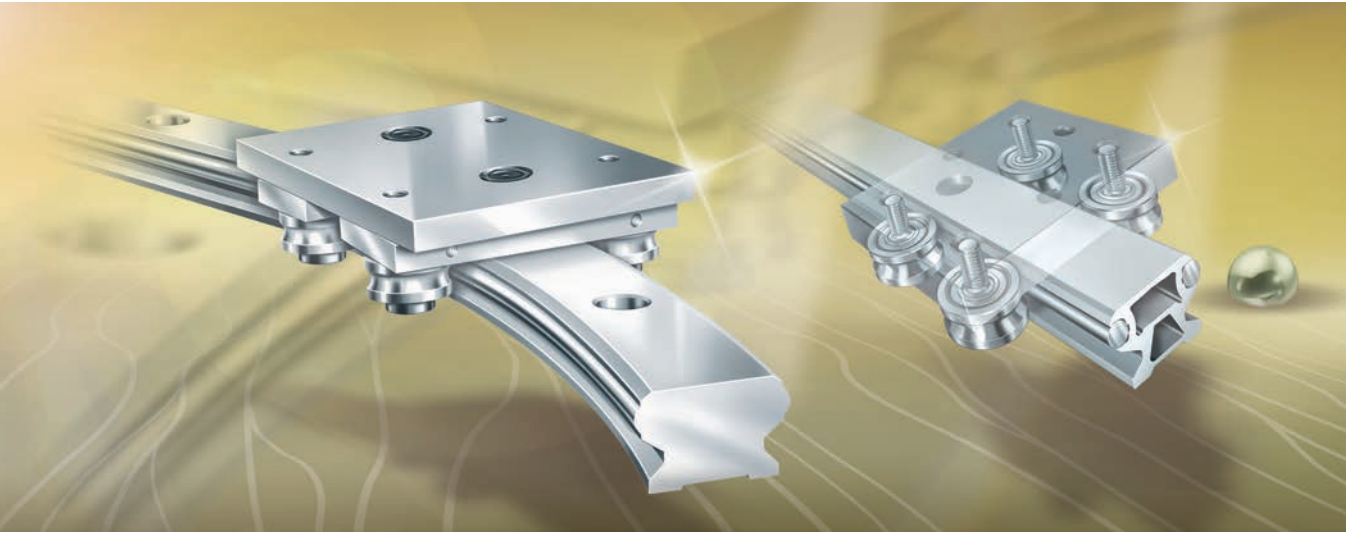


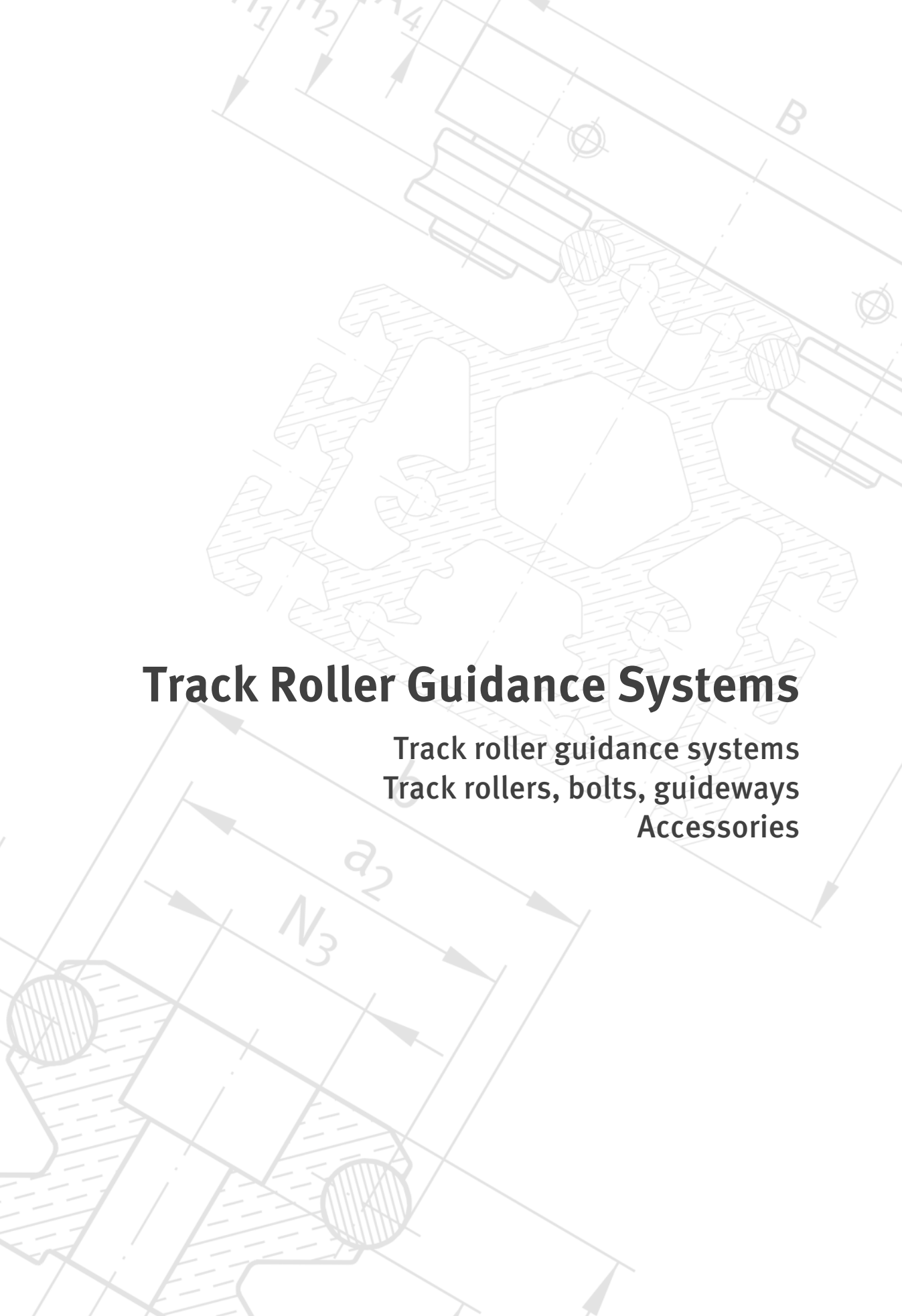


# Track Roller Guidance Systems

Track roller guidance systems  
Track rollers, bolts, guideways  
Accessories

**SCHAEFFLER**



A technical drawing of a track roller guidance system. The drawing shows a cross-section of a track roller assembly. At the top, there are three dimension lines labeled 1, 2, and 4, indicating different parts of the roller. Below these, a large, complex, hatched shape represents the main body of the roller. To the right of this shape, there are two circular features, each with a cross-hatch pattern, representing bolts or pins. Further to the right, there are two more circular features, also with cross-hatch patterns, representing additional bolts or pins. The entire assembly is shown in a perspective view, with a dashed line indicating the internal structure. The background is a light gray with a faint grid pattern.

# Track Roller Guidance Systems

Track roller guidance systems  
Track rollers, bolts, guideways  
Accessories

All data have been prepared with a great deal of care and checked for their accuracy. However, no liability can be assumed for any incorrect or incomplete data. We reserve the right to make technical modifications.

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# Foreword

Track roller guidance systems LF are highly suitable, due to their lightweight construction, for applications in handling systems where low-noise running, high speeds and long travel distances are required together with low, uniform displacement resistance.

## **Economical modular concept**

In order to cover a wide range of requirements using standard components, the guidance systems are structured according to a modular concept. The system elements, namely carriages, composite guideways, track rollers and a precisely matched range of accessories can be combined to achieve designs that are precisely matched to the application.

### **Carriages**

Carriages LF are supplied in the form of:

- economical, lightweight hollow section carriages
- robust open carriages for high performance guidance systems of a simple construction
- enclosed, compact carriages where guidance systems must operate in contaminated environments
- non-locating bearing carriages for locating and non-locating bearing applications with two guidance systems in a parallel arrangement
- bogie carriages for curved tracks or closed oval and circular guidance systems.

### **Guideways**

Composite guideways are available as solid and hollow section guideways, with a support rail of high bending rigidity, as a half guideway, a curved guideway element or a flat design. Guideways with slots for toothed racks or toothed belts are also available.

