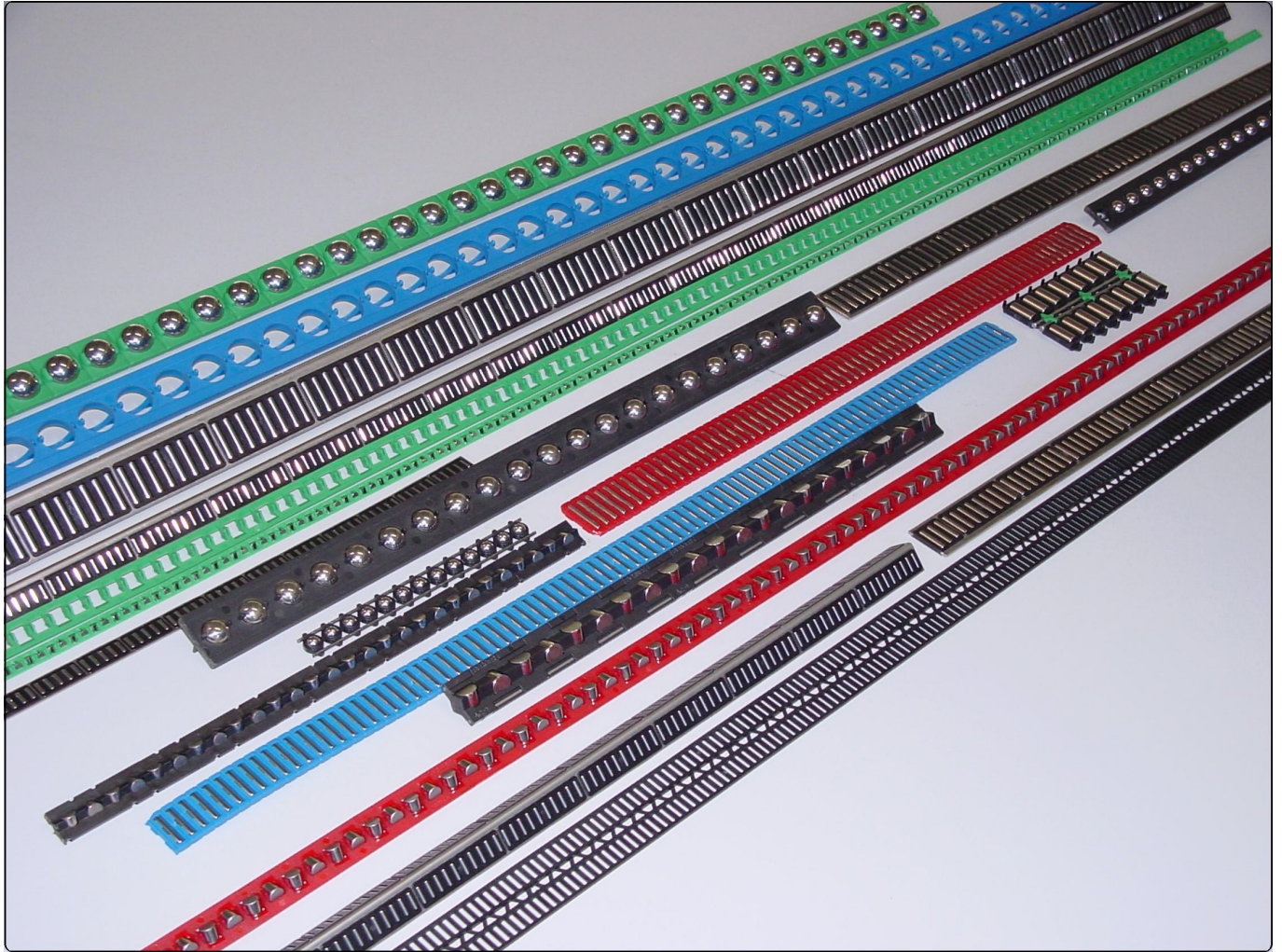


# Linear ball cages



**Standard range**

# Linear ball cages

General

## Shape

Linear bearing cages for balls, rollers or needle rollers are basically guided by roller bodies. The rollers are held in pockets. They can be manufactured in any length.

**Rollers are guided and held  
in pockets**



The basic material for linear bearing cages is injection moulded polyamide PA 12, POM or PA 12 GF (reinforced with glass fibres).

The plastic cage can be additionally stiffened by reinforcement with steel inserts in the linear longitudinal direction, so-called supports. The stiffening can be done by fixed compounding (sprayed support) or combination (clipped on support).

The ball pockets can be made with one-sided ball surround or partial surround. This prevents the balls from falling out.

## Summary of advantages

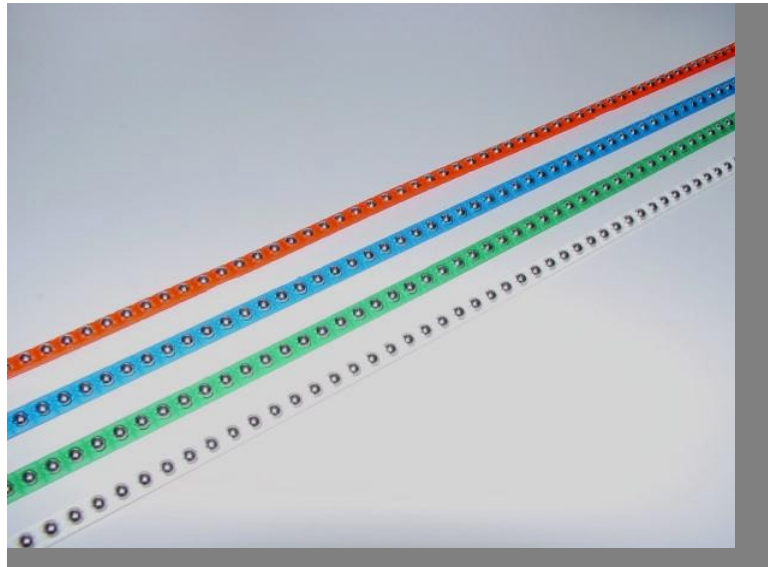
- Improved running properties and high running speeds from ball guides and supports
- Low mass of plastic or compound plastic cages
- Suitability of plastic compound cages for vertical position for adjacent, emerging cages
- Optimum roller division for higher strength and stiffness
- Individual cutting for any length
- Corrosion resistant and resistant to most solvents and alkalis and weak organic acids
- Economic supply in metre length
- Large reduction in costs compared with mechanically produced metal cages or those produced without machining.
- Combined cages are very suitable for the production of several rows of flat cages and they offer a cheap alternative when repairing guides.

# Linear ball cages

General

## Material

The main feature in the development of the linear bearing cages, apart from precision, was to find a suitable material, which with various GF additives, fulfils and even improves important functional requirements for linear movements.



As material for linear bearing cages, a thermoplastic material is preferred. Injection moulded polyamide PA 12 is a poly-condensation product of Laurinlactam. Polyamide PA 12 with the smallest water absorption and a density of 1,01 is the easiest polyamide obtainable. As technical plastic, this material has the following favourable properties for cage tapes

- High strength together with high toughness
- Excellent abrasion and smoothness properties
- Chemical properties, eg: resistance to petrol, grease and oil
- Excellent behaviour at low temperatures
- Good stability of dimensions
- Low water absorption

With these properties, the basic material polyamide PA 12 meets many requirements made of roller or ball cage tapes for linear systems.

The general thermal, electrical and mechanical properties of the cage material used are listed in the following datasheet.

All the test data were measured on test samples that had been stored for two weeks in a standard climate (23°C / 50% relative humidity).

# Linear ball cages

Polyamide injection moulded (PA 12 / PA 12 GF30)

Basic types				PA 12	PA 12 GF30
Melting temperature DSC max.		°C	dry	178	178
Density	DIN 53479	kg/dm <sup>3</sup>	dry	1.01	1.22
Water absorption 23° / 50% RF	DIN 53417	%	--	0.7	0.5
in water at 23°C	DIN 53495	%	--	1.5	1.1
linear moulding reduction		%	--	0.8 / 2.0	0.1 / 1.0
Shape maintenance ISO 75 0.46 N/mm <sup>2</sup> (B)		°C	after storage	150	170
	DIN 53461				
1.82 N/mm <sup>2</sup> (A)		°C	5 hours at 150°	50	163
Vicat softening temperature 9.81 N (A)	DIN 53460	°C	dry	170	172
49.05 N (B)		°C	dry	135	170
Linear coeff. of expansion	DIN 52328	K <sup>-1</sup>	dry	12 · 10 <sup>-5</sup>	8 · 10 <sup>-5</sup>
Max. permanent temp. of use		°C	--	80	90
Short term temperature of use		°C	--	140	150
Specific through resistance	DIN 53482	Ω cm	dry cond.	10 <sup>13</sup>	10 <sup>13</sup>
Breakdown strength (elec)	DIN 53481	kV/mm	dry cond.	38	40
Creep current strength stage KC	DIN 53480	V	dry cond.	> 600	> 600
Yield stress	DIN 53455	N/mm <sup>2</sup> N/mm <sup>2</sup>	dry cond.	-- 40	-- --
Extension at yield	DIN 53455	% %	dry cond.	-- 8	-- --
Tearing strength	DIN 53455	N/mm <sup>2</sup> N/mm <sup>2</sup>	dry cond.	-- 60	-- 105
Extension when tearing	DIN 53455	% %	dry cond.	-- 275	-- 5
Tensile elastic modulus	DIN 53457	N/mm <sup>2</sup> N/mm <sup>2</sup>	dry cond.	-- 1100	-- 5900
3,5% bending stress	DIN 53452	N/mm <sup>2</sup> N/mm <sup>2</sup>	dry cond.	-- 35	-- 130
Shore hardness D	DIN 53505	--	dry cond.	-- 67	-- 77
Impact toughness at -40°C	DIN 53453	kJ/m <sup>2</sup> kJ/m <sup>2</sup>	dry cond.	-- --	-- 55
Impact toughness	DIN 53453	kJ/m <sup>2</sup> kJ/m <sup>2</sup>	dry cond.	-- --	-- 60
Notch impact toughness (Charpy)	DIN 53453	kJ/m <sup>2</sup> kJ/m <sup>2</sup>	dry cond.	-- 10	-- 20
Notch impact toughness (Charpy) at -40°C	DIN 53453	kJ/m <sup>2</sup> kJ/m <sup>2</sup>	dry cond.	-- 6	-- 15

# Linear ball cages

## Strength

### Temperature

Roller bearing and linear bearing manufacturers who use our cage tapes made of plastic have determined the suitability of the material by internal investigations and have safely included them in their catalogues.

