branches of the power, transportation, chemical, engineering, machine, oil and gas industries benefit from the advantages of îd-Technik Cable Clamps.

Right from the beginning, the high quality of our products, the fast and reliable delivery and the high expertise of the technical advice had top priority, thus making us the market leader worldwide for Polyamide Cable Clamps.

We support you to solve specific application problems by adjusting our products to your requirements or by developing new and innovative concepts.

The Idea

Cables have to be fastened short-circuit-prove. Cables particularly have to withstand short-circuits with high magnetic forces undamaged and thereafter be fully operational without any maintenance or repair. Our Cable Clamps are designed especially for the system cable - cable fastening for the all-purpose application in all areas of cable connections. With the selection of a polyamide suitable for these requirements, îd-Technik was the first manufacturer to introduce a Polyamide Cable Clamp to the world market, that without a problem allowed the substitution of metal or wooden cable clamps.

Development

The dynamic resistance against the very high short-circuit forces is an important factor in the development and design of our îd-Technik Cable Clamps. By minimizing the surface pressure, damage to the cable during short-circuits will be avoided. Numerous short-circuit tests have been successfully accomplished and proved the stability of our Cable Clamps. Our material is chemical resistant and has a maintenance-free lifetime of more than 37 years. The wide diameter range of the Cable Clamps minimizes the stock-keeping and prevents due to the overlapping clamping ranges any mounting problems caused by deviations of the cable diameter.

Product Range

îd-Technik distributes Cable Clamps for power cables of all voltage ranges (1 kV to 765 kV). The diameters range from 24 mm to 250 mm, however, with our Elastic Inlay it is possible to fasten smaller cables with diameters down to 19 mm. îd-Technik provides Clamps for fixing one cable (single- and multi-core), Block Clamps for parallel fastening of multiple cables as well as Bundling Clamps for the fastening of cables in trefoil formation or bundling of multiple cables (even different diameters) in one Cable Clamp.

Fields of Application

îd-Technik Cable Clamps are developed for indoor and due to their absolute UV resistance outdoor operations with no restrictions. After alterations or temporary installations îd-Technik Cable Clamps can be re-used without problems. No special tools are required for the installation.

Our Clamps are used under severe conditions:

- in areas with extreme temperatures like deserts, tropical climate, high altitudes and coastal areas
- minus temperatures down to -60 °C
- long-term exposure to high temperatures up to more than 120 °C
- under cyclic alternation of load
- under radioactive radiation
- in ozone
- under water
- under exposure to termites, oils, fuels, alkalis

Quality

îd-Technik Cable Clamps have been tested by accredited testing institutes according to the international standard IEC 61914. The excellent results as well as further details are published on our homepage and on the data sheets of each Cable Clamp series.

The material of îd-Technik Cable Clamps is non-toxic, non-hazardous, fully recyclable and halogen-free. It complies with directive 2002/95/EG (RoHS) and regulation (EG) No. 1907/2006 (REACH). Furthermore it is non-metallic, non-magnetic, corrosion-free and has no interaction with the electro-magnetic field of the cables.

The advantages of our 100 % made in Germany Cable Clamps satisfy our customers worldwide in more than 120 countries. Since 1998 our Quality Management System has regularly been certified according to DIN EN ISO 9001.

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

During the last 37 years no failures or impairment of any îd-Technik Cable Clamp occurred!

Service

- We offer fast and reliable delivery of customary quantities.
- Our engineering department will support you in 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.

îd-Technik Cable Clamps

Application:

Fastening of all types of single- and multi-conductor low, middle and high voltage cables (1 kV to 765 kV)

Fastening in single, trefoil, parallel and bundled formation of energy cables

Material:

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

Properties:

Resistance to:	ultraviolet rays, ozone, oils, fuels, alkalis, radioactive rays*
Flammability:	UL94V-0
	classification following DIN 5510, part 2, flammability class: S3
	IEC 61914 following DIN 606995-11-5
Thermal expansion:	0.01 % per 10 °C temperature increase
Tensile strength:	120 N/mm^2
Flexural strength:	210 N/mm^2
Resistance to impact:	very heavy, following IEC 61914, tested at -60 °C
Lateral load test:	in x- and y- direction, following IEC 61914, tested at 120 °C
Axial load test:	following IEC 61914, tested at 120 °C

Resistance to electrodynamic force: following IEC 61914 suitable to withstand multiple short-circuits

Temperature Range:

Ambient temperatures:	down to -60 °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 37 years of maintenance- and failure-free operation

Legal Compliance:

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

Constructional Features:

- Particularly high dynamic and mechanical strength and heat resistance due to fibreglass-reinforced polyamide
- Safe restraint of dynamic forces of high short-circuit currents without damage to the cables, also for multiple short-circuits
- Tested according to IEC 61914 – Cable cleats for electrical installations - reports from accredited laboratories regarding dynamic short-circuit currents up to 180 kA, the fire-resistance of the material, and mechanical properties of the Cable Clamps are available
- 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 altitudes, arctic climate, coastal salt fogs, flooding, ozone, due to special resistance to ageing, ozone and ultraviolet rays
- 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**

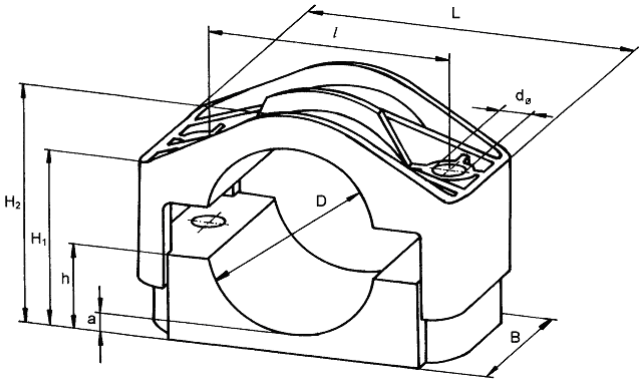
Application: Fastening of single- and multi-conductor cables, unrestricted application indoors and outdoors

Material: Polyamide, fibreglass-reinforced

Outer diameter of cables: 19 mm to 90 mm

Dynamic resistance to short circuits: 12,500 N

Max. torque for tightening screws: 5 Nm



Dimensions in mm

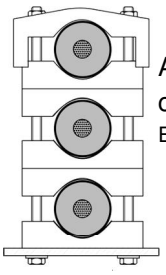
Type	Dø	Dø*	Dø**	L	B	l	dø	H_1	H_2	h	a
K 26/38	24 - 38	21 - 35	19 - 32	91	60	60	12	36 - 47	46 - 57	19	7
K 36/52	36 - 52	33 - 49	30 - 46	108	60	75	12	43 - 56	56 - 72	24	8
K 50/75	50 - 75	47 - 72	44 - 69	126	60	95	12	51 - 77	74 - 98	30	9
K 66/90	66 - 90	63 - 87	60 - 84	158	70	120	14	65 - 89	91 -115	42	10

Dø: range of outer cable diameter Dø*: ~ with one Elastic Inlay Dø**: ~ 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

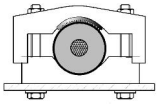
Fastening example:

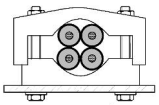


Additional bottom parts for the stacking of several cables (not K 66/90).