### **Profiled track rollers**

Profiled track rollers without filling slots are used to guide the carriages and support the forces. These double row angular contact ball bearings have an outer ring with a gothic arch profile raceway, are sealed on both sides and are greased for life. They can support axial loads from both sides and high radial forces due to the thick-walled outer ring.

### **Accessories**

The spectrum of positive characteristics of our track roller guidance systems is completed by a comprehensive, precisely matched range of accessories for the system components.



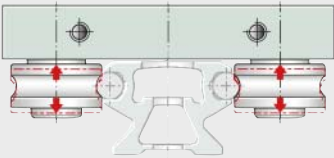
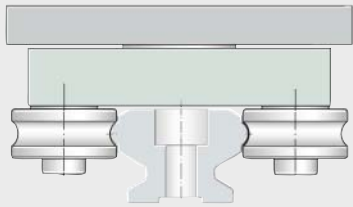
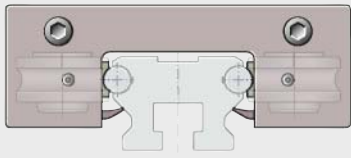
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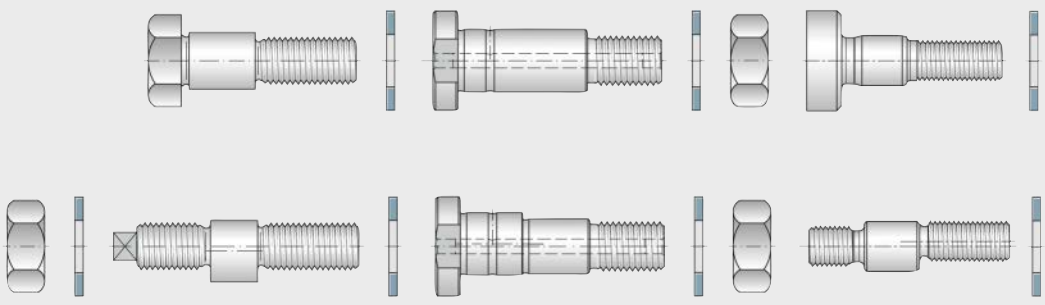
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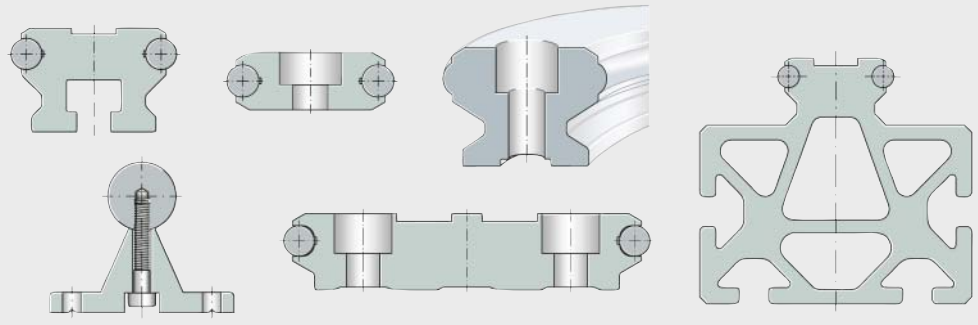
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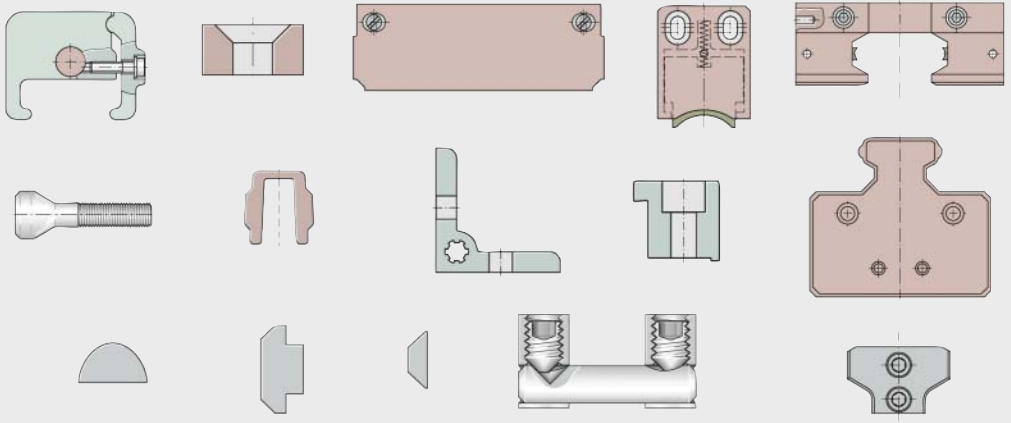
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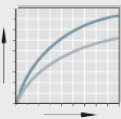
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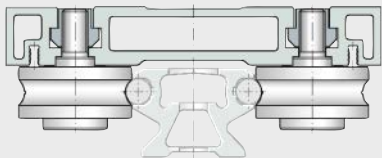


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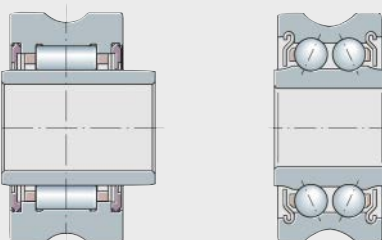
## Technical principles



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### Track roller guidance systems

- With hollow section carriage
- With compact carriage
- With open carriage
- With non-locating bearing carriage
- With bogie carriage



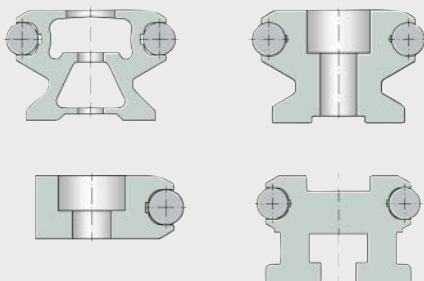
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### Track rollers

- Locating bearing track roller
- Non-locating bearing track roller

### Bolts

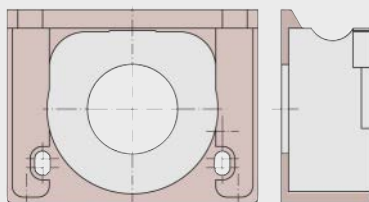
- Concentric
- Eccentric



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### Guideways

- With solid or hollow section profile
- Flat design
- With support rail
- With slots
- Half guideway
- Curved guideway element



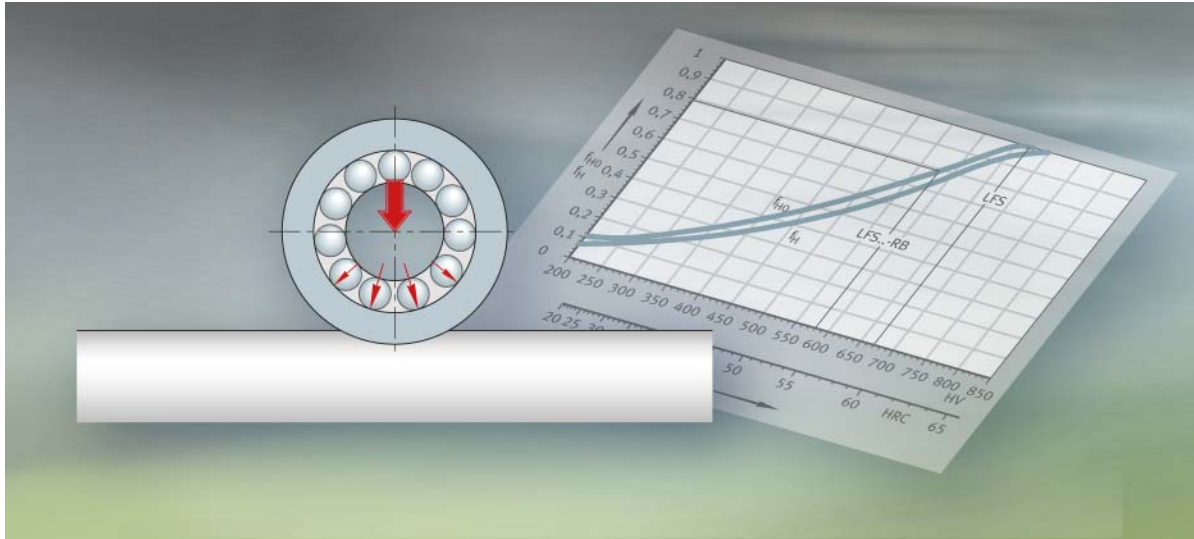
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## Technical principles

- Load carrying capacity and rating life
- Lubrication
- Design of bearing arrangements
- Mounting
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# Technical principles

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# Load carrying capacity and rating life

## Permissible radial loads

The thick-walled outer rings of the track rollers can support high radial loads. If these track rollers are used against a shaft as a raceway, the outer rings undergo elastic deformation, *Figure 1*.