For the material PA 12 for continuous operation, the limit is 90° to 100°C and for short periods of use the permitted temperature is 100° to 120°C.

Glass fibre reinforced PA 12 (30% GF) has a limit in continuous use of 100 to 110°C and for short periods of use of 120° to 130°C.

For short term use, 300 to 500 hours are allowed for the material PA 12 and 500 to 1000 hours for the material PA 12 GF.

The actual heat resistance of the material to the occurrence of embrittlement is considerably higher.

**The limiting temperatures of roller bearing cages in the standard version in continuous operation are -40°C and +100°C and for short periods of operation up to +120°C.**

### Vacuum

One can say about using our cages under vacuum, that in a vacuum, low molecular parts can evaporate. According to the experts, the proportion of these parts is very small and it has no effect on the mechanical properties of the cage material.

### Argon (inert gas)

According to various tests on the material, it is 100% resistant to argon.

### Halogen gas

Halogen gases are based on bromine or chlorine.

As halogen gases are very aggressive, the use of our cages made of PA 12 and PA 12 GF material is unsuitable for them.

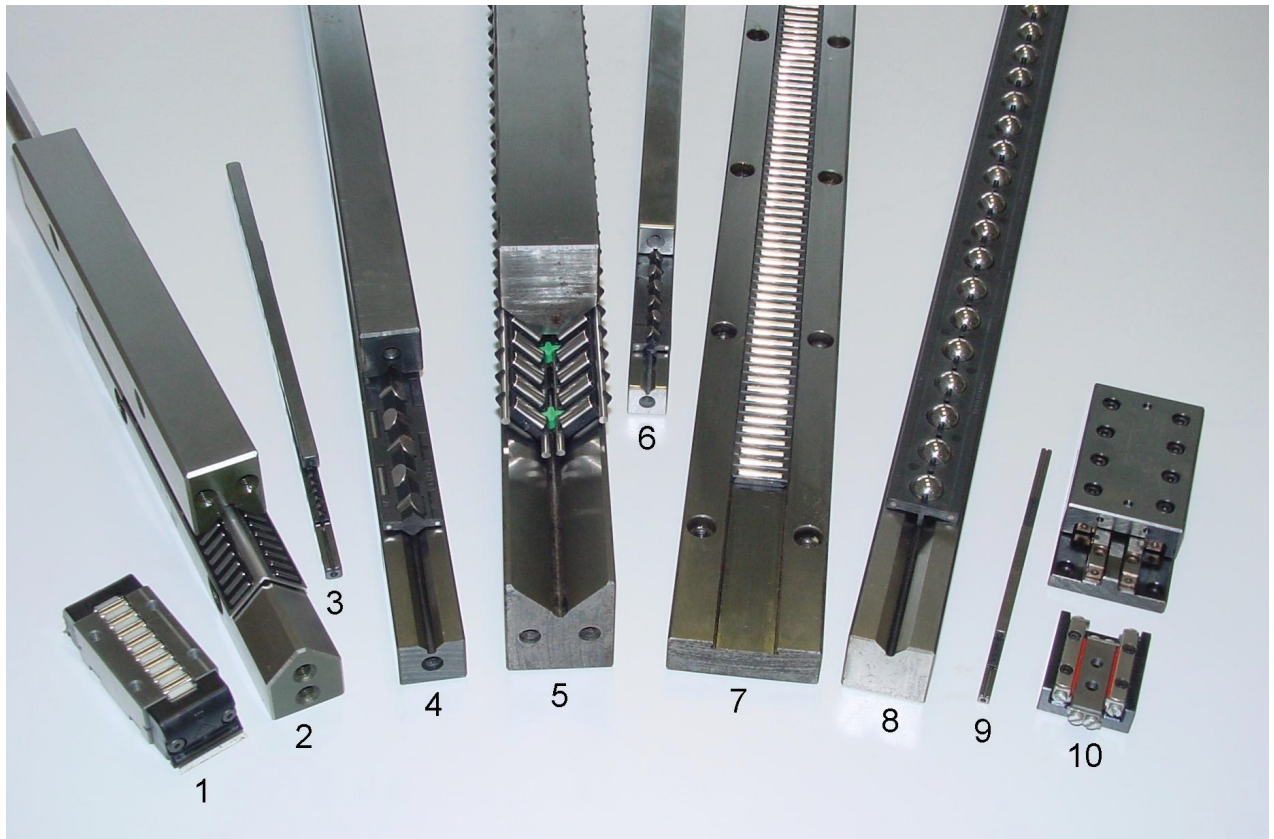
Halogen gases cause changes in dimension and a reduction in the mechanical properties.



# Linear ball cages

Areas of application

## Linear bearing cages for roller guides



- 1 Roller circumferential shoe with circumferential cage KKVK
- 2 V/M guide rails with angled flat cage KKVR
- 3 Roller guide Gr. 3 with cross roller cage KKXL
- 4 Roller guide Gr. 9 with cross roller cage KKXV
- 5 V/M guide rails with angled flat cage KKHV
- 6 Roller guide Gr. 6 with cross roller cage KKXV
- 7 Flat guide with flat needle cage KKVR
- 8 Cross roller guide Gr. 9 with flat ball cage KKVK
- 9 Cross roller guide Gr. 1,5 with cross roller cage KKXL
- 10 Miniature roller table Gr. 2 with cross roller cage KKXL

# Linear bearing cage KKLK

Series KKLK ball cage tape filled with balls

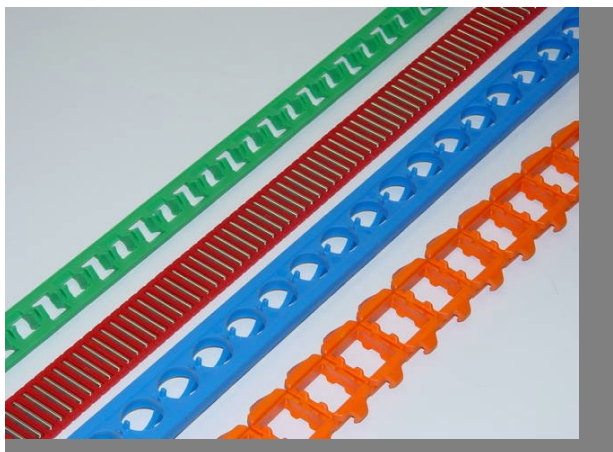
## General

Linear ball cages of series KKLK are pure plastic cage tapes which were mostly taken from the standard range (roller bearing cages) for the linear area. The cage tapes are made in metre lengths and are specially made by a separate tempering process for linear applications in greater lengths.

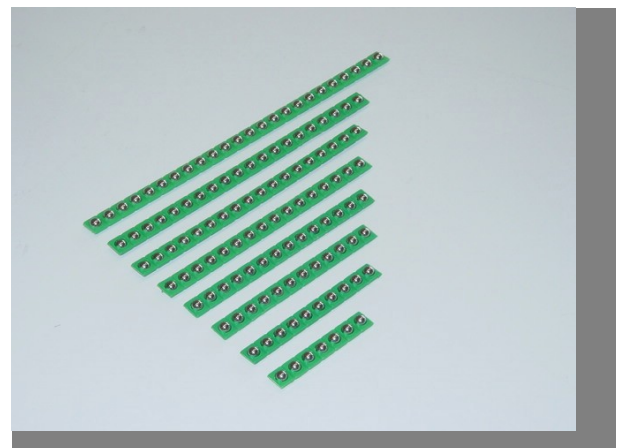
Ball cages of series KKLK have ball pockets with ball guides and supports. They are offered including the balls, in metre lengths or ready to install. The standard balls for filled linear ball cages are made according to DIN 5401 / Grade 15 (Class 2) of 100 Cr6 material. Variants made of other materials, eg: corrosion-resistant steel (X46Cr13 / 1.4034) or plastic (POM) or ceramic ( $AL_2O_3$ ) are also possible.

## Further options

Cage tapes for roller bearing and linear systems from the standard range are coloured according to the manufacturer's choice. For large quantities and call-up orders, special colours can be considered. Different colours are useful if different sorts of rollers are in use and these require quick allotment in assembly, or if different materials (chromium steel and stainless steel balls) are optically indistinguishable.