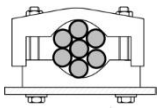
Example: Stack of three: 1 complete Cable Clamp plus 4 additional bottom parts
Stack of two: 1 complete Cable Clamp plus 2 additional bottom parts

Application with Elastic Inlay





Also suitable for bundled fastening of multiple cables



îd-Technik Cable Clamps are tested according to international standard IEC 61914 by accredited testing institutes.

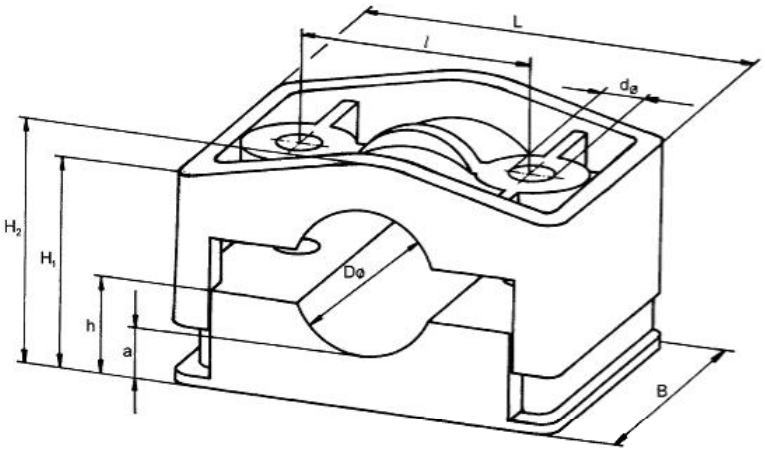
Test results for Cable Clamp Series K

	Classification			IEC 61914 Paragraph
Material	Non-metallic	High-grade plastic		6.1.2
Operating temperature	-60°C +120°C	Minimum Maximum		6.2
Resistance to impact	Very heavy	At -60°C 5 kg of 400 mm height		6.3.5
Lateral load test in x-direction	10,000 N	At +120°C		6.4.1
Lateral load test in y-direction	19,000 N	At +120°C		6.4.1
Axial load test	600 N	At +120°C		6.4.2
Resistance to electrodynamic force	12,500 N	Suitable to withstand multiple short circuits	Tested at 109 kA	6.4.4
UV-resistance	High			6.5.1
Flame propagation	Passed V-0 S3	30 sec		10.1 UL 94 DIN 5510

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
Dynamic resistance to short circuits:	25,000 N
Max. torque for tightening screws:	5 Nm

CERTIFIED IEC 61914 CERTIFIED



Dimensions in mm

Type	Dø	Dø*	Dø**	L	B	l	dø	H1	H2	h	a
KT 25/39	25 - 39	22 - 36	19 - 33	107	60	65	13	46 - 60	55 - 69	27	15

Dø: range of outer cable diameter Dø*: ~ with one Elastic Inlay Dø**: ~ 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

îd-Technik Cable Clamps are tested according to international standard IEC 61914 by accredited testing institutes.

Test results for Cable Clamp Series KT

	Classification			IEC 61914 Paragraph
Material	Non-metallic	High-grade plastic		6.1.2
Operating temperature	-60°C +120°C	Minimum Maximum		6.2
Resistance to impact	Very heavy	At -60°C 5 kg of 400 mm height		6.3.5
Lateral load test in x-direction	20,000 N	At +120°C		6.4.1
Lateral load test in y-direction	30,000 N	At +120°C		6.4.1
Axial load test	600 N	At +120°C		6.4.2
Resistance to electrodynamic force	25,000 N	Suitable to withstand multiple short circuits	Tested at 151 kA	6.4.4
UV-resistance	High			6.5.1
Flame propagation	Passed V-0 S3	30 sec		10.1 UL 94 DIN 5510

Cable Clamps

Series: **KR**

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

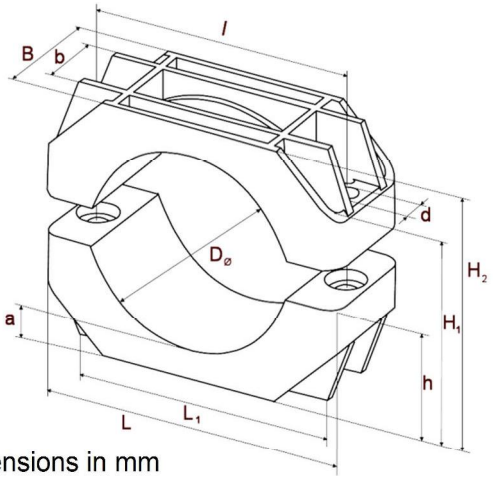
Material: Polyamide, fibreglass-reinforced

Outer diameter of cables: 72 mm to 250 mm

Dynamic resistance to short circuits: 30,000 N

Max. torque for tightening screws: 8 Nm

CERTIFIED IEC 61914 CERTIFIED



Dimensions in mm

Type	D⌀	D⌀**	L	L_1	B	b	l	d⌀	H_1	H_2	h	a
KR 75/100	75 - 100	72 - 97	180	172	77	44	150	14	71 - 97	109 - 134	52	17
KR 100/130	100 - 130	97 - 127	210	197	97	54	175	14	99 - 129	140 - 170	69	20
KR 130/160	130 - 160	127 - 157	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

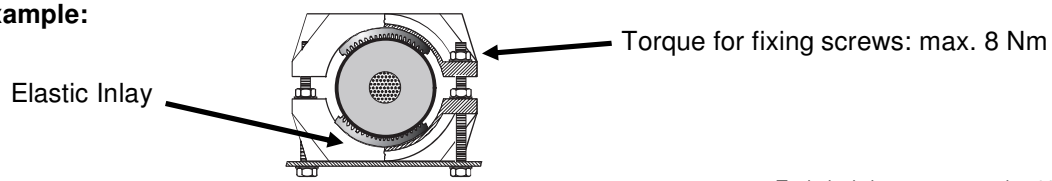
D⌀: outer cable diameter D⌀**: ~ with two Elastic Inlays

Also suitable for bundled fastening of multiple 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:



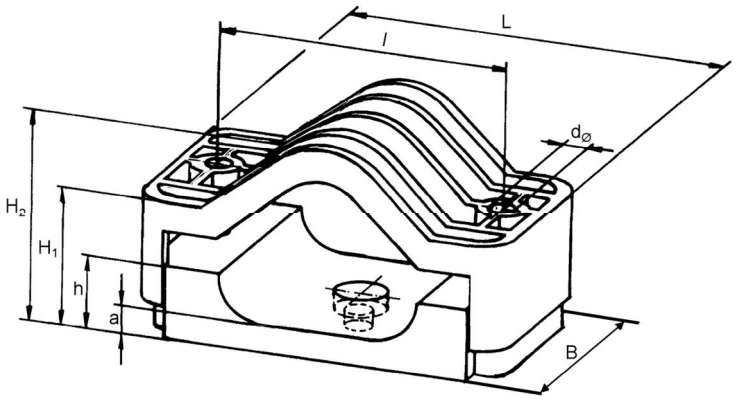
îd-Technik Cable Clamps are tested according to international standard IEC 61914 by accredited testing institutes.