Compared to rolling bearings supported in a housing bore, track rollers have the following characteristics:

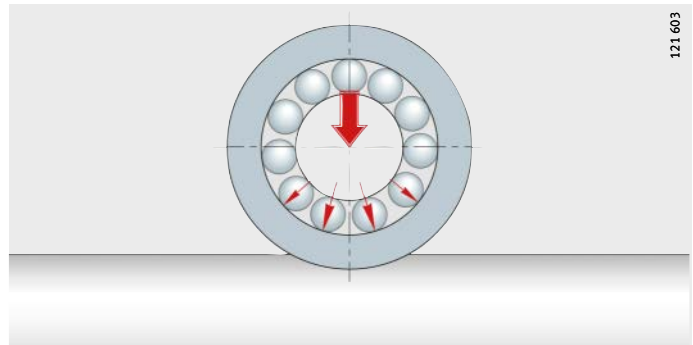
- modified load distribution in the bearing. This is taken into consideration by means of the basic load ratings  $C_{rw}$  and  $C_{0rw}$  used in the calculation of the rating life
- bending stress in the outer ring. This is taken into consideration by means of the permissible radial loads  $F_{r\text{ per}}$  and  $F_{0r\text{ per}}$ . The bending stresses must not exceed the permissible strength values of the material (due to the risk of fracture).

## Permissible radial load under dynamic loading



For rotating bearings under dynamic load, the effective dynamic load rating  $C_{rw}$  is used.  $C_{rw}$  is used to calculate the basic rating life.

The permissible dynamic radial load  $F_{r\text{ per}}$  must not be exceeded. If the basic static load rating  $C_{0rw}$  is lower than the basic dynamic load rating  $C_{rw}$ ,  $C_{0rw}$  is used.



*Figure 1*  
Deformation of the outer ring  
when used against a flat raceway



### Permissible radial load under static loading



For bearings under static load, when stationary or with only infrequent motion, the effective static load rating  $C_{0rw}$  is used.  $C_{0rw}$  is used to calculate the static load safety factor  $S_0$ .

At the same time, the permissible static radial load  $F_{0per}$  must not be exceeded.

In addition to the permissible radial load of the bearing, the permissible radial load of the mating track must also be taken into consideration.

The basic load ratings stated are valid only in conjunction with a shaft as a mating track that is hardened (at least 670 HV) and ground (Ra 0,3).

### Fatigue limit load

The fatigue limit load  $C_{urw}$  is defined as the load below which – under laboratory conditions – no fatigue occurs in the material.

### Calculation of the rating life

The general methods for calculating the rating life are:

- the basic rating life in accordance with DIN ISO 281
- the adjusted rating life in accordance with DIN ISO 281
- the expanded calculation of the adjusted reference rating life in accordance with DIN ISO 281-4.

These methods are described in Catalogue HR 1, Rolling Bearings, in the chapter Load carrying capacity and rating life.

# Load carrying capacity and rating life

## Rating life of track rollers

In comparison with Catalogue HR 1, Rolling Bearings, the following values must be exchanged:

- $C_r = C_{rw}$
- $C_{0r} = C_{0rw}$
- $C_{ur} = C_{urw}$

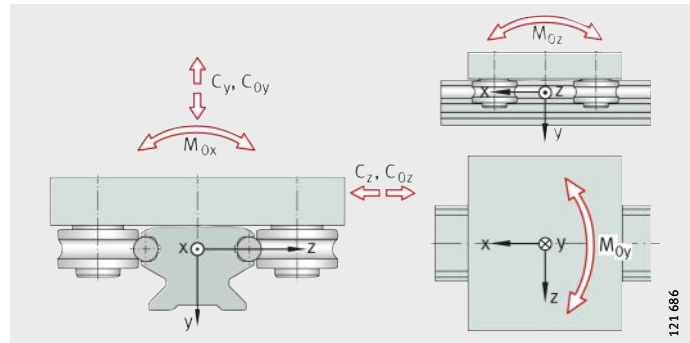
The carriages LFCL, LFL...SF, LFL, LFKL...SF and bogie carriage LFDL contain four track rollers LFR.

The equivalent principle applies here. The corresponding parameters are taken into consideration in the basic load ratings  $C_y$ ,  $C_{0y}$ ,  $C_z$ ,  $C_{0z}$  and the permissible moment ratings  $M_{0x}$ ,  $M_{0y}$  and  $M_{0z}$ .

|                                          |    |
|------------------------------------------|----|
| $C_y$                                    | N  |
| Basic dynamic load rating in y direction |    |
| $C_{0y}$                                 | N  |
| Basic static load rating in y direction  |    |
| $C_z$                                    | N  |
| Basic dynamic load rating in z direction |    |
| $C_{0z}$                                 | N  |
| Basic static load rating in z direction  |    |
| $M_{0x}$                                 | Nm |
| Static moment rating about x axis        |    |
| $M_{0y}$                                 | Nm |
| Static moment rating about y axis        |    |
| $M_{0z}$                                 | Nm |
| Static moment rating about z axis.       |    |

In the case of track rollers with a profiled outer ring, calculation is carried out exclusively by means of the basic rating life to DIN ISO 281.

*Figure 2*  
Load carrying capacity  
and load directions





Other formulae for calculating  
the basic rating life

$$L_s = 0,0314 \cdot D_a \cdot \left( \frac{C_{rw}}{P_r} \right)^p$$

$$L_h = 26,18 \cdot \frac{D_a}{H \cdot n_{osc}} \cdot \left( \frac{C_{rw}}{P_r} \right)^p$$

$$L_h = 52,36 \cdot \frac{D_a}{\bar{v}} \cdot \left( \frac{C_{rw}}{P_r} \right)^p$$

Rating life for carriages  
with four track rollers

$$L_s = \left( \frac{C_y, C_z}{P} \right)^p$$

$$L_h = \frac{833}{H \cdot n_{osc}} \cdot \left( \frac{C_y, C_z}{P} \right)^p$$

$$L_h = \frac{1666}{\bar{v}} \cdot \left( \frac{C_y, C_z}{P} \right)^p$$

- $L_s$   $10^5$  m  
Basic rating life in metres
- $D_a$  mm  
Rolling contact diameter of track roller, see dimension tables
- $C_{rw}, C_y, C_z$  N  
Effective dynamic load rating
- $P_r$  N  
Equivalent dynamic load (radial load)
- $p$  –  
Ball:  $p = 3$ ;  
needle roller (non-locating bearing track roller or carriage):  $p = 10/3$
- $L_h$  h  
Basic rating life in operating hours
- $H$  m  
Single stroke length for reciprocating motion
- $n_{osc}$   $\text{min}^{-1}$   
Number of return strokes per minute
- $\bar{v}$  m/min  
Mean travel velocity
- $P$  N.  
Equivalent dynamic load in the corresponding load direction  
(for applications with combined loads, please contact us).

# Load carrying capacity and rating life

## Operating life

The operating life is the life actually achieved by a rolling bearing. It may differ significantly from the calculated rating life.

This may be due to wear or fatigue as a result of:

- deviations in the operating data
- insufficient or excessive operating clearance (track roller, guideway)
- contamination
- inadequate lubrication
- operating temperature too high or too low
- reciprocating motion with very small stroke length, which can lead to false brinelling
- high vibration load, leading to false brinelling
- very high shock loads (static overloading)
- prior damage during mounting.

Due to the variety of mounting and operating conditions, the operating life cannot be precisely calculated in advance. The most reliable way of arriving at a close estimate is by comparison with similar applications.