Differently coloured linear cages



Linear ball cages in different lengths ready to instal

# Linear bearing cages KCLK

Series KCLK ball cage tapes filled with balls

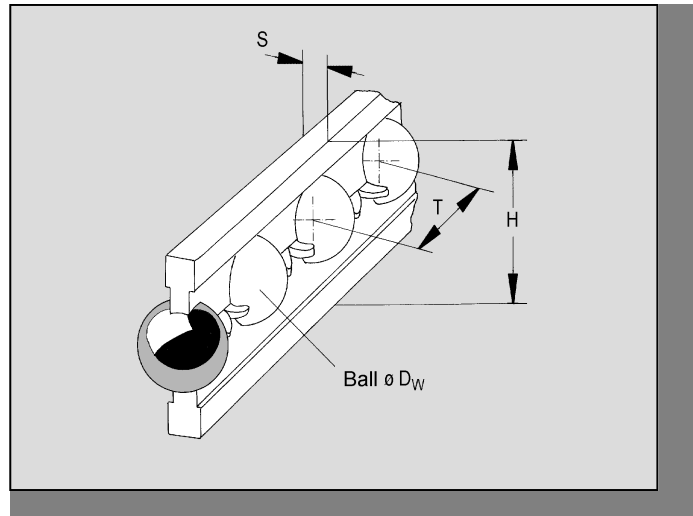
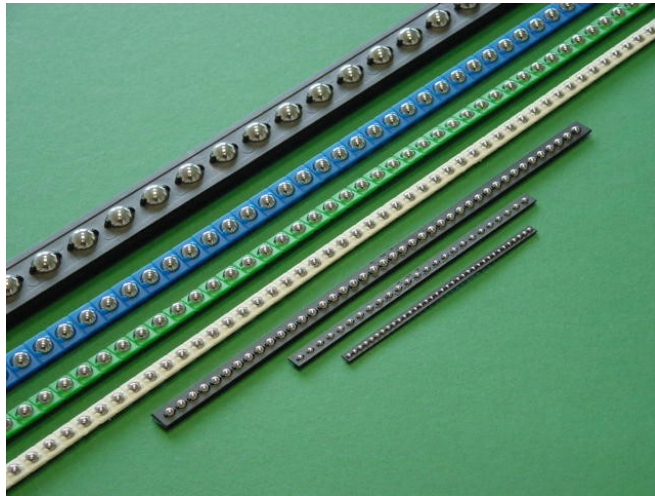


Table of dimensions [dimensions in mm]

type 1)	Ball Ø		H	S	T	HLG
	D <sub>w</sub>	[inch]				
KCLK 015/...	1,500		3,5	0,45	2,2	80 2)
KCLK S16/...	1,588	1/16	3,1	0,50	2,2	85 2)
KCLK 016/...	1,588	1/16	3,5	0,50	2,2	85 2)
KCLK 020/...	2,000		5,0	0,75	3,9	102 2)
KCLK 021/...	2,000		5,0	0,75	3,0	MW
KCLK 023/...	2,381	3/32	6,0	0,80	3,6	MW
KCLK 030/...	3,000		7,0	1,00	4,2	180 2)
KCLK 031/...	3,000		7,0	1,00	4,2	MW
KCLK S32/...	3,175	1/8	4,4	0,70	4,2	MW
KCLK 032/...	3,175	1/8	7,0	1,00	4,2	MW
KCLK 039/...	3,969	5/32	6,3	1,30	5,8	MW
KCLK 040/...	4,000		6,3	1,30	5,8	MW
KCLK 047/...	4,762	3/16	8,0	1,50	6,8	MW
KCLK 050/...	5,000		8,0	1,50	6,8	MW
KCLK 060/...	6,000		9,0	1,60	7,8	MW
KCLK 063/...	6,350	1/4	9,0	1,60	7,8	MW
KCLK 079/...	7,938	5/16	12,0	2,00	12,0	MW
KCLK 080/...	8,000		12,0	2,00	12,0	MW
KCLK 090/...	9,000		15,0	2,00	11,5	MW
KCLK 095/...	9,525	3/8	12,6	2,50	12,0	MW
KCLK 100/...	10,000		13,2	2,50	12,5	MW
KCLK 110/...	11,000		13,7	2,50	14,0	MW
KCLK 111/...	11,112	7/16	13,7	2,50	14,0	MW
KCLK 127/...	12,700	1/2	22,0	3,50	16,0	MW

1) Other dimensions on request

MW = metre length

2) Material POM

For linear bearing cages with limited manufacturing length (HLG) from individual tools, the material POM (polyacetalene) is used.

The most important thermal properties are

- keeping its shape up to 105°C
- melting temperature 177°C
- linear coefficient of thermal expansion ( $1 \times 10^{-5}$ ) 10,4 for -40°C to 30°C (complete datasheet on request)



# Linear bearing cages KCLK 101

Series KCLK 101 linear ball cages

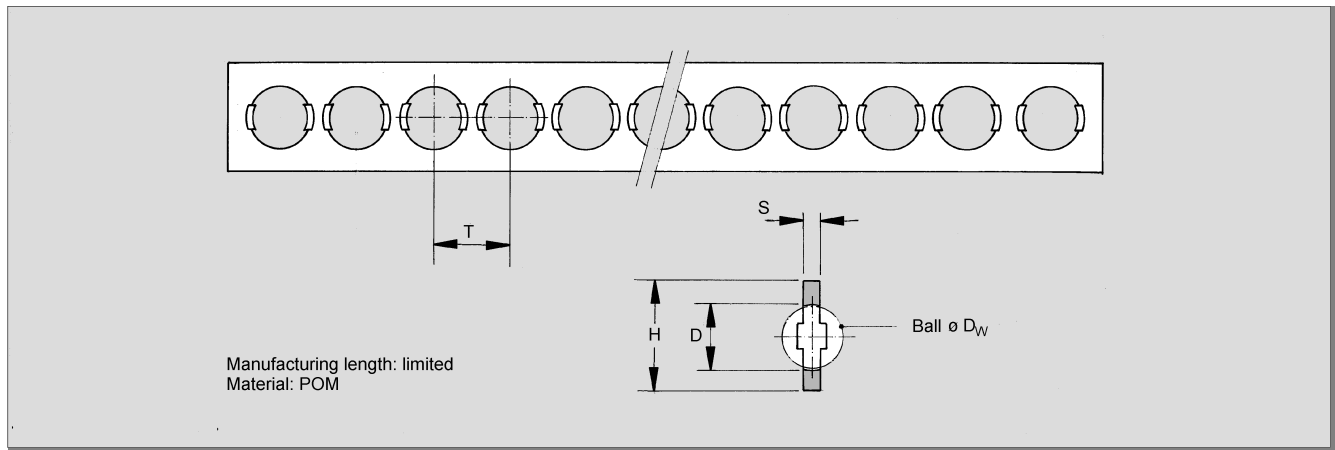
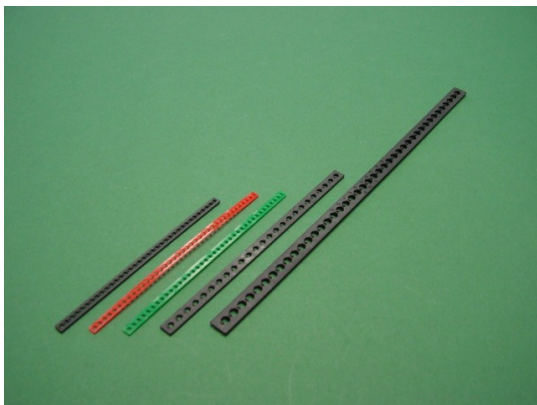


Table of dimensions [dimensions in mm]								
type 1)	ball Ø		H	S	T	D	HLG	No. of balls each
	D <sub>w</sub>	(inch)						
<b>KCLK 101-01</b>	1,500		3,5	0,45	2,2	1,6	~ 80	35
<b>KCLK 101-016</b>	1,588	1/16	3,5	0,50	2,2	1,7	~ 85	38
<b>KCLK 101-S16</b>	1,588	1/16	3,1	0,50	2,2	1,7	~ 85	38
<b>KCLK 101-02</b>	2,000		5,0	0,75	3,9	2,1	~102	25
<b>KCLK 101-03</b>	3,000		7,0	1,00	4,2	3,1	~180	42

1) Other dimensions on request

The linear ball cages of series KCLK 101 are plastic flat cages. The ball pockets have a ball support. The cages are produced with a limited manufacturing length (HLG) and cannot be obtained in metre lengths. They are supplied without balls and with a minimum quantity of 100 off. Linear ball cages with limited manufacturing length are made of the material POM (polyacetalene). The most important properties are keeping its shape up to 105°C and a linear thermal coefficient of expansion of  $10,4 \times 10^{-5}$ , determined over a temperature range of -40°C to 30°C. The complete material data of mechanical, thermal and electrical properties can be obtained on request. For cages of this type filled with balls see page 9 (KCLK).