Test results for Cable Clamp Series KR

	Classification			IEC 61914 Paragraph
Material	Non-metallic	High-grade plastic		6.1.2
Operating temperature	-60°C +120°C	Minimum Maximum		6.2
Resistance to impact	Very heavy	At -60°C 5 kg of 400 mm height		6.3.5
Lateral load test in x-direction	18,000 N	At +120°C		6.4.1
Lateral load test in y-direction	15,000 N	At +120°C		6.4.1
Axial load test	1,500 N with Elastic Inlays	At +120°C		6.4.2
Resistance to electrodynamic force	30,000 N	Suitable to withstand multiple short circuits	Tested at 180 kA	6.4.4
UV-resistance	High			6.5.1
Flame propagation	Passed V-0 S3	30 sec		10.1 UL 94 DIN 5510

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
Dynamic resistance to short circuits:	13,000 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

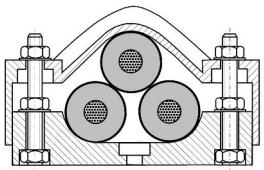
Typ	DØ	DØ*	L	B	*l*	dØ	H_1	H_2	h	a
KS 25/36	25 - 36	22 - 33	150	80	110	12	55 - 75	77 - 97	35	19
KS 33/46	33 - 46	30 - 43	170	80	130	12	55 - 85	85 - 115	35	15

DØ: outer cable diameter DØ*: ~ 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:



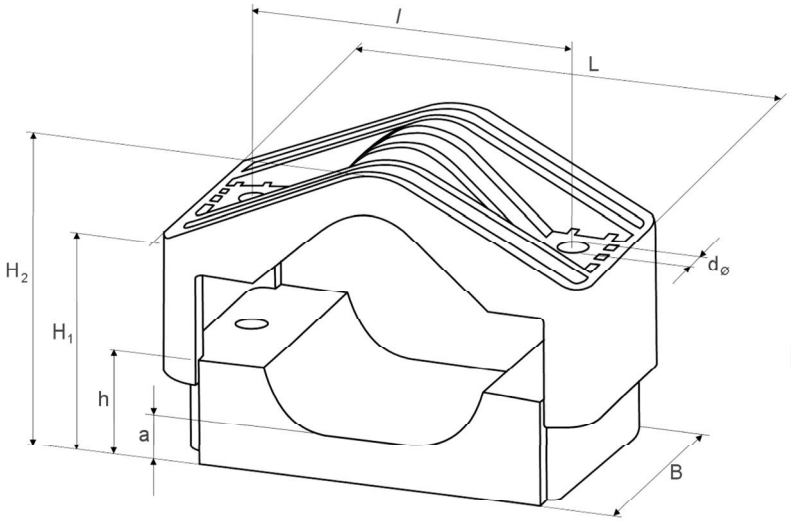
îd-Technik Cable Clamps are tested according to international standard IEC 61914 by accredited testing institutes.

Test results for Cable Clamp Series KS

	Classification			IEC 61914 Paragraph
Material	Non-metallic	High-grade plastic		6.1.2
Operating temperature	-60°C +120°C	Minimum Maximum		6.2
Resistance to impact	Very heavy	At -60°C 5 kg of 400 mm height		6.3.5
Lateral load test in x-direction	15,000 N	At +120°C		6.4.1
Lateral load test in y-direction	25,000 N	At +120°C		6.4.1
Axial load test	1,000 N	At +120°C		6.4.2
Resistance to electrodynamic force	13,000 N	Suitable to withstand multiple short circuits	Tested at 66.4 kA	6.4.4
UV-resistance	High			6.5.1
Flame propagation	Passed V-0 S3	30 sec		10.1 UL 94 DIN 5510

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
Dynamic resistance to short circuits:	25,000 N
Max. torque for tightening screws:	8 Nm



Dimensions in mm

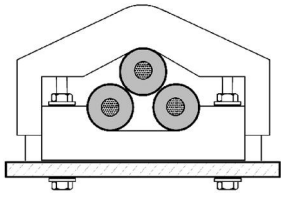
Type	$D_Ø$	$D_Ø$*	L	B	l	$d_Ø$	H_1	H_2	h	a
KP 29/41	29 - 41	26 - 38	172	80	125	14	60 - 90	81 - 111	40	20
KP 39/53	39 - 53	36 - 50	190	80	145	14	63 - 93	101 - 131	45	20
KP 51/64	51 - 64	48 - 61	205	90	160	14	95 - 123	130 - 158	70	25

$D_Ø$: outer cable diameter $D_Ø$*: ~ 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:



îd-Technik Cable Clamps are tested according to international standard IEC 61914 by accredited testing institutes.

Test results for Cable Clamp Series KP

	Classification			IEC 61914 Paragraph
Material	Non-metallic	High-grade plastic		6.1.2
Operating temperature	-60°C +120°C	Minimum Maximum		6.2
Resistance to impact	Very heavy	At -60°C 5 kg of 400 mm height		6.3.5
Lateral load test in x-direction	18,000 N	At +120°C		6.4.1
Lateral load test in y-direction	25,000 N	At +120°C		6.4.1
Axial load test	1,500 N	At +120°C		6.4.2
Resistance to electrodynamic force	25,000 N	Suitable to withstand multiple short circuits	Tested at 129 kA	6.4.4
UV-resistance	High			6.5.1
Flame propagation	Passed V-0 S3	30 sec		10.1 UL 94 DIN 5510

Cable Clamps

Series: **KH**

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

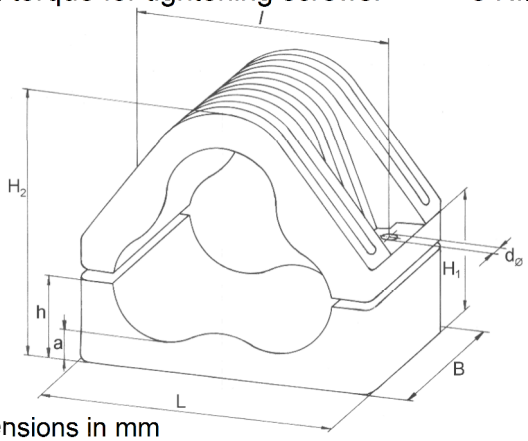
Material: Polyamide, fibreglass-reinforced

Outer diameter of cables: 59 mm to 165 mm

Dynamic resistance to short circuits: 30,000 N

Max. torque for tightening screws: 8 Nm

CERTIFIED IEC 61914 CERTIFIED



Dimensions in mm

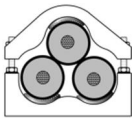
Type	$D_ø$	$D_ø$*	L	B	l	$d_ø$	H_1	H_2	h	a
KH 62/75	62 - 75	59 - 72	225	90	185	18	114 - 142	172 - 200	80	30
KH 73/86	73 - 86	70 - 83	250	100	210	18	119 - 147	192 - 220	85	30
KH 84/97	84 - 97	81 - 94	270	100	230	18	128 - 156	214 - 242	95	30
KH 95/107	95 - 107	92 - 104	290	100	250	18	136 - 164	244 - 262	103	30
KH 105/117	105 - 117	102 - 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:



The Distance Wedge is recommended for cables with impregnated paper insulation for high- and extra high-voltage and at vertical installations. For the range of outer cable diameter refer to Distance Wedge data sheet.