### Static load safety factor

The indicator of static loading is the static load safety factor  $S_0$ . This indicates the security against impermissible permanent deformations in the bearing and is determined by means of the following equation:

$$S_0 = \frac{C_{0rw}}{F_{0r}}$$

### Static load safety factor for carriages with four track rollers

$$S_0 = \frac{C_0}{F_0}$$

$$S_0 = \frac{M_0}{M}$$

|                                                                    |    |
|--------------------------------------------------------------------|----|
| $S_0$                                                              | –  |
| Static load safety factor                                          |    |
| $C_{0rw}$                                                          | N  |
| Effective static load rating of track roller, see dimension tables |    |
| $F_{0r}$                                                           | N  |
| Static force acting in radial direction                            |    |
| $C_0$                                                              | N  |
| Basic static load rating of carriage, see dimension tables         |    |
| $F_0$                                                              | N  |
| Static force acting in y and z direction                           |    |
| $M_0$                                                              | Nm |
| Permissible static moment in x, y, z direction                     |    |
| $M$                                                                | Nm |
| Moment acting in load direction ( $M_x, M_y, M_z$ ).               |    |

Track rollers are regarded as heavily loaded at a static load safety factor of  $S_0 < 4$ .

For applications with normal operating conditions, a value  $S_0 > 4$  is required.

When using individual track rollers, for example in conjunction with guideways, the decisive factor where required is the permissible load of the guideway.



Static load safety factors  $S_0 < 1$  cause plastic deformation of the rolling elements and the raceway, which can impair smooth running. This is only permissible for bearings with small rotary motions or in secondary applications.

# Load carrying capacity and rating life

## Minimum load

In order to ensure that the outer ring is driven, that no slippage occurs and that the track roller does not lift from the mating track, the track rollers must be subjected to a minimum load in dynamic operation.



In general, the minimum load is calculated using the ratio  $C_{0rw}/F_r < 60$ .

## Differences in raceway hardness

If shafts with a lower surface hardness are used (such as X46, X90), a hardness factor must be applied, see equations and *Figure 3*.

$$C_H = f_H \cdot C$$

$$C_{0H} = f_{H0} \cdot C_0$$

$C_H$  N  
Effective dynamic load rating

$f_H$  –  
Dynamic hardness factor

$C$  N  
Basic dynamic load rating

$C_{0H}$  N  
Effective static load rating

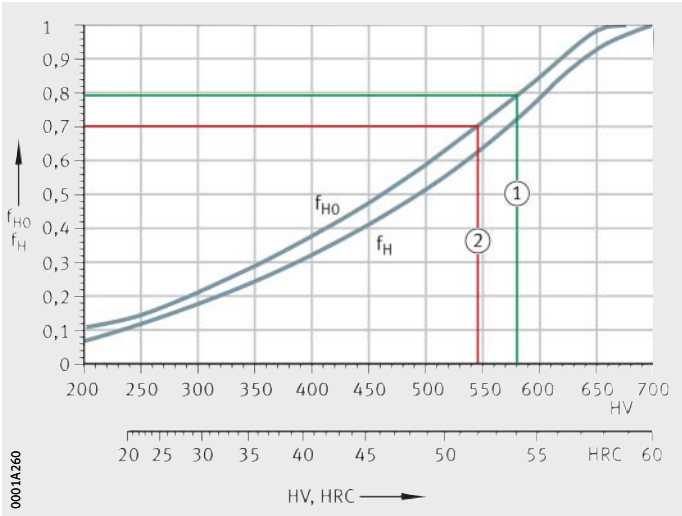
$f_{H0}$  –  
Static hardness factor

$C_0$  N  
Basic static load rating.

$f_{H0}, f_H$  = hardness factor  
HV, HRC = surface hardness

- ① LFS...RB, W...X90
- ② W...X46

*Figure 3*  
Static and dynamic hardness factors  
for lower hardness of raceways





# Lubrication

## Lubrication of guideway raceways

The guideway raceways must be lubricated (even before first use). Lubrication can be carried out by means of lubrication and wiper units.

These units are already integrated in the compact carriage LFKL...SF. For carriages LFL...SF and LFCL, the lubrication and wiper unit AB, see page 109, is available as an accessory.

The guideway raceway is lubricated by an oil-soaked felt insert. Oil can be fed to the felt inserts via lubrication nipples in the end faces. At delivery, the felt inserts are already soaked with oil (H1 approval for the food industry), where relubrication is to be carried out an oil of viscosity  $\nu = 460 \text{ mm}^2/\text{s}$  is recommended.

## Lubrication intervals

The lubrication intervals for guideway raceways are dependent on the environmental influences. The cleaner the environment, the smaller the quantity of lubricant required. The time and quantity can only be determined precisely under operating conditions since it is not possible to determine all the influences by calculation. An observation period of adequate length must be allowed.



Fretting corrosion is a consequence of inadequate lubrication and is visible as a reddish discolouration of the mating track or outer ring. Inadequate lubrication can lead to permanent system damage and therefore to failure. It must be ensured that the lubrication intervals are reduced accordingly in order to prevent fretting corrosion.

In general, a thin film of oil should always be present on the shaft.

## Lubrication of track rollers

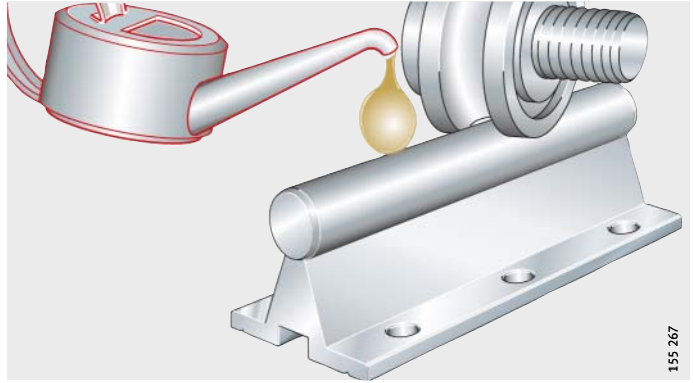
At delivery, track rollers LFR have an initial greasing of a high quality lithium soap grease.

From LFR5204-16, the inner ring has a relubrication hole. Track rollers of smaller diameters are lubricated for life.

# Lubrication

## Further information on lubrication

Further information can be found in Catalogue HR 1, Rolling Bearings, in the chapter Lubrication.



*Figure 1*

Lubrication of guideway raceways



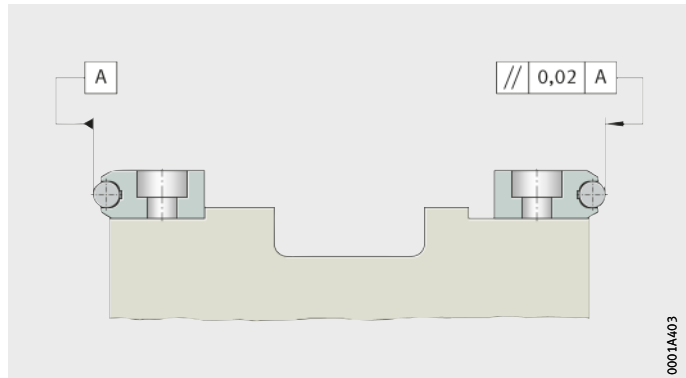
# Design of bearing arrangements

## Requirements for the adjacent construction

The running accuracy of the linear guidance system is essentially dependent on the straightness, accuracy and rigidity of the mounting surfaces.

The higher the requirements for accuracy and smooth running of a track roller guidance system, the more attention must be paid to the geometrical and positional accuracy of the adjacent construction. The adjacent surfaces should be flat and have parallel faces.

For two guideways, we recommend a parallelism according to *Figure 1*.



*Figure 1*  
Parallelism of guideways

## Shaft creep

Under unfavourable conditions, shaft creep of a few millimetres may occur in isolated cases. This creep may occur mainly in applications with high accelerations in conjunction with high alternating loads and guideways that are not completely supported. It may also be caused by an adjacent construction that is too soft.

In such cases, shaft creep can be prevented by the use of end plates ANS.LFS, see dimension table page 115. They can be supplied already mounted.

## Displacement force

The displacement force is dependent on the preload, the lubrication and the particular application. It is therefore not possible to make generally valid statements.