### Example of order / inquiry

KCLK 101 - 03

/

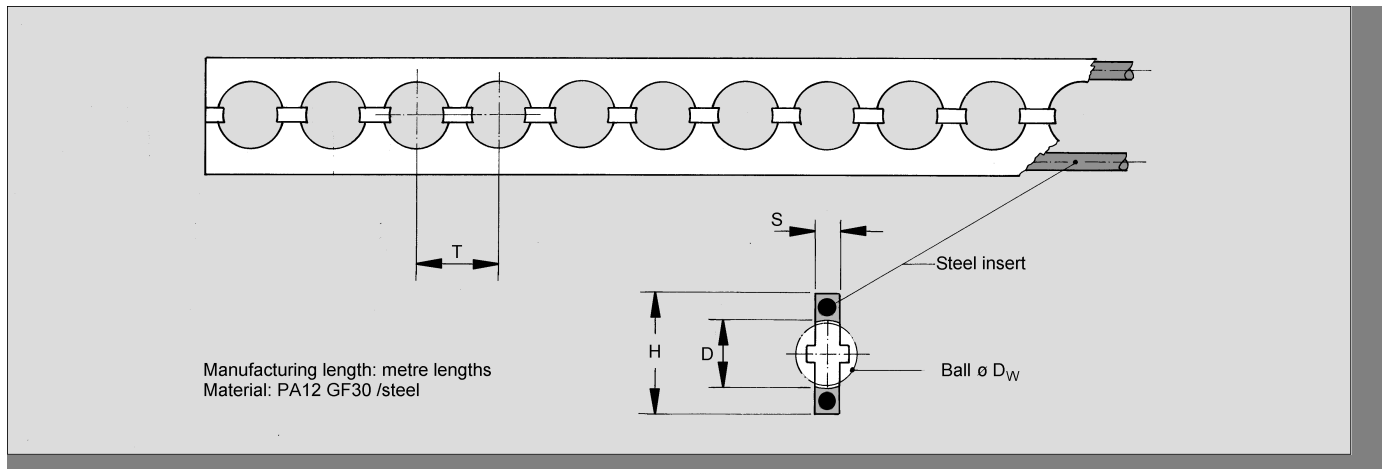
500 off

type for ball Ø 3  
not filled with balls

quantity  
off

# Linear bearing cages KKVK

Series KKVK compound ball cage



type 1) without balls	type with balls	ball Ø D <sub>w</sub>	H	S	T	D	No. of balls per metre
KKVK 111-06	KKVK-06	6	14	2,5	9,0	6,2	111
KKVK 112-09	KKVK-09	9	20	3,5	14,0	9,2	71
(KKVK 113-12) 2)	(KKVK-12) 2)	12	20	4,0	15,5	12,2	64

1) Other dimensions on request

2) Expiring type, alternative is shown on page 12 – KKAk 12...L

Linear bearing cages of series KKVK are plastic flat cages with integrated steel inserts. They are manufactured by a special compound technology in metre lengths.

The standard manufacturing lengths of linear bearing cages of compound construction are 1400 mm. Due to the two steel inserts, which act as stiffening of the plastic flat cage, the latter can easily be used vertically.

The ball pockets are made so that the balls can only be pressed into the pockets from one side. The opposite side has a partial surround of the ball bodies, so that they cannot fall out on this side.

- Possible supplies
- metre lengths without balls (minimum 50 metres)
  - cut to length filled with balls (no minimum limit)
  - metre lengths with balls for cutting oneself (no minimum limit)



## Example of order / inquiry

<input type="text" value="KKVK 111 - 06"/>	/	<input type="text" value="50 metres"/>
type without balls		quantity in metres
<input type="text" value="KKVK - 06"/>	/	<input type="text" value="59"/>
type incl. balls	no. of ball pockets	quantity ready for use
<input type="text" value="KKVK - 06"/>		<input type="text" value="100 metres"/>
type incl. balls		quantity in metres

# Linear bearing cages KKAK ...L

Series KKAK ...L ball flat cage

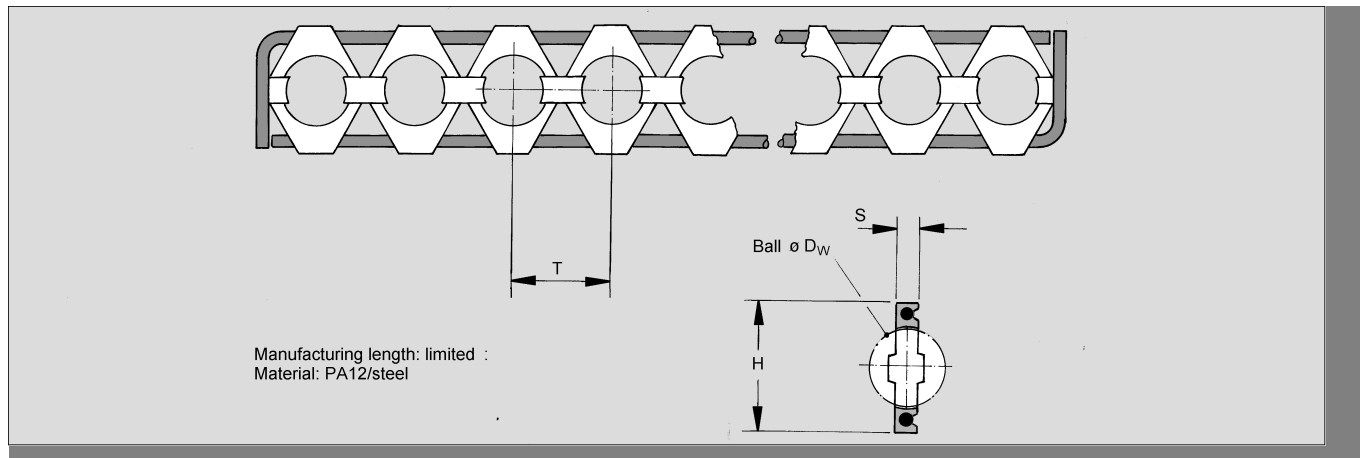


Table of dimensions [dimensions in mm]					
type 1)	balls $\varnothing$		H	S	T
	$D_w$	(inch)			
KKAK 6 ...L	6,000		13	3,0	9,0
KKAK 9,525 ...L	9,525	3/8	20	3,5	20,0
KKAK 11 ...L	11,000		19	4,0	14,5
KKAK 11,906 ...L	11,906	15/32	20	5,0	15,5
KKAK 12 ...L	12,000		20	5,0	15,5
KKAK 14 ...L	14,000		21	6,0	17,0

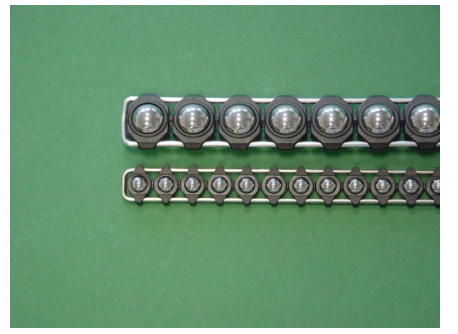
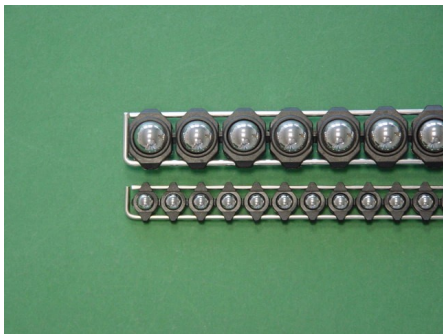
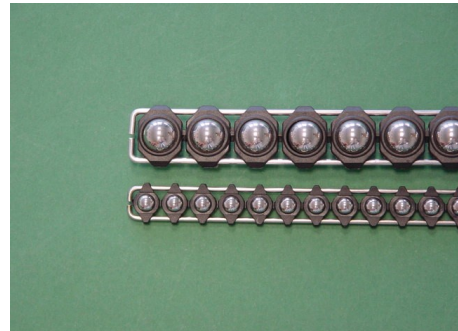
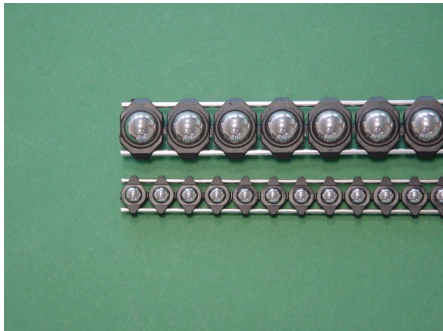
1) Other dimensions on request

Linear bearing cages of series KKAK ...L are guided and held ball flat cages. The cages are so-called combination cages and consists of precision steel wires (supports) which are completed by clipped on cage tapes. By using curved supports it is possible to produce ball segment cages, eg: for curved guides with restricted range. The combination shape is suitable for producing multi-row versions. The steel supports ensure the necessary stiffening of the ball flat cage and improve the running behaviour in vertical operation. The cages are produced individually to length and are supplied filled with balls. The ends of the cage can be configured differently (see examples of variants).