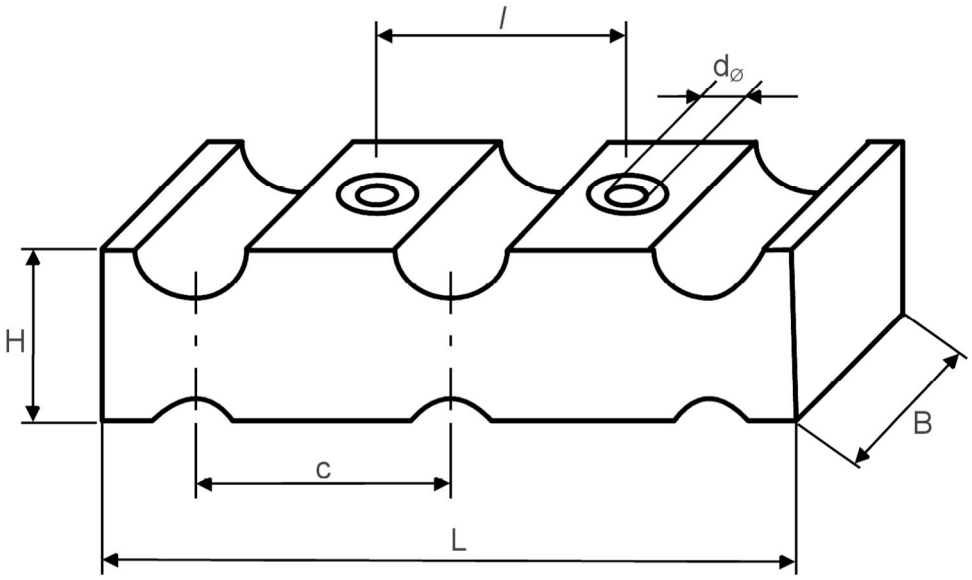
îd-Technik Cable Clamps are tested according to international standard IEC 61914 by accredited testing institutes.

Test results for Cable Clamp Series KH

	Classification			IEC 61914 Paragraph
Material	Non-metallic	High-grade plastic		6.1.2
Operating temperature	-60°C +120°C	Minimum Maximum		6.2
Resistance to impact	Very heavy	At -60°C 5 kg of 400 mm height		6.3.5
Lateral load test in x-direction	35,000 N	At +120°C		6.4.1
Lateral load test in y-direction	35,000 N	At +120°C		6.4.1
Axial load test	1,500 N with Elastic Inlays	At +120°C		6.4.2
Resistance to electrodynamic force	30,000 N	Suitable to withstand multiple short circuits	Tested at 149 kA	6.4.4
UV-resistance	High			6.5.1
Flame propagation	Passed V-0 S3	30 sec		10.1 UL 94 DIN 5510

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



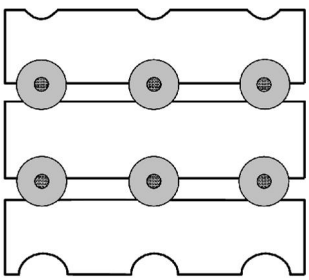
Dimensions in mm

Type	Dø	L	B	l	dø	H	c
RS3 - 12/32	12 - 32	202	53	75	13	51	75

Dø: outer cable diameter

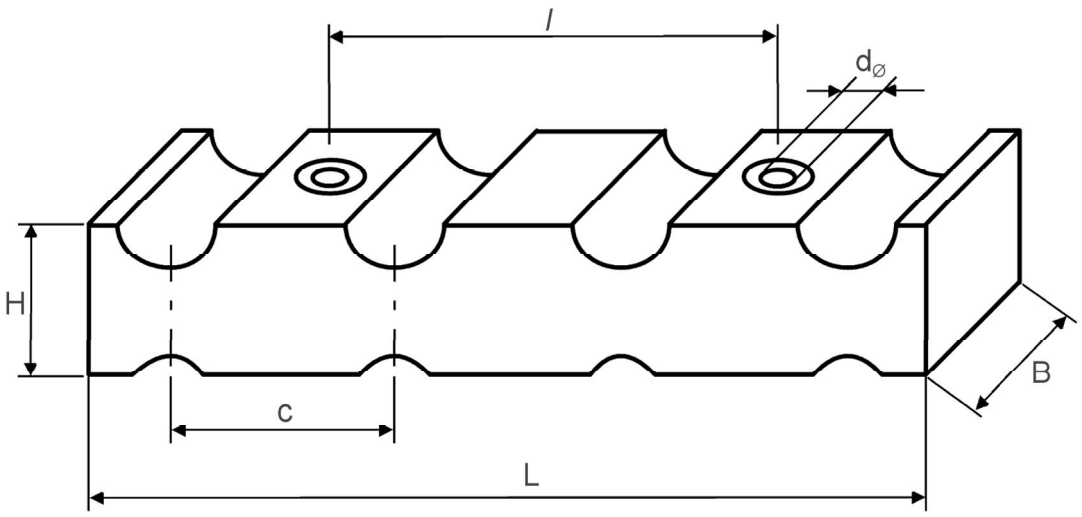
Minimum order quantity and delivery time upon request