# Design of bearing arrangements

## Location of carriages and guideways

If lateral loads are present, it is recommended that the guideways and carriages should be located against locating surfaces. In the case of guideways comprising multiple sections joined together, it is recommended that the guideways should be aligned by means of the shaft. If necessary, the shafts should be located on the adjacent construction by means of dowels.

If two guideways are arranged in parallel, the first guideway should be clamped against a stop, *Figure 1*, page 21. The second guideway should then be aligned accordingly. Any gaps between the guideway and the adjacent construction should be filled with synthetic resin.

## Track roller guidance systems in accordance with customer specifications

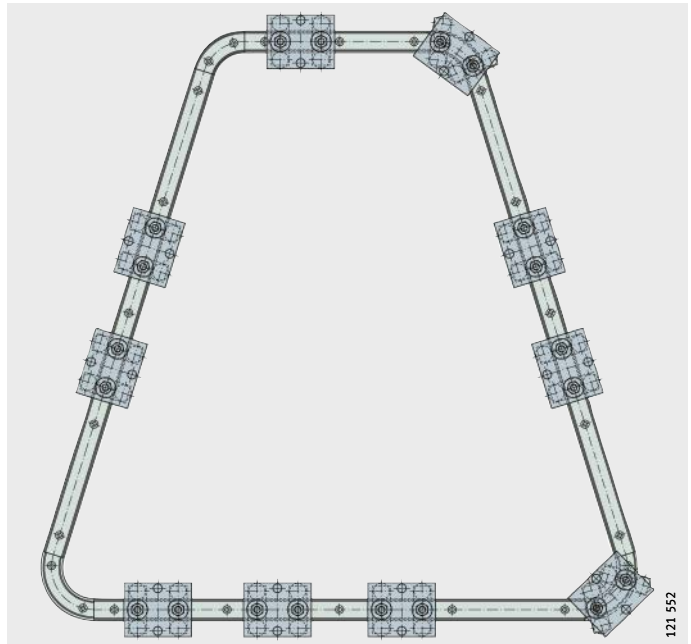
The INA track roller guidance systems with curved guideway elements can be used to achieve an extremely wide variety of applications, *Figure 2* and *Figure 3*, page 23.

If the arrangement required cannot be represented using the standard ordering designation, a customer drawing must be submitted with the enquiry.

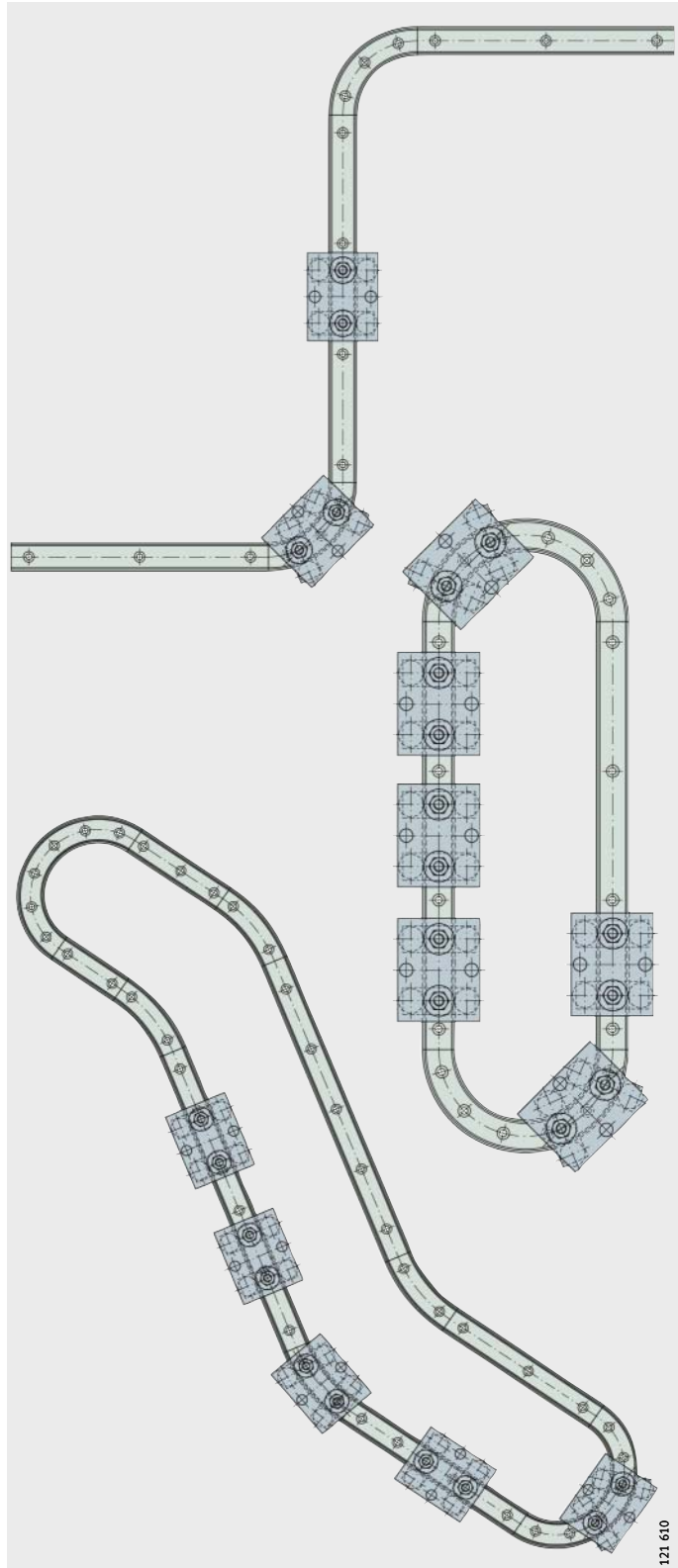
For arrangements with curved guideway elements, it is recommended that the guideway connectors VBS should be used at the joints, see page 114. This gives considerably easier mounting.



Standard oval tracks are always supplied with guideway connectors VBS, see page 102.



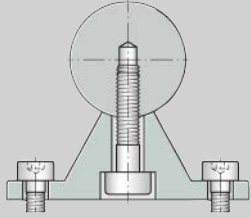
*Figure 2*  
Arrangement according  
to customer requirements



121 610

# Design of bearing arrangements

## Possible combinations of profiled track rollers with guideways

| Guideways                                                                          |              |                            |    |     |
|------------------------------------------------------------------------------------|--------------|----------------------------|----|-----|
|  |              |                            |    |     |
| Shaft diameter<br>mm                                                               | Fixing screw | Load case, <i>Figure 4</i> |    |     |
|                                                                                    |              | I                          | II | III |
| 12                                                                                 | DIN ISO 4762 | ■                          | –  | –   |
|                                                                                    | DIN 7984     | ■                          | ■  | ■   |
| 16                                                                                 | DIN ISO 4762 | ■                          | –  | –   |
|                                                                                    | DIN 7984     | ■                          | –  | –   |
| 20                                                                                 | DIN ISO 4762 | ■                          | –  | –   |
|                                                                                    | DIN 7984     | ■                          | –  | –   |
| 25                                                                                 | DIN ISO 4762 | ■                          | ■  | ■   |
|                                                                                    | DIN 7984     | ■                          | ■  | ■   |
| 30                                                                                 | DIN ISO 4762 | ■                          | –  | –   |
|                                                                                    | DIN 7984     | ■                          | ■  | ■   |
| 40                                                                                 | DIN ISO 4762 | ■                          | ■  | ■   |
|                                                                                    | DIN 7984     | ■                          | ■  | ■   |
| 50                                                                                 | DIN ISO 4762 | ■                          | ■  | ■   |
|                                                                                    | DIN 7984     | ■                          | ■  | ■   |

- combination possible if the rail is located using the stated screw
- combination possible
- combination possible if  $t \leq t_{\max}$  and  $b \leq b_{\max}$
- please contact us

1) With AB.W:  $t_{\max} = 2,5$ .



