The versatile areas of application assume different characteristics from linear guideways and recirculating units. Various parameters and considerations essential for product selection. These are set out in detail below.

11.1 Linear guideways

Relationship between stroke H and length of the guideway L

If the stroke is below 400 mm, the following formula applies:

$$\frac{H}{L} \leq 0.7$$

If the stroke is above 400 mm, the following formula applies:

$$\frac{H}{L} \leq 1$$

L	= Length of the linear guideway in mm
H	= Stroke in mm

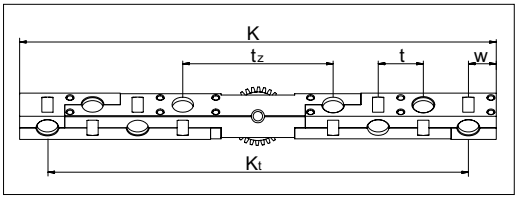
Calculating the cage length K

$$K \leq L - \frac{H}{2}$$

K	= Cage length in mm
L	= Length of the linear guideway in mm
H	= Stroke in mm

The stroke must be limited by means of stops on the table and not by the cages. The stops should preferably be fitted along the axis of symmetry of the guideways to avoid additional forces acting on the linear guideways.

Calculating the number of rolling elements (R_A) per cage



a) For cage types KBN, AC, AK, EE, SHW, HW

$$R_A = \frac{K - 2w}{t} + 1$$

or

$$R_A = \frac{K_t}{t} + 1$$

b) For cage type KBS

$$R_A = \frac{K - (2w + t_z)}{t} + 2$$

K	= Cage length in mm
R_A	= Total available rolling element per cage
w	= Distance from cage start to the middle of the first rolling element in mm
t	= cage division in mm
K_t	= Load-bearing length in mm
t_z	= Length of the middle section for the KBS cage

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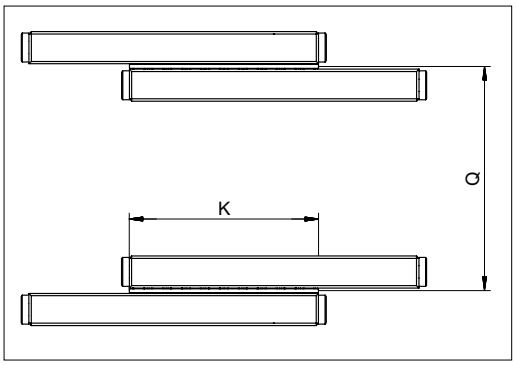
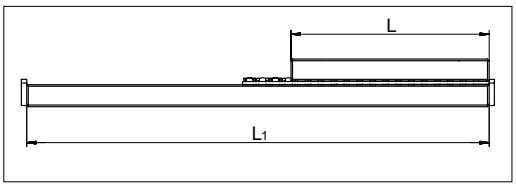
The relationship between the cage length K and the average guideway spacing Q



$$\frac{K}{Q} \geq 1$$

K	= Cage length in mm
Q	= Average linear guideway spacing in mm

The maximum permissible installation ratio in the case of overrunning cages



Overrunning cages are expedient if a short table is to be moved on a long guideway track. In each case the short rail for the guideway must have a rounded run-in (special version EG, see chapter 7.3) so that the overrunning cage causes as little pulsation as possible.

Not every cage is suitable for this application. The maximum cage overrun depends on the position of the rails and on the cage material.

Maximum permitted installation ratios L to L_1:
– for fixed guideways 1 : 2
– for laid on guideways 1 : 4

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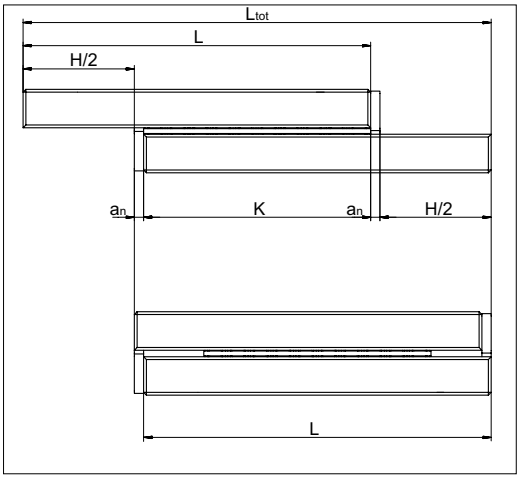
Installation variants for linear guideways with wipers

For different linear guideways wipers can be used in the form of end pieces (a_n). Two installation variants are possible for this. In both instances this results in the following length ratios:



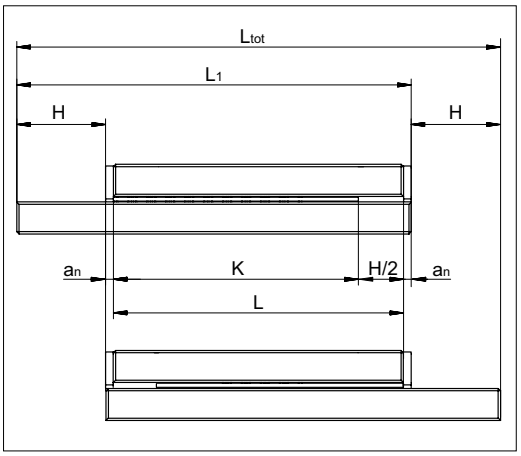
Variant 1

Roller guideways with end pieces/wipers and rails **equal** in length:

$K = L - H/2 - a_n$

$L_{tot} = L + H/2 + a_n$

With this design the linear guideways must be fitted offset by the amount a_n.



Variant 2

Roller guideways with end pieces/wipers and rails **not equal** in length:

$K = L - H/2$

$L_{tot} = L1 + H$ (if the long guideway moves)

$L_{tot} = L1$ (if the short guideway moves)

K	= Cage length in mm
H	= Stroke in mm
L	= Length in mm
L_1	= Length in mm
L_{tot}	= Total length in mm
a_n	= Thickness of the end piece in mm

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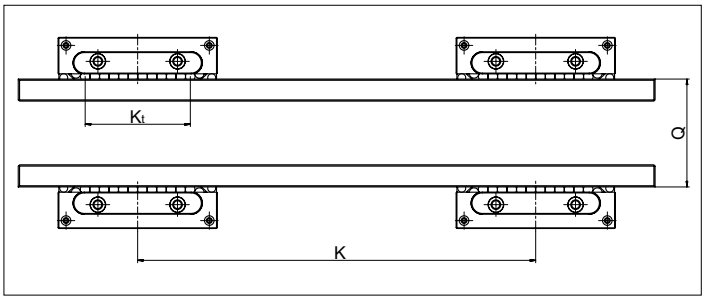
11.2 Recirculating units

When using recirculating units, theoretically there is not restriction in stroke. The stroke is only restricted by the length of the guide rails.



In terms of the spacing K between the recirculating units and the rail spacing Q, the following ratios are recommended as a guideline:

When using **one** recirculating unit per rail: $\frac{K_t}{Q} \geq 1$

When using **more than one** recirculating unit per rail: $\frac{K}{Q} \geq 1$

K	= Spacing between the recirculating units in mm
K_t	= Load-bearing length in mm
Q	= Average rail spacing in mm