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

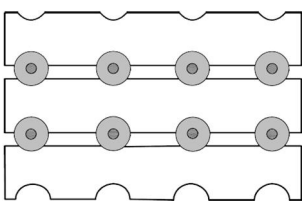


Dimensions in mm

Type	$D_ø$	L	B	l	$d_ø$	H	c
RS4 - 12/32	12 - 32	275	53	150	13	51	75

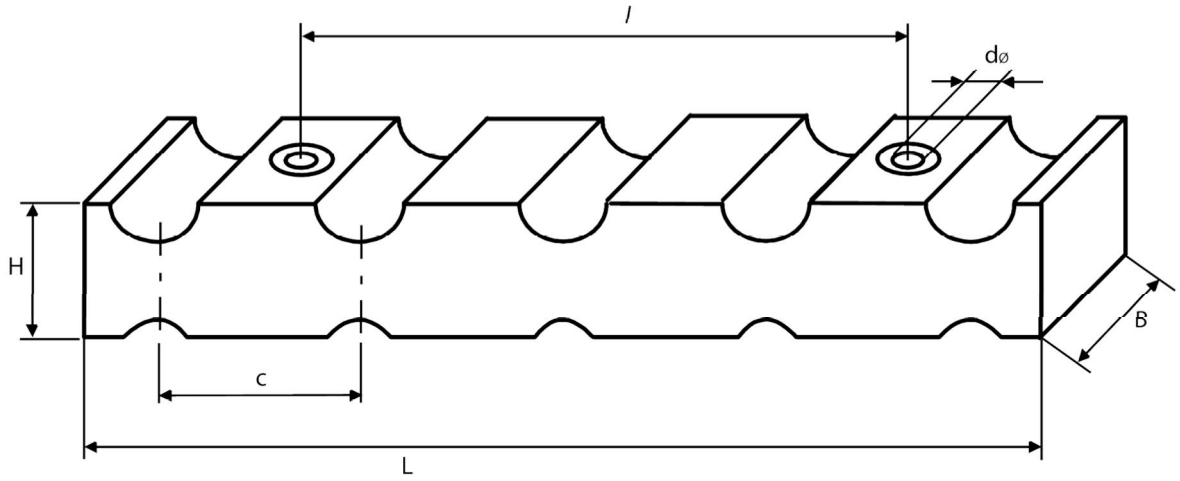
$D_ø$: outer cable diameter

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



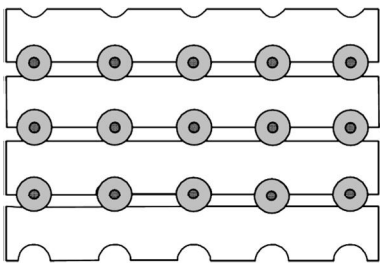
Dimensions in mm

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:



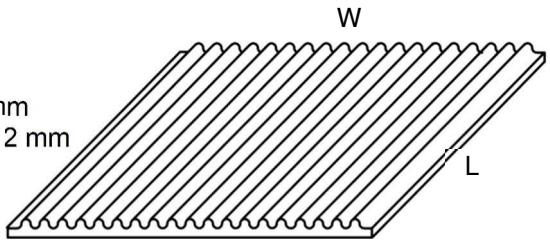
Elastic Inlay

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)

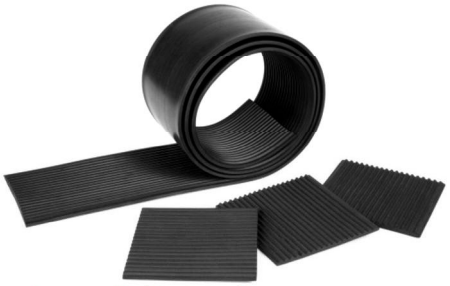
extension of the clamping range for the fixation of cables with smaller outer diameters

Material: One-side ribbed EPDM



thickness: 5 mm
height of ribs: 2 mm

dimensions: 100 mm (W) x 100 mm (L)
150 mm (W) x 140 mm (L)

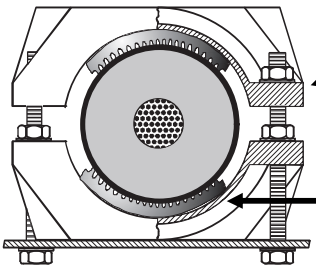


also available in rolls
dimensions: 100 mm (W) x 3 m (L)
150 mm (W) x 3 m (L)

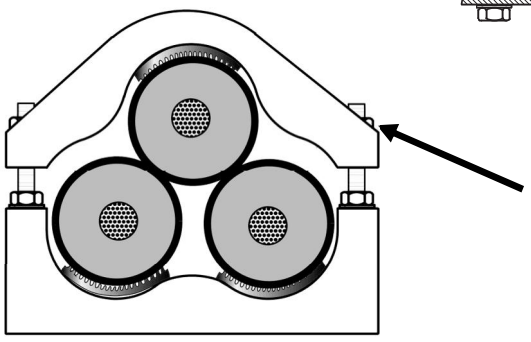
Elastic Inlay 150 mm x 140 mm for KR 160/200, KR 200/250, KH 115/140 and KH 138/165
Elastic Inlay 100 mm x 100 mm for all other Cable Clamps

Application examples:

Series KR



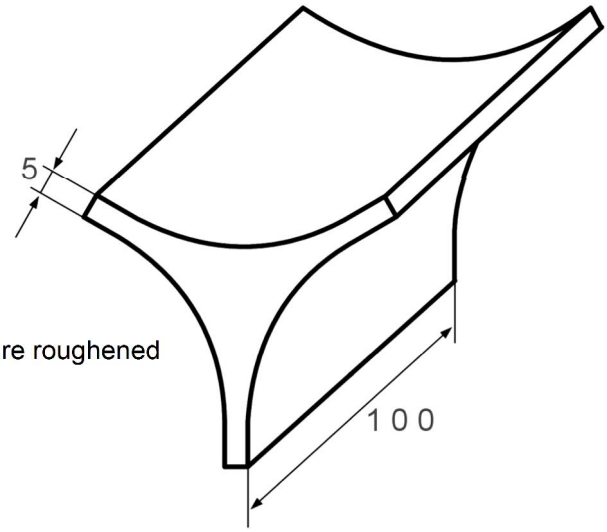
Series KH



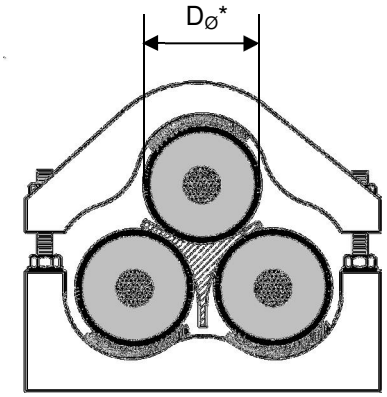
Distance Wedge

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



Surfaces are roughened

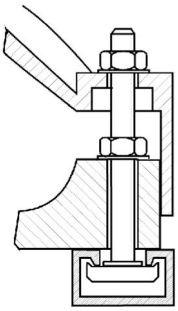


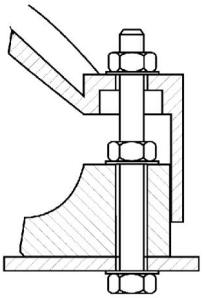
Wedge Type	DØ	Clamp Type
S 57/92	57 - 70	KH 62/75
	68 - 81	KH 73/86
	79 - 92	KH 84/97
S 90/112	90 - 102	KH 95/107
	100 - 112	KH 105/117

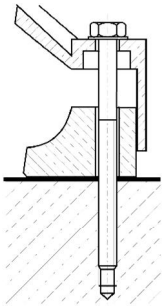
DØ: outer diameters of the single cables using Distance Wedge and Elastic Inlays