| TSUW                   |                        |                     |    |                 | TSSW                                 |                     |    |     | TSMW                |    |     |
|------------------------|------------------------|---------------------|----|-----------------|--------------------------------------|---------------------|----|-----|---------------------|----|-----|
| t <sub>max</sub><br>mm | b <sub>max</sub><br>mm | Load case, Figure 4 |    |                 | t <sub>max</sub><br>mm <sup>1)</sup> | Load case, Figure 4 |    |     | Load case, Figure 4 |    |     |
|                        |                        | I                   | II | III             |                                      | I                   | II | III | I                   | II | III |
| 5                      | 5                      | ●                   |    | ○ <sup>1)</sup> | –                                    | –                   | –  | –   | –                   | –  | –   |
| –                      | –                      | ●                   | –  | –               | –                                    | –                   | –  | –   | –                   | –  | –   |
| –                      | –                      | ●                   | –  | –               | –                                    | ●                   | –  | –   | ●                   | –  | –   |
| 10                     | 12                     | ●                   | ●  | ○               | 36                                   | ●                   | ●  | ●   | ●                   | ●  | ●   |
| 12                     | 16                     | ●                   | ●  | ○               | 42                                   | ●                   | ●  | ●   | ●                   | ●  | ●   |
| 10                     | –                      | ●                   | ●  | ○               | 50                                   | ●                   | ●  | ●   | –                   | –  | –   |
| 13                     | –                      | ●                   | ●  | ○               | 70                                   | ●                   | ●  | ●   | –                   | –  | –   |

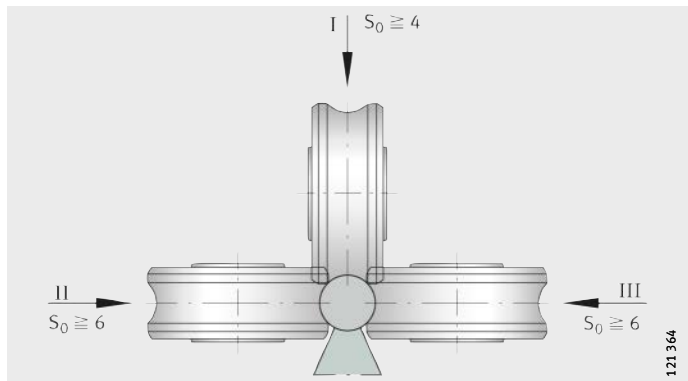


For the combination, take account of:

- the static load safety factor  $S_0$ , see page 17
- the load cases, Figure 4
- a shaft hardness of 670 HV.

$$S_0 = C_{0W}/P_0$$

Figure 4  
Load cases I, II and III



# Mounting

## Delivered condition

Carriages are delivered with the track rollers fitted. All the bolts are tightened to the required tightening torque.

## Carriages

For carriages, this gives:

- hollow section carriage LFCL;  
clearance-free, with mounting of accessories as necessary
- compact carriage LFKL...-SF;  
clearance-free, with mounting of lubrication and wiper unit as necessary
- non-locating bearing carriage LFL...-SF;  
clearance-free, with mounting of accessories as necessary
- open carriage LFL...-SF;  
clearance-free, with mounting of accessories as necessary
- bogie carriage LFDL...-SF (-B);  
LFDL...-SF clearance-free, with mounting of accessories as necessary. In the case of LFDL...-B, the clearance must be set by means of eccentrics.

## Mounting of guidance system with one guideway

Mounting of guidance system with one guideway:

- Place the guideway on the adjacent construction and screw mount finger tight.
- Align the guideway; if necessary, clamp the shaft against the locating edge and screw mount firmly, observing the tightening torques.
- Clearance-free carriages: slide the carriage onto the guideway.
- Carriages with adjustable clearance: if lateral load is present, ensure that the principal load is supported by the concentric bolts.
- Position and screw mount the adjacent construction.



## Mounting of guidance system with two guideways

Mounting of guidance system with two guideways:

- Position the first guideway, clamp it against the locating edge and tighten the screws.
- Position the second guideway and screw mount finger tight.
- Slide the carriage onto the guideway, set the clearance as necessary, *Figure 2*, page 28.
- Position the adjacent construction, align the carriage and screw mount firmly; observe the tightening torques  $M_A$ , see table, page 29.
- Align the second guideway with the aid of the table, move the table several times during this operation.
- Tighten the fixing screws in the guideway; tightening torques  $M_A$ , see table, page 29.

Where necessary, form fit can be achieved between the guideways and adjacent construction by means of synthetic resin or strips.

## Mounting of curved guideway elements and oval tracks

Mounting of curved guideway elements and oval tracks:

- Assemble the curved guideway elements or oval tracks.
- Position the assembled elements precisely on the adjacent construction and fix in place by means of clamps.
- Transfer the hole pattern for the fixing holes to the adjacent construction.
- Remove the elements and make the fixing holes in the adjacent construction.
- Position the elements on the adjacent construction again and tighten the fixing screws; observe the tightening torques  $M_A$ , see table, page 29.

## Mounting of bogie carriage

Slide the clearance-free carriage LFDL...-SF onto the guideway. No setting of clearance is required, *Figure 1*, page 28.



The bogie carriage LFDL...-SF cannot be mounted on closed ring systems, in this case use the clearance-free bogie carriage LFDL...-B.

## Carriages with adjustable clearance

Slide the carriage LFDL...-B onto the guideway and set in position without load. Rotate the eccentric bolts using an open-end wrench or ring wrench so that the track rollers are set against the raceway, observing the direction of rotation, *Figure 2*, page 28.

Tighten the hexagon nuts to the tightening torque  $M_A$ ; tightening torques, see table, page 29.



The track rollers must be easily movable and clearance-free. If they are set in place too firmly, this will generate preload that reduces the life of the guidance system.

# Mounting

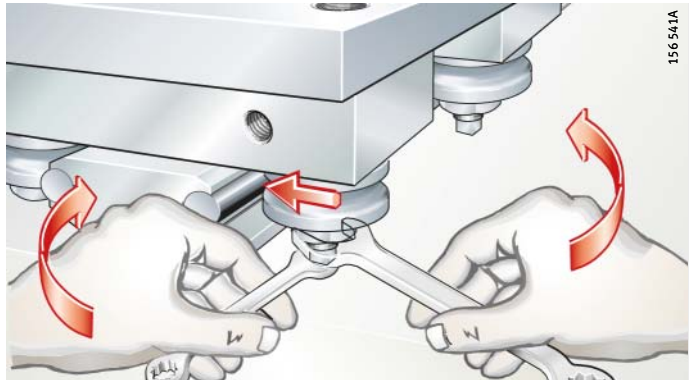
## Inspection

Check the adjustment. The guidance system is correctly adjusted if, when the carriages are moved, all the track rollers rotate and the carriages can be moved easily.

The concentric bolts are tightened to the necessary tightening torque, the eccentric bolts are tightened finger tight. When setting the preload, these must be tightened to the tightening torque  $M_A$ , see table Tightening torques for track roller bolts, page 29.



*Figure 1*  
Clearance-free carriage LFDL...-SF



*Figure 2*  
Carriage with adjustable  
clearance LFDL...-B



**Tightening torques  
for track roller bolts**

| Track roller,<br>profiled track roller | Bolt    | Tightening torque<br>$M_A$ |                  |
|----------------------------------------|---------|----------------------------|------------------|
|                                        |         | Standard (-2Z)<br>Nm       | RB (-2RSR)<br>Nm |
| LFR50/5-4                              | M4      | 2,5                        | 2,5              |
| LFR50/5-6                              | M4      | 2,5                        | 2,5              |
| LFR50/8-6                              | M8      | 15                         | 12               |
| LFR5201-10                             | M10     | 40                         | 23               |
| LFR5301-10                             | M10     | 40                         | 23               |
| LFR5302-10                             | M12     | 70                         | 39               |
| LFR5201-12                             | M10     | 40                         | 23               |
| LFR5204-16                             | M16×1,5 | 100                        | 75               |
| LFR5206-20                             | M20×1,5 | 200                        | 100              |
| LFR5206-25                             | M20×1,5 | 200                        | 100              |
| LFR5207-30                             | M24×1,5 | 300                        | 150              |
| LFR5208-40                             | M30×1,5 | 600                        | 310              |
| LFR5308-50                             | M30×1,5 | 800                        | 410              |

**Tightening torques  
for screws in carriage  
according to DIN ISO 4762-8.8**

| Screw | Tightening torque<br>$M_A$<br>Nm |
|-------|----------------------------------|
| M5    | 5,8                              |
| M6    | 9,9                              |
| M8    | 24                               |
| M10   | 48                               |
| M12   | 83                               |

**Tightening torques  
for screws in guideways LFS  
according to DIN ISO 4762-8.8 or  
DIN 7984-8.8**

| Screw | Tightening torque<br>$M_A$<br>Nm |
|-------|----------------------------------|
| M5    | 5,8                              |
| M6    | 9,9                              |
| M8    | 24                               |
| M10   | 48                               |
| M12   | 83                               |

# Accuracy

## Accuracy of guideways LFS

Data on the straightness, parallelism (differential measurement), length and positional tolerances of guideways are given in the following tables and figures, *Figure 1* to *Figure 5*, page 32.