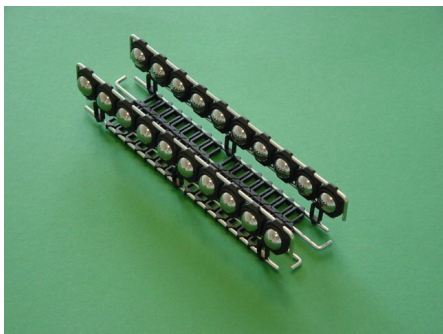
# Linear bearing cages KKAK ...L

Series KKAK ...L / examples of variants

Example of variant / longitudinal closure



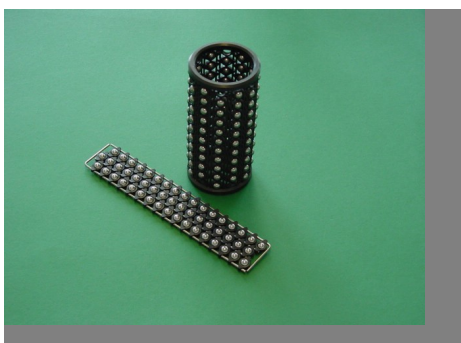
Example of variant / multi-row cages



Ball box



Example of variant / multi-row cages

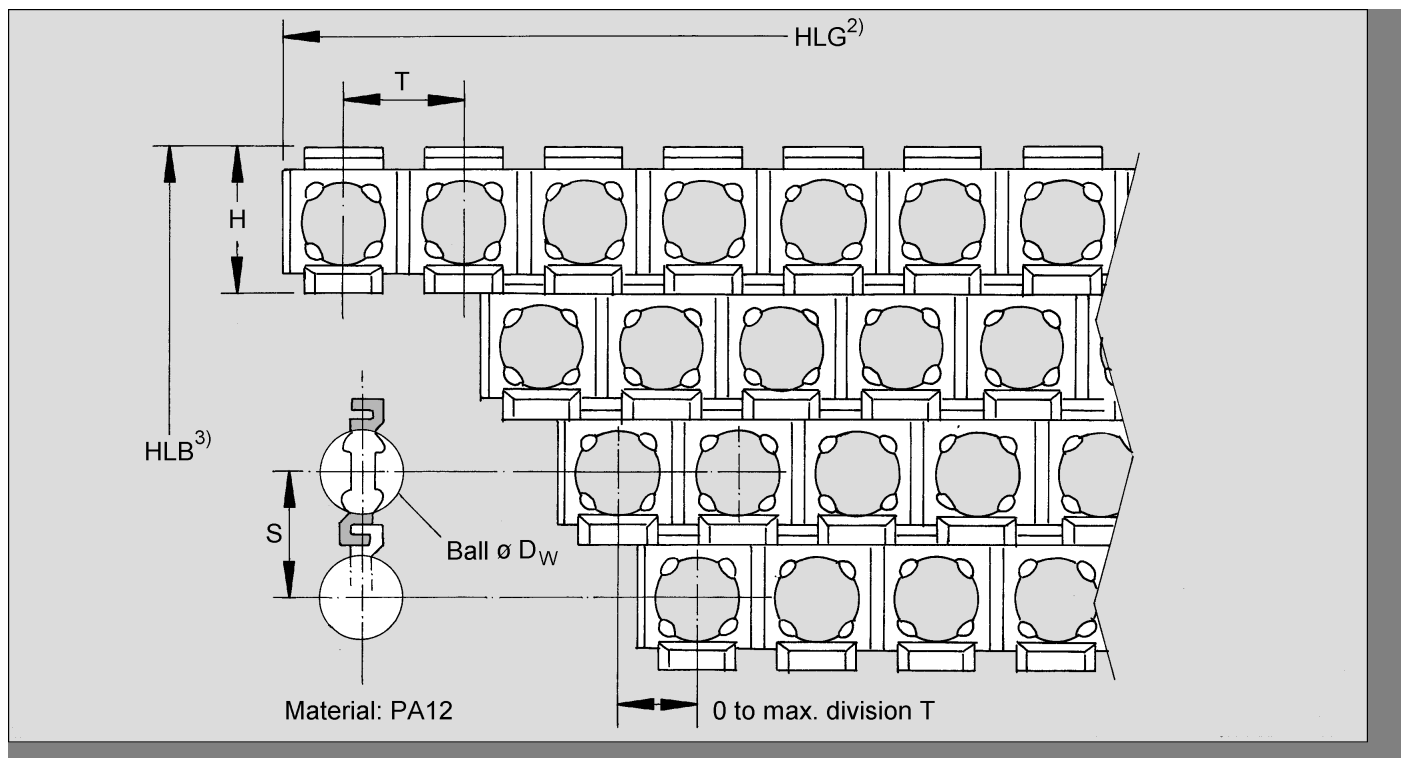


Cage segments



# Linear bearing cages KKNK 104

Series KKNK 104, linear ball mesh



**Table of dimensions** [dimensions in mm]

type 1) without balls	type with balls	ball Ø D <sub>w</sub>	H	S	T	No. of balls
<b>KKNK 104-03</b>	<b>KKNK-03</b>	3,00	6,20	4,80	4,50	222
<b>KKNK 104-04</b>	<b>KKNK-04</b>	4,00	7,40	6,45	5,75	173
<b>KKNK 104-05</b>	<b>KKNK-05</b>	5,00	9,30	7,95	6,75	148
<b>KKNK 104-06</b>	<b>KKNK-06</b>	6,00	11,00	9,55	7,75	129

- 1) Other types on request
- 2) HLG = manufacturing length unlimited
- 3) HLB = manufacturing widths unlimited

Linear bearing cages of series KKNK 104 are single row plastic cage tapes, which can be manufactured in unlimited lengths and unlimited widths.

The individual rows are connected by clipping together along the wide side of the cage tape.

The clipping does not produce a firm connection of rows, but is only used for positioning of the ball mesh and the different shapes. Ball networks are mainly used for unordered movements in different directions.



# Linear bearing cages KKNK 104

Series KKNK 104, ball network

## Shapes (examples)

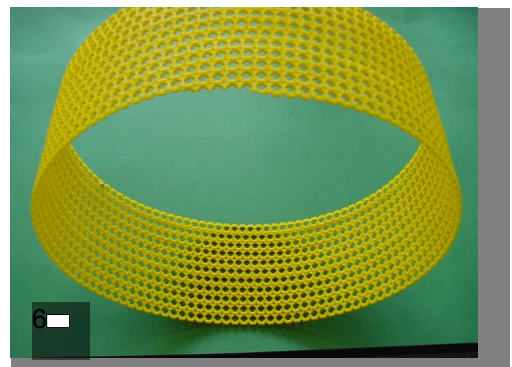
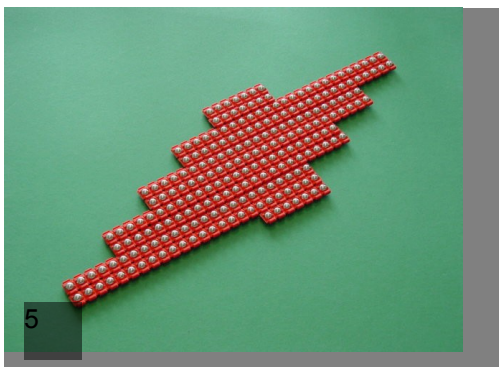
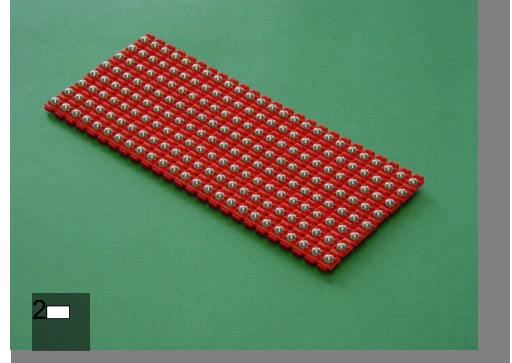


Fig. 1 Ball mesh of curved shape as ball box for simultaneous linear and rotary movement, diameter from about 50 mm

Fig. 2 Ball mesh of rectangular or square shape for linear longitudinal and lateral movement

Bild 3 Ball mesh of circular shape for circular and linear movement

Fig. 4, 5 and 6 Special shapes according to the application.

# Linear bearing cages KKXL-01 / 02

Series KKXL-01/02, cross roller cages

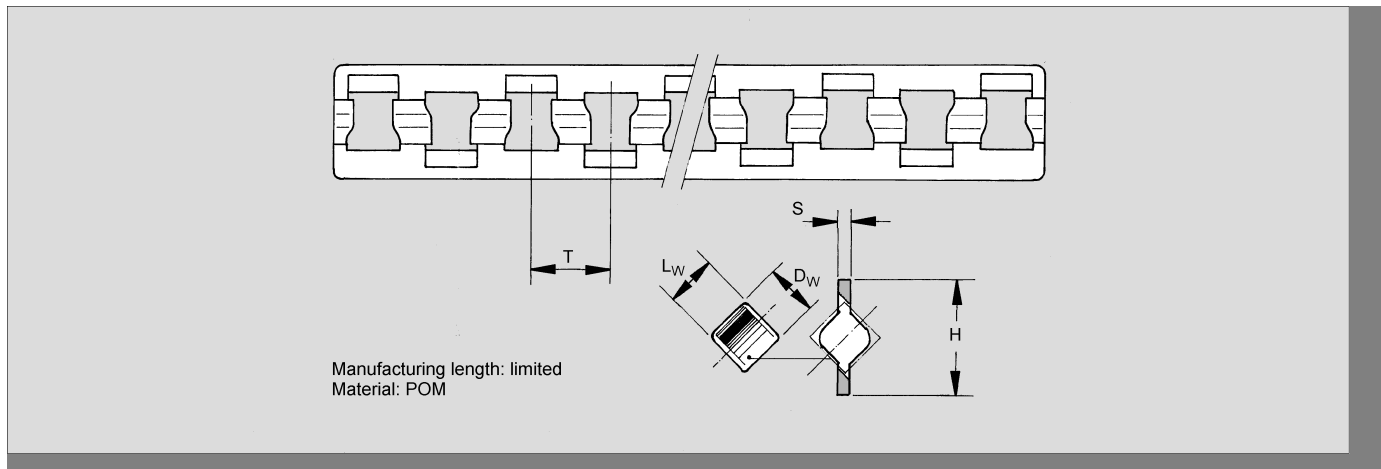


Table of dimensions [dimensions in mm]						
type 1)	roller Ø D <sub>w</sub> x L <sub>w</sub>	H	S	T	HLG	No. of rollers each
KKXL-01	1,5 x 1,4	3,8	0,5	3	75	24
KKXL-02	2,0 x 1,8	5,5	0,7	4	100	24

1) Other dimensions on request

Linear cross roller cages of series KKXL-01/02 are plastic cages. The roller pockets have a roller support. The cages are produced with a limited manufacturing length (HLG) and therefore cannot be obtained in metre lengths. They are supplied without rollers and with a minimum quantity of 100 off. The rollers can be supplied separately. For other details of cylindrical rollers type KZR 110 see page 28 (rollers).

Linear bearing cages with limited manufacturing length are made of the material POM (polyacetalene). The most important thermal properties are keeping its shape up to 105°C and a linear thermal coefficient of expansion of  $10,4 \times 10^{-5}$  in a temperature range of -40°C to 30°C. The complete material data of mechanical, thermal and electrical properties can be supplied on request.