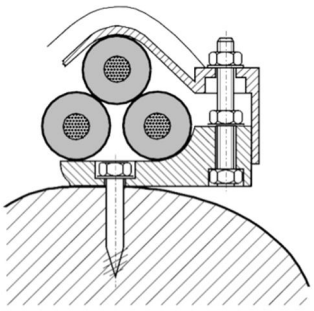
Fastening Examples

All series



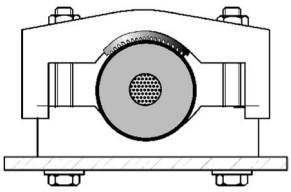


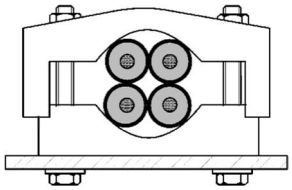




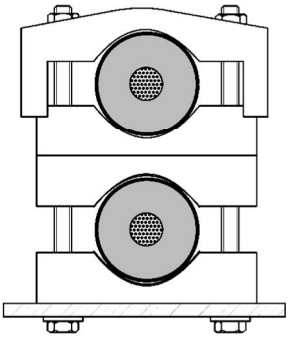
Only Series KS

Series K

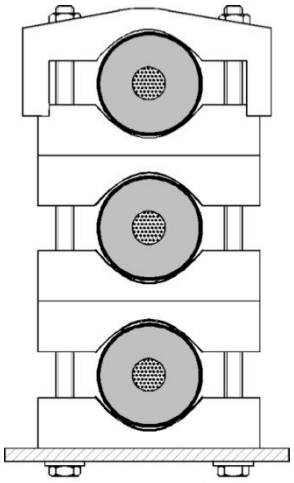




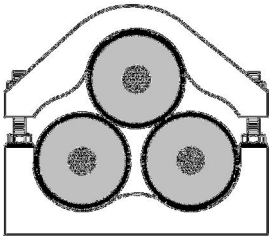
With Elastic Inlay to adjust
the diameter of the cable

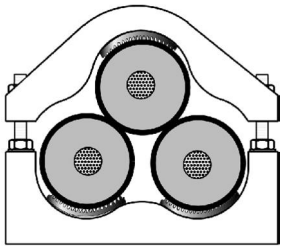


With additional bottom parts



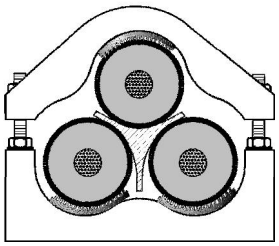
Series KS, KP, KH





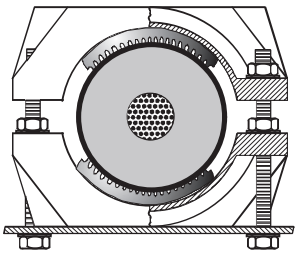
With Elastic Inlays

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

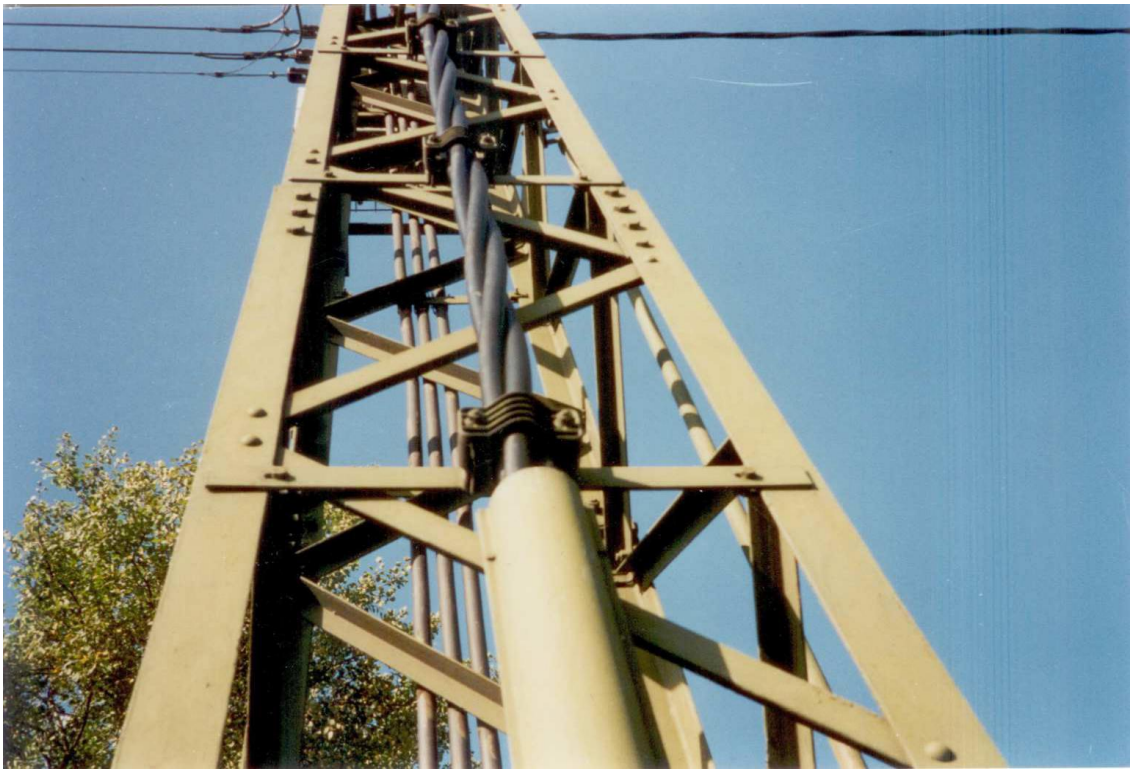
20 kV-Cable:

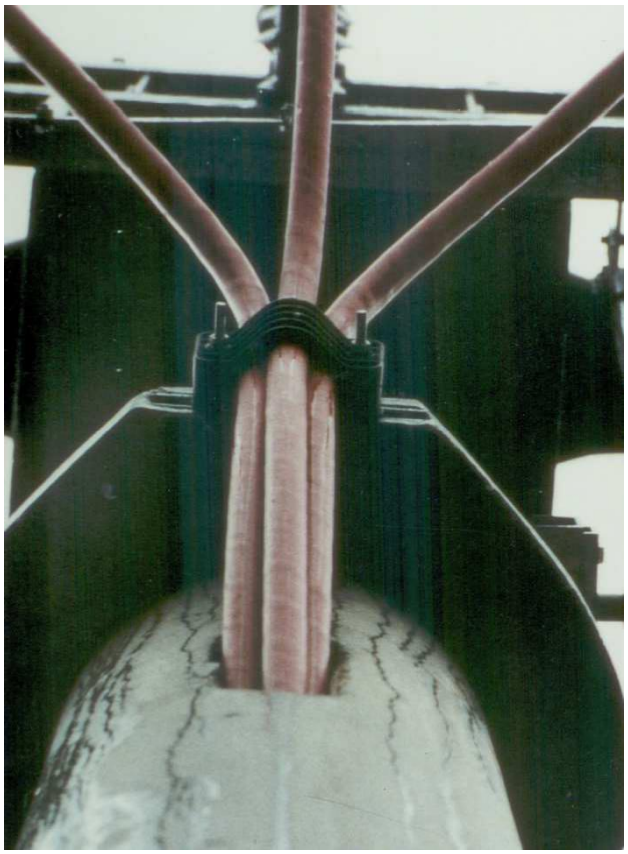
Bundling with fibre-glass reinforced bundling tapes