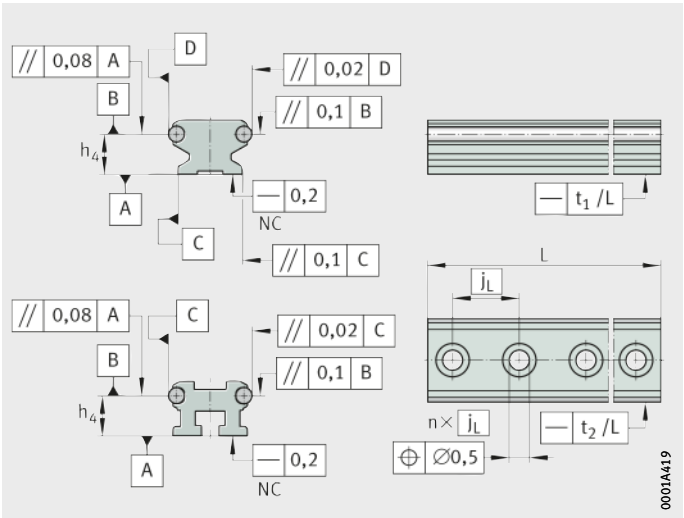
The guideways are precision straightened and the tolerances are better than DIN EN 12020.

### Length tolerance

| Length<br>L<br>mm      |                          | Tolerance<br>mm |
|------------------------|--------------------------|-----------------|
| Single-piece guideways | $L < 1\,000$             | $\pm 2$         |
|                        | $1\,000 \leq L < 2\,000$ | $\pm 3$         |
|                        | $2\,000 \leq L < 4\,000$ | $\pm 4$         |
|                        | $4\,000 \leq L$          | $\pm 5$         |
| Multi-piece guideways  | Total length L           | $\pm 0,1\%$     |

### Straightness tolerance for guideways

| Length of guideway       | Tolerance                     |                          |
|--------------------------|-------------------------------|--------------------------|
|                          | $t_1$<br>(contact face)<br>mm | $t_2$<br>(lateral)<br>mm |
| $L < 1\,000$             | 0,5                           | 0,2                      |
| $1\,000 \leq L < 2\,000$ | 1                             | 0,3                      |
| $2\,000 \leq L < 3\,000$ | 1,5                           | 0,4                      |
| $3\,000 \leq L < 4\,000$ | 2                             | 0,5                      |
| $4\,000 \leq L < 5\,000$ | 2,5                           | 0,6                      |
| $5\,000 \leq L < 6\,000$ | 3                             | 0,7                      |
| $6\,000 \leq L < 7\,000$ | 3,5                           | 0,8                      |
| $7\,000 \leq L < 8\,000$ | 4                             | 0,9                      |