## Example of order / inquiry

KKXL-01 / 200 off  
type for roller Ø 1,5  
without rollers quantity

associated cylindrical rollers (see page 28 – rollers)

KZR 110-1,5 / 4.800 off  
roller Ø 1,5 x 1,4 quantity

# Linear bearing cages KKXL-03 / 06 / 09

Series KKXL-03 / 06 / 09, cross roller tape

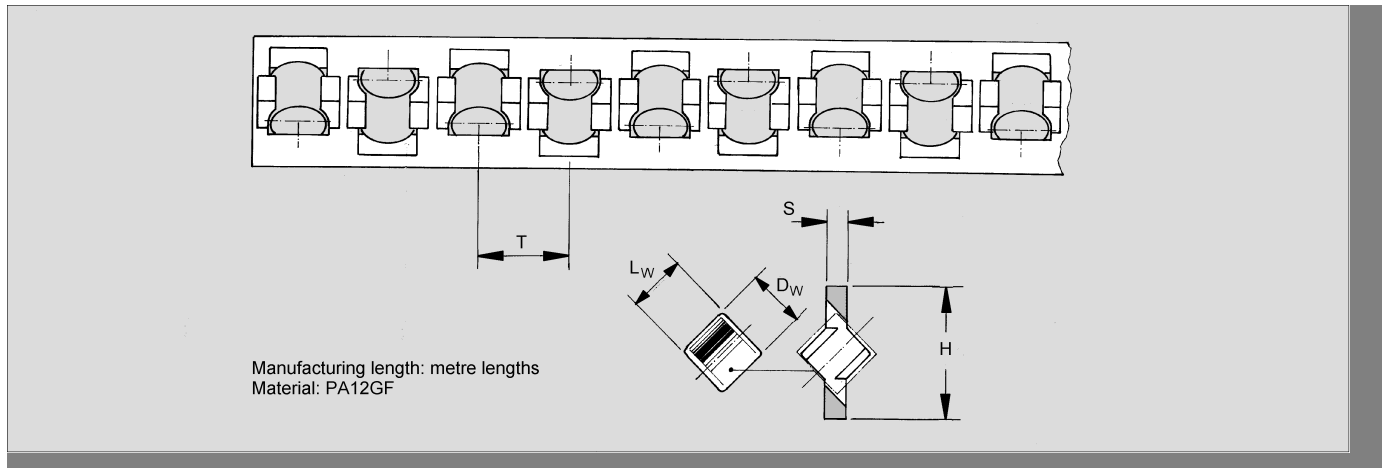


Table of dimensions [dimensions in mm]						
type 1) without rollers	type with rollers	roller Ø Dw x Lw	H	S	T	No. of rollers per metre
KKXL 030	KKXL-03	3 x 2,8	7	1,00	5,0	200
KKXL 060	KKXL-06	6 x 5,8	14	2,00	8,5	118
KKXL 090	KKXL-09	9 x 8,8	20	3,00	14,0	71
KKAC 020	KKAC-02	2 x 1,8	5	0,75	3,9	250

1) Other dimensions on request

Linear bearing cages of series KKAC-02 and KKXL-03 / 06 / 09 are plastic cage tapes for cylindrical rollers in cross arrangement (cross rollers). They are produced in metre lengths, where the standard lengths are 1000mm.

The cross roller cage tapes are filled with rollers and offered without rollers. The rollers can be supplied separately. For further details of cylindrical rollers see page 28 (rollers).

- Possibilities of supply
- metre lengths without rollers, minimum quantity KKXL 030 – 250 m / KKXL 060 – 100 m / KKXL 090 – 50 m / KKAC 020 – 50 m
  - ready to fit, filled with rollers (no minimum limit)
  - metre lengths with roller, to cut up oneself (no minimum limit)



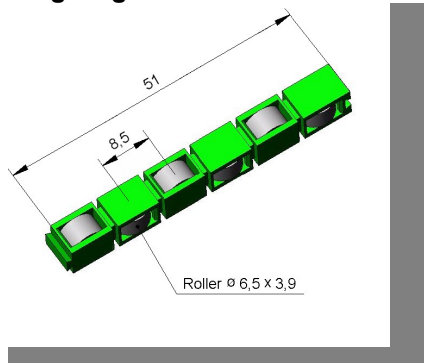
## Example of order / inquiry

KKXL 030	/	250 off
type without rollers		quantity or metres (1m = 1 off)
KKXL-03	/	18
type incl. rollers		no off roller pockets
		quantity no. off ready to fit
KKXL-03	100 metres	
type incl. rollers		quantity metres or no. off
for cutting off oneself (1m = 1 off)		

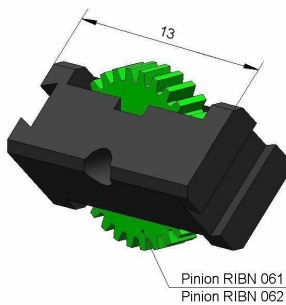
# Linear-crossroller cage KKBN

with „SLIPLESS-System SLS“ Type KKBN 06 SLS

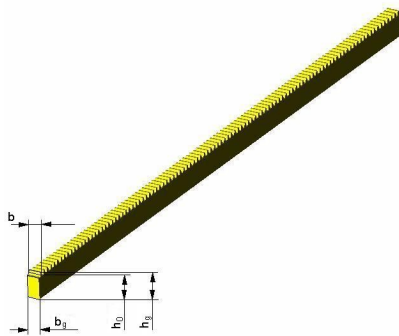
## Crossroller-cagesegment



## Pinion pocket



## Gear rack



## Fitted dimensions

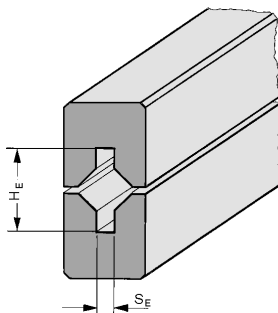


Table of dimensions [dimensions in mm]

Crossroller-cagesegment			
type	Cyl.-roller 1) D <sub>w</sub> x L <sub>w</sub>	Pitch T	Length L
KKBN 060	Ø 6,5 x 3,9	8,5	51
KKBN 040	Ø 4,0 x 2,8	6,0	36

1) Cyl.-rollers sort. G1 (see page 28 – rolling elements)

Table of dimensions [dimensions in mm]

Pinion (straight-fluted)			
type		RIBN 061	RIBN 062
Divided circle-Ø	d <sub>01</sub>	9,0	9,0
Modulus	m	0,3	0,3
Number of tooth	Z	30,0	30,0
Crown line-Ø	d <sub>k</sub>	9,6	9,6
Width of tooth	b	1,0	2,0
Pressure angle	α	20°	20°
<b>Material</b>		Plastic POM	Plastic POM Brass MS58

Gear rack  
(straight fluted)

type		ZABN 061	ZABN 062
High	h <sub>o</sub>	1,4	3,7
Total High	h <sub>g</sub>	1,7	4,0
Length	L	100,0 2)	250,0 1)
Modulus	m	0,3	0,3
Width of tooth	b	1,0	2,0
Total width	b <sub>g</sub>	1,55	2,0
Pressure angle	α	20°	20°
<b>Material</b>		Plastic PA 6.6 GF	Plastic PA 6.6 GF Brass MS58

Fitted dimensions

Gear rack	Pinion	H <sub>E</sub>	S <sub>E</sub>
ZABN 061	RIBN 061	12,05	1,60
ZABN 062	RIBN 062	16,70	2,00

1) Gear rack made of plastic TN can be supplied in every length even  $\geq 250$  mm.

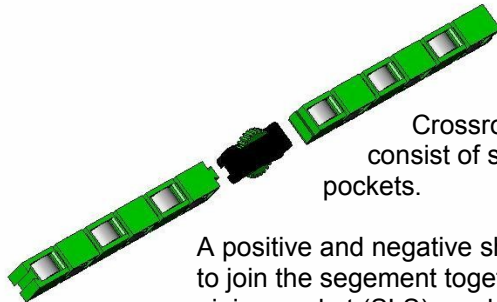
Gear rack made of brass MS can only be supplied with a length of 250 mm.

2) Gear rack can only be supplied in plastic TN with a max. length of 100 mm.

# Linear-crossroller cage KKBN

with „SLIPLESS-System SLS“ Type KKBN 06 SLS

**Cagesegment + pinion pocket + cagesegment = KKBN 06 SLS**



Crossroller cages type series KKBN consist of segments, having 6 alternate roller pockets.

A positive and negative shaped „dovetail“ sliding connection enables to join the segment together to the required insert length. The pinion pocket (SLS) can be integrated in the cage segments due to this connection style. SLS is a standard for the size 06 (other dimensions on request).

The cagesegments are available without rollers or filled with rollers ready to install. Minimum quantities have to be considered.