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

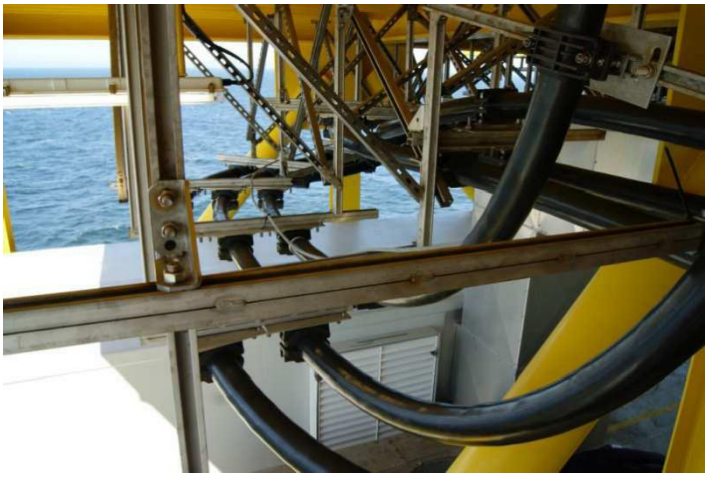
Serie KS





380 kV Installation Berlin
Serie KR

Off-Shore-Transformation Platform
Baltic I
Serie KR



Switch gear connection
Serie K

REQUIREMENTS

of the

IEC 61914 Cable Cleats for electrical Installations

1. Requirements of the manufacturer

The IEC 61914 requires from the manufacturer of the cable clamps tests of mechanical and electro-dynamic properties, of UV and corrosion resistance, and flame tests. These tests must be performed by an accredited testing institute.

Cable clamps certified according to this standard must be designed and manufactured to guarantee a safe handling and safe fastening for wires / cables in accordance with the below classification as given by the manufacturer.

The tests are performed on specific clamps of each series, whereby the clamps are classified according to various characteristics.

2. Classification (Paragraph 6 of the standard)

Material (6.1)

Metallic 6.1.1	Non-metallic 6.1.2	Composite 6.1.3

Temperature (6.2)

Maximum temperature	Minimum temperature

Resistance to impact (6.3)

Very light 6.3.1	Light 6.3.2	Medium 6.3.3	Heavy 6.3.4	Very heavy 6.3.5

Type of retention (6.4)

With lateral retention 6.4.1 in x-direction in y-direction	With axial retention 6.4.2

Resistant to electro-magnetical forces (short circuits):

Withstanding one short circuit 6.4.3	Withstanding more than one short circuit 6.4.4

Reaction to environmental influences (6.5)

UV-light *1 6.5.1		Corrosion / salt spray test *2 6.5.2	
Declared	Not declared	Low	High

*1 only for non-metallic and composite components

*2 only for metallic and composite components

Flame propagation (10.1)

Not passed	Passed

Inductive heating (12.2)

Declared *3

*3 only for ferromagnetic components

3. Marking of the clamps

Furthermore, a marking of the cable clamps and a documentation (7) of the results is required by the IEC 61914.

The marking shall provide following information (7.1)

Manufacturer's or vendor's name / logo / trademark	Product identification / type

Hereby the marking must be durable and easily legible (7.2).

With the design and manufacturing of cable clamps it has to be ensured that the cable clamps are free of sharp edges, burrs, etc., to avoid damage to the cables and / or conductors and to avoid injury of the assembly staff and operators (8).

4. Required tests for the classification

4.1 Mechanical tests

All mechanical tests are carried out on three samples of *the smallest and largest clamp of a series*, respectively.

4.1.1 Impact test (9.2)

The impact test serves to prove the manufacturer's specified minimum operating temperature and impact strength of the clamp.

Impact tests on non-metallic and composite clamps are carried out after *pre-conditioning in an UV-chamber for 700 hours (29 days)* at the *minimum permanent application temperature* as specified by the manufacturer.

Minimum Temperature [°C]
+5
–5
–15
–25
–40
–60

On metallic clamps, the impact test is carried at ambient temperature. The impact energy of the hammer is indicated according to the classification in the following table:

Classification	Impact energy [J]	Equivalent mass [kg]	Height [mm]
Very light	0.5	0.25	200
Light	1.0	0.25	400
Medium	2.0	0.5	400
Heavy	5.0	1.7	300
Very heavy	20.0	5.0	400

After testing, the cable clamps must not have any signs of destruction, no breakage or damage must be visible. If in doubt, lateral load tests (9.3) have to be carried out with these cable clamps.

Documentation to be specified by the manufacturer:

The achieved classification for each series at the minimum permanent application temperature must be documented by the manufacturer in his documentation (if necessary, with an explanation of the torques of the fixing screws).

4.1.2 Lateral load test (9.3)

The lateral load tests serve to demonstrate the manufacturer's specified maximum operating temperature and the maximum lateral restraining forces [N] of the clamps of each series.

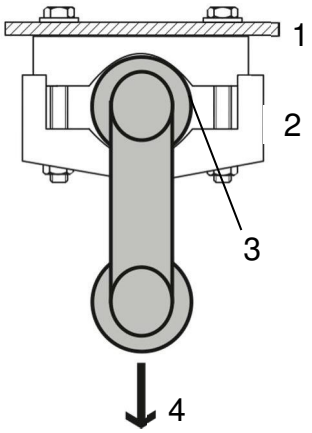
These tests must be performed on non-metallic and composite clamps with the *maximum permanent application temperature* as specified by the manufacturer.

Maximum Temperature [°C]
+ 40
+ 60
+ 85
+ 105
+ 120

On metallic cable clamps the tests are carried out at ambient temperature.

The lateral load test is carried out with *test mandrels*, representing the *smallest* possible cable *diameter* for each clamp. The lateral load test is carried out in two directions:

x-direction



Legend:

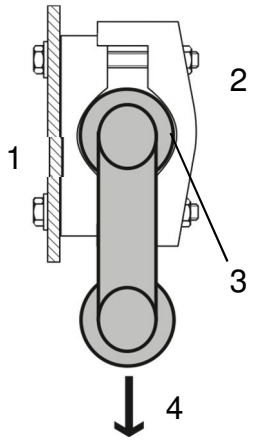
1 Mounting surface

2 Cable clamp

3 Test mandrel

4 Load [N]

y-direction



Legend:

1 Mounting surface

2 Cable clamp

3 Test mandrel

4 Load [N]

Non-metallic and composite cable clamps must hold the maximum load [N] for *60 minutes*.

Metallic clamps must hold the load for 5 minutes.

The maximum movement of the mandrels must be *less than 50 % of the mandrel diameter*.

Documentation to be specified by the manufacturer:

The maximum lateral restraining forces [N] for each series at the maximum permanent application temperature are to be documented by the manufacturer in his documents (if necessary, with an explanation of the torques of the mounting screws).

4.1.3 Axial load test (9.4)

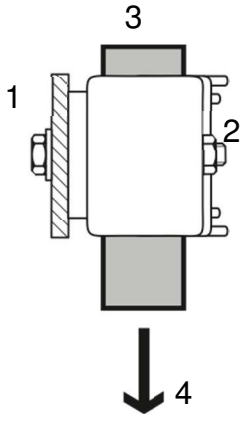
The axial load tests serve to demonstrate the manufacturer's specified maximum operating temperature and the maximum axial restraining forces [N] of the clamps of each series.

These tests must be performed on non-metallic and composite clamps with the *maximum permanent application temperature* as specified by the manufacturer.

Maximum temperature [°C]
+ 40
+ 60
+ 85
+ 105
+ 120

On metallic cable clamps the tests are carried out at ambient temperature.

The lateral load test is carried out with *test mandrels*, representing the *smallest* possible cable *diameter* for each clamp.



Legend:

1 Mounting surface

2 Cable clamp

3 Test mandrel

4 Load [N]

Clamps of all materials must hold the maximum load [N] for 5 minutes.

After the test the *axial displacement of the mandrel with respect to the clamp must not exceed 5 mm*.

Documentation to be specified by the manufacturer:

The maximum axial restraining forces [N] for each series at the maximum permanent application temperature are to be documented by the manufacturer in his documents (if necessary, with an explanation of the torques of the mounting screws).

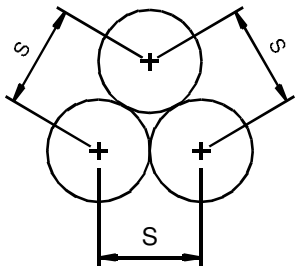
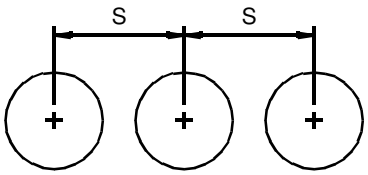
4.2 Electrodynamic tests

4.2.1 Test for resistance to electromechanical forces (9.5)

The short circuit tests serve to demonstrate the manufacturer's specified maximum dynamic short circuit resistance of the clamps of each series.

The short circuit tests are carried out on one type of each series.

At a cable section with *five clamp positions at equal intervals (D)* the following arrangements are distinguished:

Three cables in trefoil formation with bundling clamp:	Three cables in parallel arrangement with single clamps:
	

For each arrangement the test must be carried out with a three-phase short-circuit at the maximum peak value of the short-circuit current (i_p) as specified by the manufacturer.

One end of the cable route is connected to a three-phase power supply and the other end to a three-phase short-circuiting busbar.

The maximum force on the conductor is given by:

$$F = \frac{0.17 * i_p^2}{s}$$

F = maximum force on the conductor [N/m]

i_p = peak short-circuit current [kA]

S = cable centre-line distance [m]

The maximum peak short-circuit current (i_p) as specified by the manufacturer is given by:

$$i_p = \sqrt{\frac{F_s * s}{0.17 * D}}$$

F_s = maximum dynamic force on the clamp [N]

D = maximum distance between two neighbouring clamps [m]

Remark:

When determining the distance between two clamps (D), it is essential to ensure that the *maximum allowable buckling of the cables* according to the cable manufacturer in case of short circuit is not exceeded!

In order to represent realistic values for the user, the manufacturer should perform the short-circuit tests with practical values for the distance between two clamps and short-circuit current.

The classification distinguishes between clamps that withstand one short-circuit (6.4.3) or multiple short-circuits (6.4.4).

Resistant to one short-circuit (6.4.3)

After the short-circuit test:

- there must be no failure that affects the intended function of the cable clamp of keeping the cables in place

- the cable clamps must be intact without damage

- there must be no damage or cuts to the insulation of the cable

Resistant to more than one short-circuit (6.4.4)

After the first short-circuit, with no damage to the cables or clamps, a second test is performed on *the same arrangement with the same peak short-circuit current*.

After this test the clamps and cables have to meet the same requirements.

With 1 kV-cables a voltage withstand test is carried out.

Documentation to be specified by the manufacturer (7.3)

The manufacturer must document following data:

- peak short-circuit current i_p [kA]

- symmetrical short-circuit current i''_k [kA]

- outer diameter of the cables used in the test [mm]

- cable centre-line distance S [m]

- maximum distance between two clamps D [m]

Remark:

To save the user consuming calculations to determine the carrying capacity of the clamp, the maximum allowable dynamic short circuit strength [N] of the clamps (F_S) and the torques of the fixing screws should be specified by the manufacturer.

$$F_S = \frac{0.17 * D * i_p^2}{S}$$

4.3 Flame propagation test (10)

The flame propagation test serves to demonstrate the flame propagation of the material.

The cable clamps are exposed for 30 seconds to a fire test with the needle flame (10.1).

There must be no flame and no embers or no flaming 30 seconds after removal of the needle flame.

Furthermore, the tissue paper may not ignite.

Documentation to be specified by the manufacturer

The manufacturer must document in his records, whether the cable clamps are resistant to flame or not.

4.4 Test of reaction to environmental influences (11)

4.4.1 Test of resistance to ultraviolet light (11.1)

The UV-test serves to demonstrate the UV-resistance of the material.

The *smallest* and *largest* cable clamps of each series are *irradiated* for *700 hours* (29 days) under the conditions described in IEC §11.1 *with UV light*.

After UV exposure, the cable clamps must not show any signs of destruction, breakage or damage.

Subsequently, the clamps must pass the impact test (9.2) at the minimum permanent application temperature as specified by the manufacturer.

Documentation to be specified by the manufacturer:

The manufacturer must document in his records, whether the cable clamps are UV-resistant or not.

4.4.2 Test of resistance to corrosion (11.2)

The test of resistance to corrosion serves to demonstrate the resistance to corrosion of the material.

Metallic and composite cable clamps must have adequate resistance to corrosion and salt spray. The respective tests are describes in the standard at 11.1 und 11.2.

For non-metallic cable clamps these tests are not necessary.

Documentation to be specified by the manufacturer:

The manufacturer must document in his records, whether the cable clamps are resistant to corrosion or not.

4.5 Test of inductive heating (12.2)

With the use of ferromagnetic materials, there is the danger of inductive heating of the cable due to eddy currents.

Documentation to be specified by the manufacturer:

The manufacturer shall apply an appropriate warning.

ISO-Certificate

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 83059

Certificate Holder: **îd-Technik GmbH**
Hohe Str. 34-36
D - 68526 Ladenburg

Scope: development and distribution of fixings for power cables and accessories for cable connections and cable laying

Proof has been furnished by means of an audit that the requirements of ISO 9001:2008 are met.

The due date for all future audits is 31.12.

Validity: The certificate is valid from 01.01.2014 until 31.12.2016.
First certification 1998

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