## Example of order / inquiry

Crossroller cage-cagesegment filled with 6 cyl.-rollers Ø 6,5 x 3,9

Designation **KKBN 06 / 6** Quantity **100 off**

Size of cyl.-rollers  
Cylinder-roller 6,5 x 3,9  
Cage type series

Crossroller cage-cagesegment filled with 6 cyl.-rollers Ø 6,5 x 3,9  
Stainless Steel (SS)

Designation **KKBN 06 / 6 SS** Quantity **100 off**

Crossroller-cagesegment not filled

Designation **KKBN 060** Quantity **500 off**

For cylinder-roller 6,5 x 3,9  
Cage type series

## Example of order / inquiry

with pinion RIBN 062 and gear rack ZABN 062

Crossroller cage ready to ins  
3,9

Designation **KKBN 062 / 1**

Crossroller cage ready to install with cylinder-rollers Ø 6,5 x 3,9  
corrosion resistant steel (SS)

Designation **KKBN 062 / 12 SLS TN SS** Quantity **100 off**

Matching gear rack

Designation **ZABN 062 / 2**



# Linear bearing cages KLBF

Series KLBF, flat roller cage

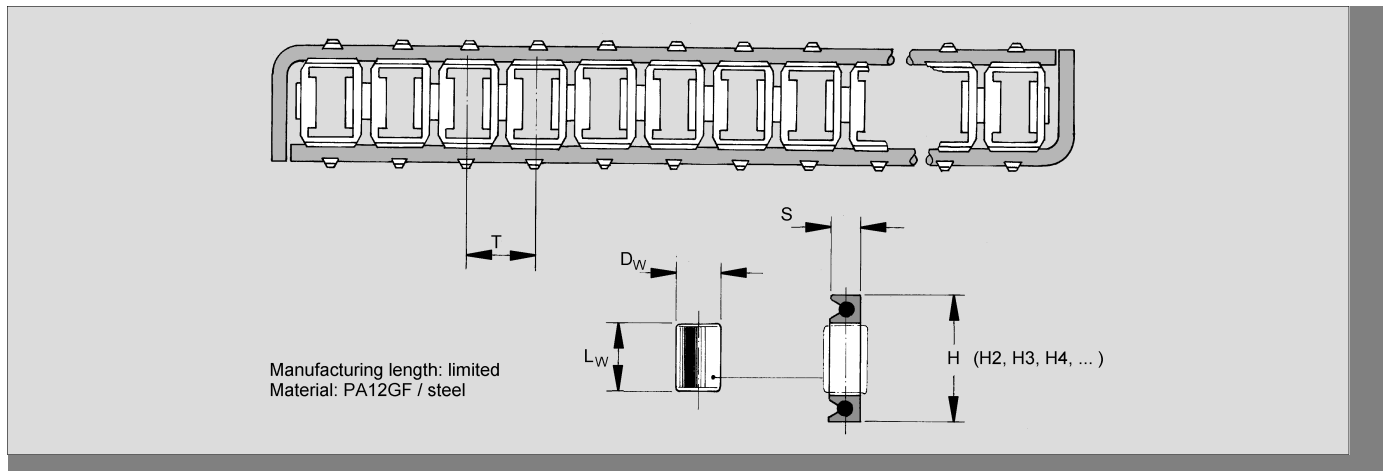


Table of dimensions [dimensions in mm]							
type 1)	roller Ø D <sub>w</sub> x L <sub>w</sub>	H	S	T	cage height 2)		
					2 row H2	3 row H3	4 row H4
<b>KLBF 4015</b>	4 x 8	15	3,0	7,5	27,0	39,0	51,0
<b>KLBF 5015</b>	5 x 8	15	3,5	8,0	27,0	39,0	51,0
<b>KLBF 7025</b>	7 x 14	25	5,0	11,0	45,5	65,5	85,5
<b>KLBF 18036 3)</b>	18 x 18	36	10,0	23,0	---	---	---

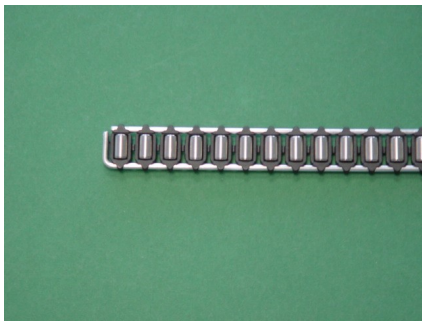
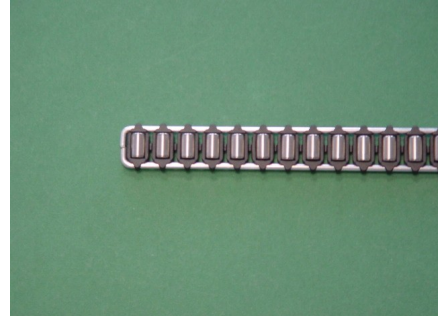
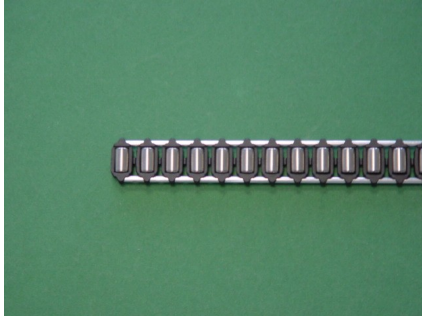
- 1) Other dimensions on request
- 2) Any number of rows of rollers can be added
- 3) Not suitable for mult-rows

Linear bearing cages of series KLBF are guided and held flat roller cages. The cages are so-called combination cages and consist of precision steel wires (supports), which are made into flat roller cages by clipped on cage tapes. Using curved supports, it is possible to produce roller segment cages, eg: for curved guides with restricted range. Combination shapes are also suitable for producing mult-row versions. The steel supports ensure the necessary stiffening of the flat roller cage and improve the running in vertical operation. The cages are produced individually for the required length and supplied filled with rollers. The ends of the cage can be configured differently (see example of variants).

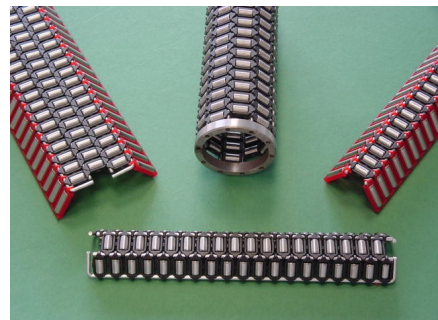
# Linear bearing cages KLBF

Series KLBF / examples of variants

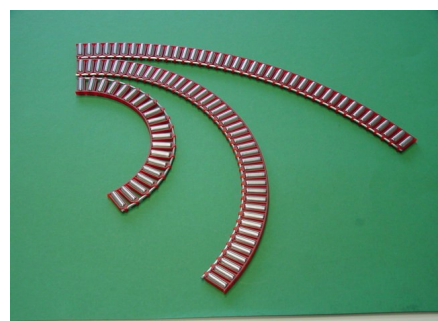
## Variant example / longitudinal closure



## Variant example / multi-row cages



## Variant example / cage segments



# Linear bearing cage KLBF 5020 / KLBF 5020 ZW

Series KLBF 5020/ KLBF 5020... ZW flat roller cage

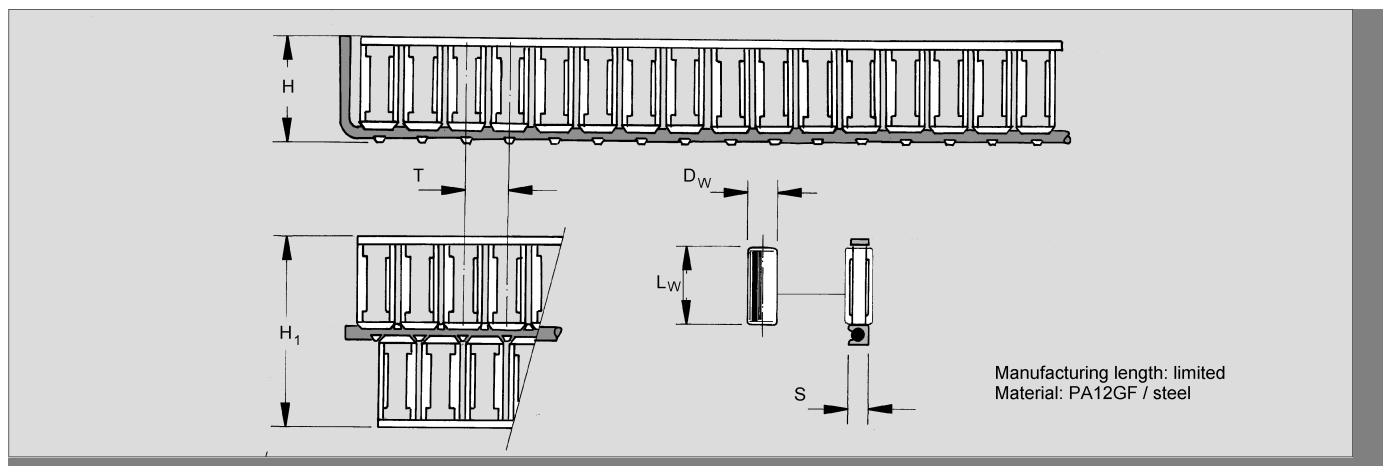


Table of dimensions [dimensions in mm]					
type 1)	roller Ø $D_w \times L_w$	H	S	T	No. of rollers per metre
KLBF 5020	5,0 x 15,0	20	3,5	8	125

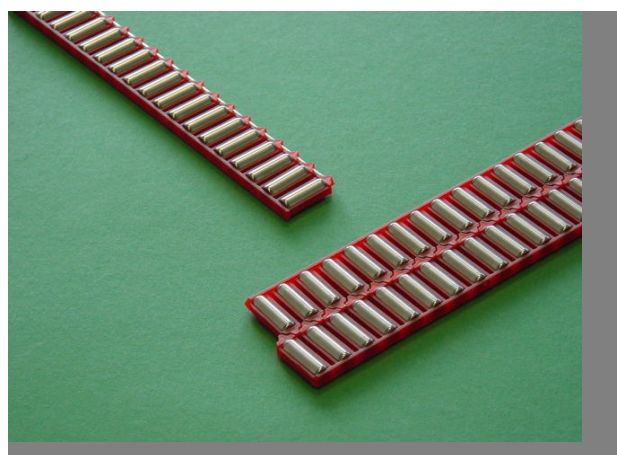
Table of dimensions [dimensions in mm]					
type 1)	roller Ø $D_w \times L_w$	$H_1$	S	T	No. of rollers per metre
KLBF 5020 ZW	5,0 x 15,0	37	3,5	8	250

1) Other dimensions on request

Linear bearing cages of series KLBF 5020 and KLBF 5020 ZW are guided and held flat roller cages. The cages are combination cages and consist of a precision steel wire together with a roller cage tape to form a single row flat cage.

The cage can be expanded into a two row flat roller cage (ZW) by connecting another row. Other possible combinations are only possible together with type KLBF 5015, see also example of variant on page 21.

The cages are supplied to the customer's data ready to fit, including cylindrical rollers.



# Linear bearing cage KKFF

Series KKFF needle roller- / flat roller cage

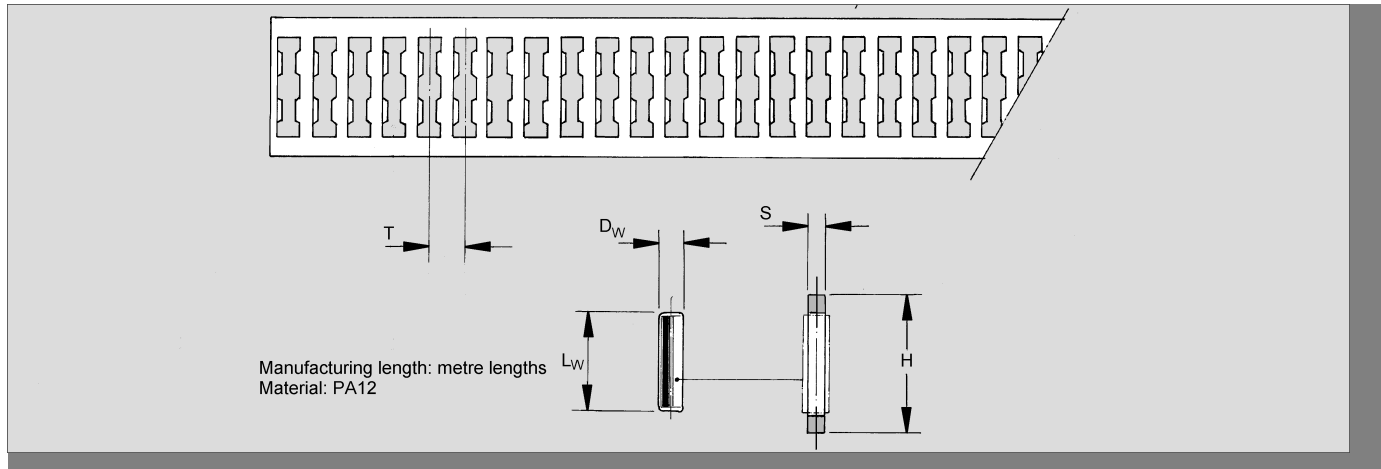
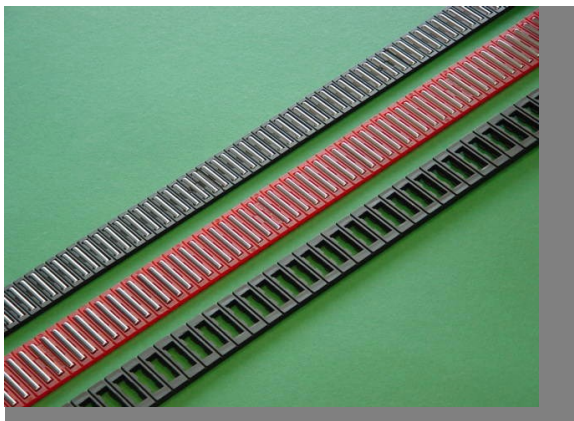


Table of dimensions [dimensions in mm]					
type 1)	needle roller Ø D <sub>w</sub> x L <sub>w</sub>	H	S	T	no. of needle rollers per metre
KKFF 1510	1,5 x 7,8	10	1,1	2,9	344
KKFF 2518	2,5 x 13,8	18	2,0	4,8	208
KKFF 3020	3,0 x 15,8	20	2,5	5,2	192
KKFF 4030	4,0 x 23,8	30	3,0	7,0	142
KKFF 5010	5,0 x 5,0	10	2,5	7,5	133
KKFF 5023	5,0 x 15,0	23	3,5	8,0	125
KKFF 5035	5,0 x 27,8	35	3,5	9,0	111
KKFF 10016	10,0 x 10,0	16	2,5	13,0	77
KKFF 12040	12,0 x 30,0	40	5,0	16,0	62
KKFF 16028	16,0 x 16,0	28	4,0	22,0	45

1) Other dimensions on request

Linear bearing cages of series KKFF are one row plastic cage tapes for rollers or needle rollers. The cage tapes are made in metre lengths and have roller supports.

- Possibilities of supply
- ready to fit, cut, filled with rollers / needle rollers (no minimum quantity limit)
  - metre lengths filled with rollers, for cutting up oneself (no minimum quantity limit)



### Example of order / inquiry

KKFF 3020	/	100 metres
type incl. needle rollers		quantity in metres for cutting up oneself
KKFF 3020	/	0490
type incl. needle rollers	length of cage	quantity ready to fit
	490 mm	
		20 off

# Linear bearing cage KKHW

Series KKHW, angled flat cage

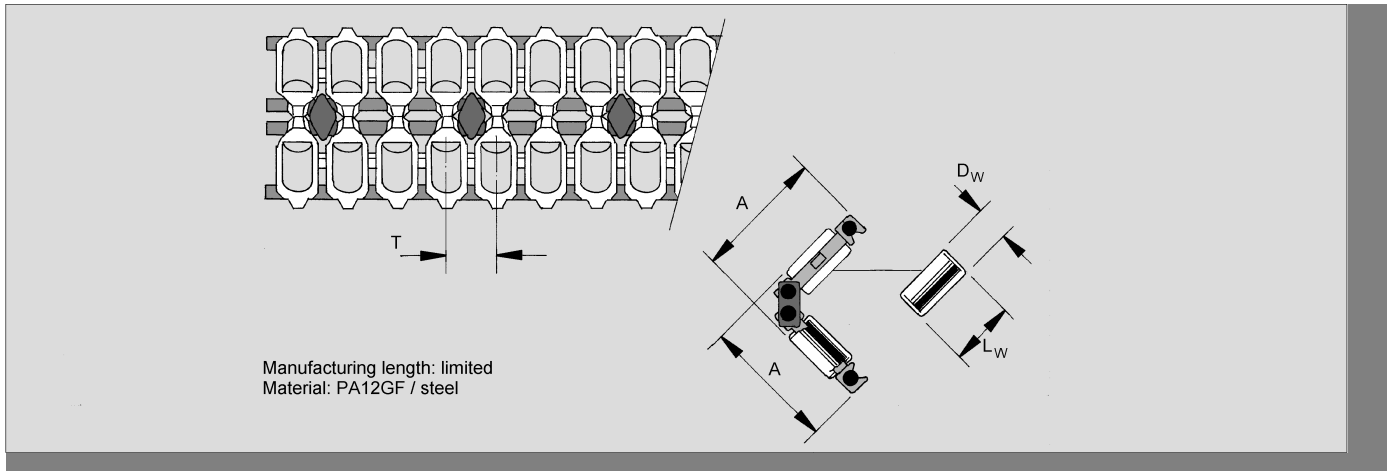
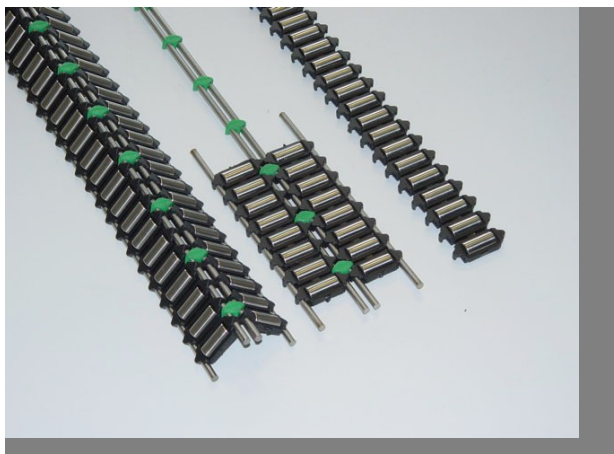


Table of dimensions [dimensions in mm]				
type 1)	roller $\varnothing$ $D_w \times L_w$	A	T	No. of rollers per metre
<b>KKHW 7030</b>	7 x 14	30	11	180

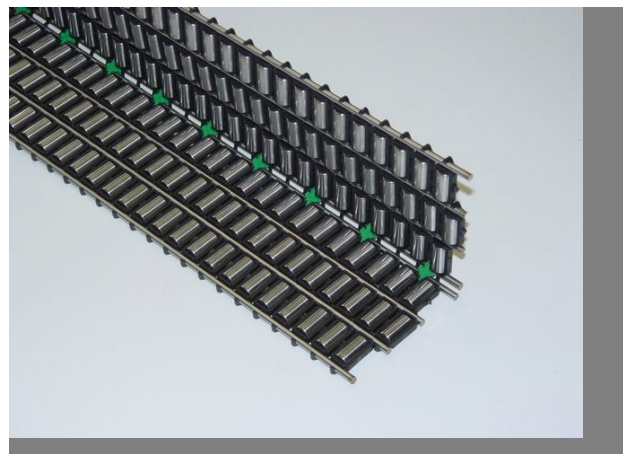
1) Other dimensions on request

Linear bearing cages of series KKHW are single row flat roller cages which are made into angled flat cages by a special support element with fixings. The angle is preferably 90°, but can set to any desired angle.

The shank lengths A with a spacing of 20 mm can be expanded so several row angled flat cages. Angled flat cages are manufactured according to the customers requirements and are supplied ready to fit including rollers.



two row flat cage angled as angled flat cage



multi-row angled flat cage with spacing of 20 mm can be expanded in any number of rows.