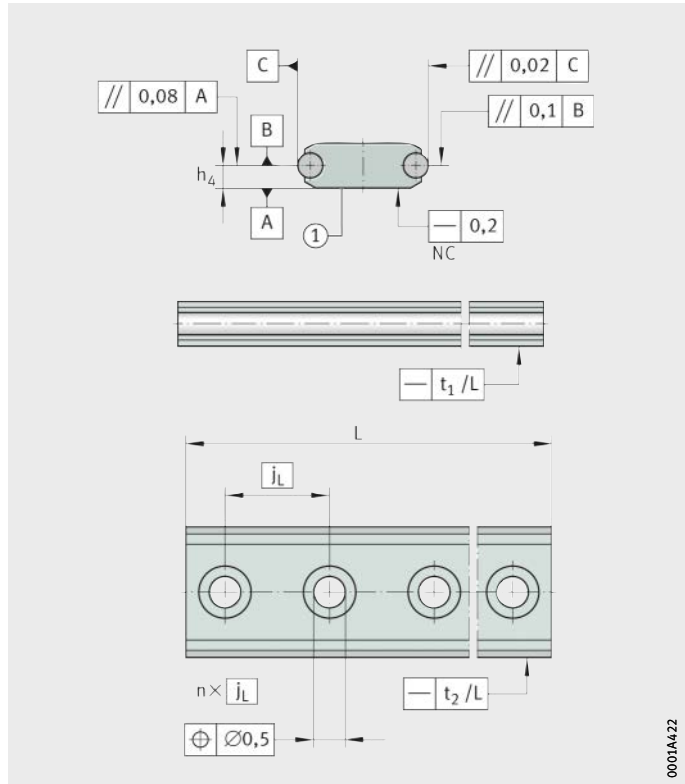


*Figure 1*  
Tolerances for guideways  
LFS, LFS..-C, LFS..-NZZ, LFSR..-ST



① Contact face indicated by slot

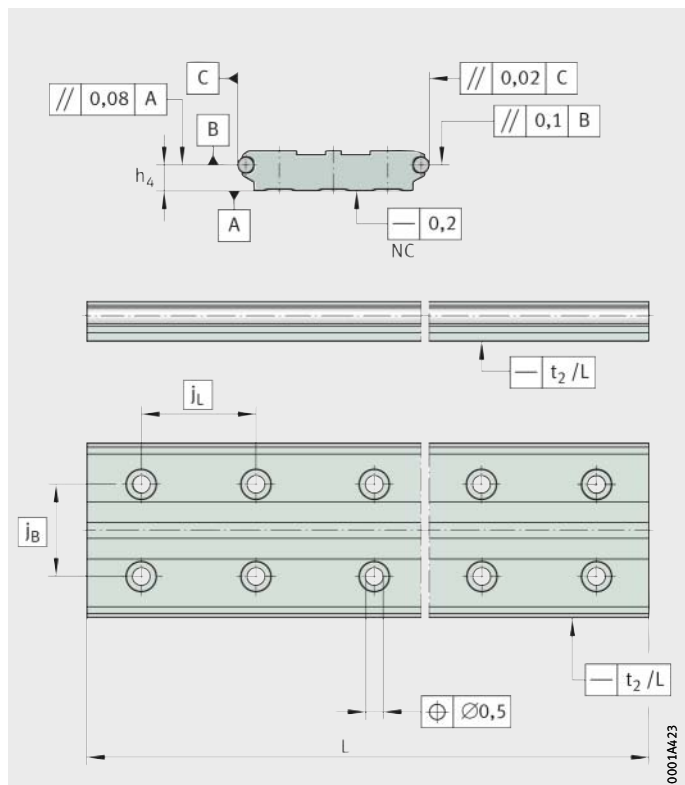
*Figure 2*  
Guideway LFS...-F



0001A422

Parallelism determined  
by differential measurement

*Figure 3*  
Guideway LFS120

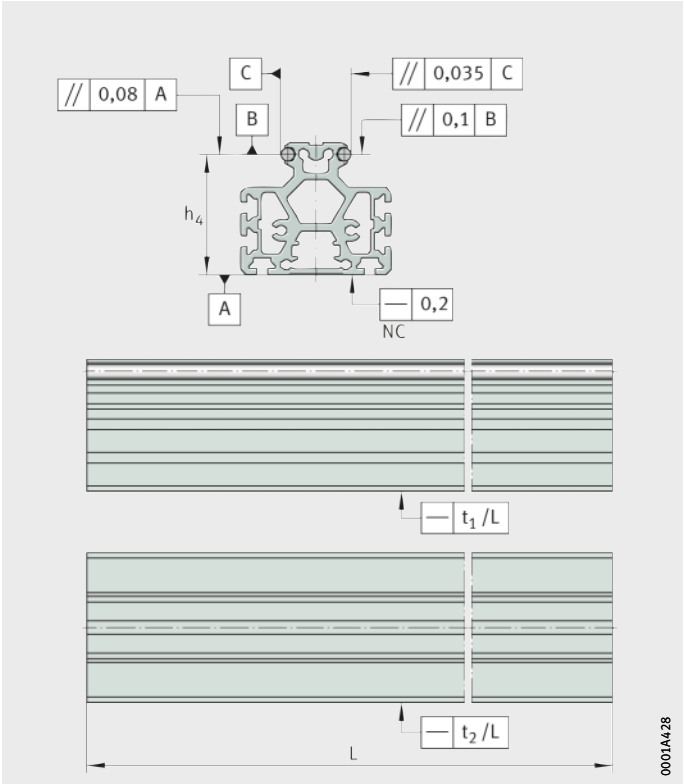


0001A423

# Accuracy

Parallelism determined by differential measurement

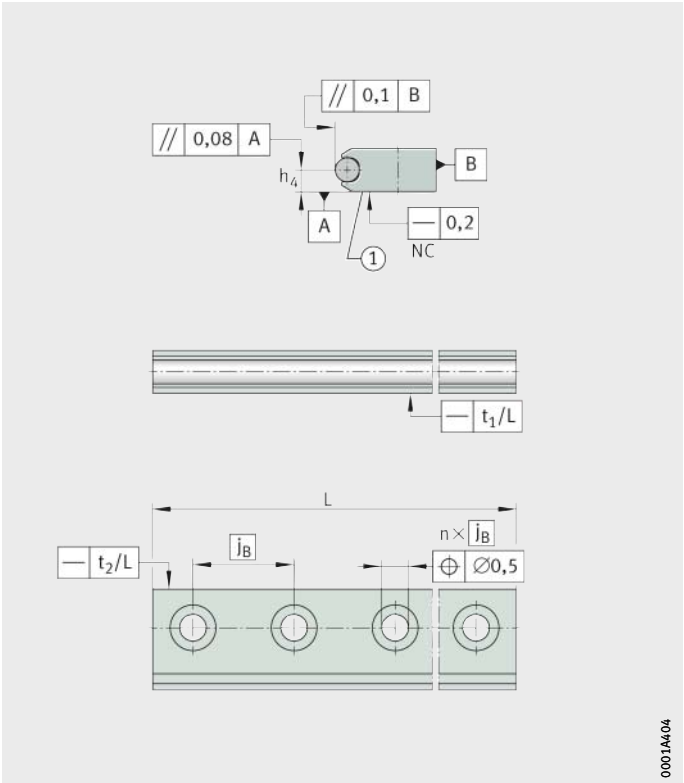
Figure 4  
Guideway LFS...-M



0001A428

① Contact face indicated by slot

Figure 5  
Guideway LFS...-FH



0001A404



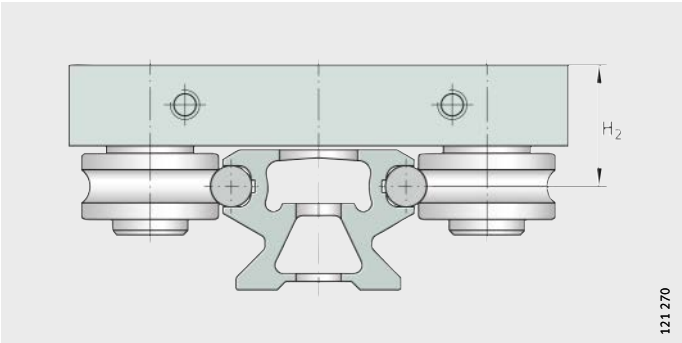
**Tolerances for  $H_2$  and  $h_4$**

Tolerances for  $H_2$  and  $h_4$ , see table, *Figure 6* and *Figure 7*.

| Guideway  | Tolerance for |             |
|-----------|---------------|-------------|
|           | $H_2$<br>mm   | $h_4$<br>mm |
| LFS20     | +0,3          | -0,1        |
| LFS25     |               | -0,1        |
| LFS25-M   |               | $\pm 0,25$  |
| LFS32     |               | +0,2        |
| LFS32-C   |               | +0,2        |
| LFS32-N   |               | +0,2        |
| LFS32-F   |               | +0,1        |
| LFS32-M   |               | $\pm 0,25$  |
| LFS32-FH  |               | +0,1        |
| LFS42-C   |               | +0,2        |
| LFS42-F   |               | +0,1        |
| LFS52     |               | +0,2        |
| LFS52-C   |               | +0,2        |
| LFS52-NZZ |               | +0,2        |
| LFS52-F   |               | +0,1        |
| LFS52-M   |               | +0,5        |
| LFS52-FH  |               | +0,1        |
| LFS86-C   |               | +0,25       |
| LFS120    |               | +0,2        |

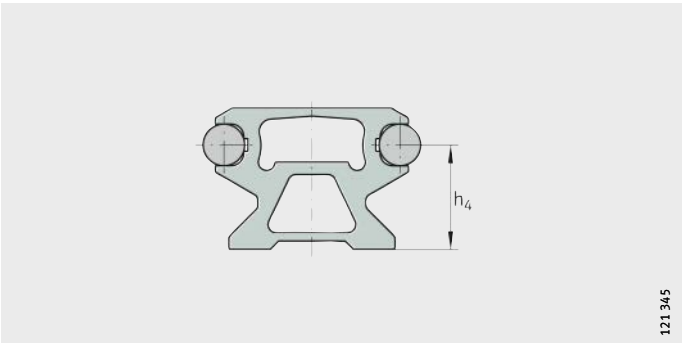
Tolerance for  $H_2 = +0,3$  mm

*Figure 6*  
Reference dimension for accuracy,  
dimension  $H_2$



121 270

*Figure 7*  
Reference dimension for accuracy,  
dimension  $h_4$



121 345

## Ordering example, ordering designation

### Ready-to-fit systems

The elements of the track roller guidance systems (such as the carriage, guideway) must be ordered separately.

Carriages should be regarded as a unit, including the track rollers and bolts.

Carriages and guideways can be used in any combination and can be ordered independently of each other.

### Ordering example

Track roller guidance system of corrosion-resistant design with open carriage LFL52-E-SF, *Figure 1* and *Figure 2*.

|          |                     |      |
|----------|---------------------|------|
| Carriage | Carriage            | LFL  |
|          | Size                | 52-E |
|          | Clearance-free      | SF   |
|          | Corrosion-resistant | RB   |

Ordering designation **LFL52-E-SF-RB**



*Figure 1*  
Open carriage LFL52-E-SF

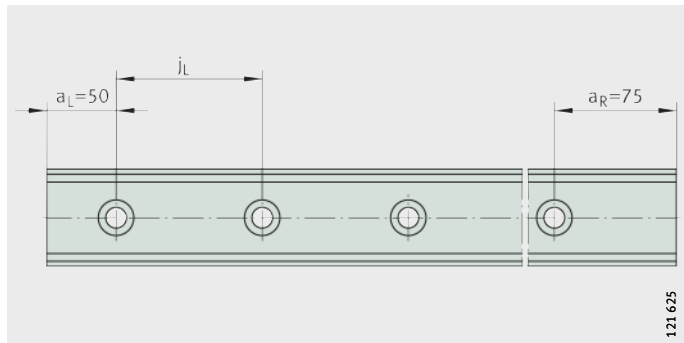
121 660



Guideway Hollow section guideway LFS52-CE, length 1500 mm,  $a_L = 50$  mm,  $a_R = 75$  mm, corrosion-resistant design, *Figure 2*:

|                      |         |
|----------------------|---------|
| Guideways            | LFS     |
| Width of guideway    | 52 mm   |
| Length of guideway l | 1500 mm |
| Design               | CE      |
| Corrosion-resistant  | RB      |
| Spacing $a_L$        | 50 mm   |
| Spacing $a_R$        | 75 mm   |

Ordering designation **LFS52×1500-CE-RB-50/75**



*Figure 2*  
Guideway LFS52-CE

# Ordering example, ordering designation

## Closed oval tracks

Oval track with two 180° arcs

|                              |          |
|------------------------------|----------|
| Guideways                    | LFS      |
| Width of guideways $b$       | 52 mm    |
| Length of straight guideways | 2 000 mm |
| Closed oval track            | OV       |
| Radius of arc $r$            | 300 mm   |

Ordering designation

Without guideway connectors VBS, *Figure 3*

**1×LFS52×2000-OV-300**

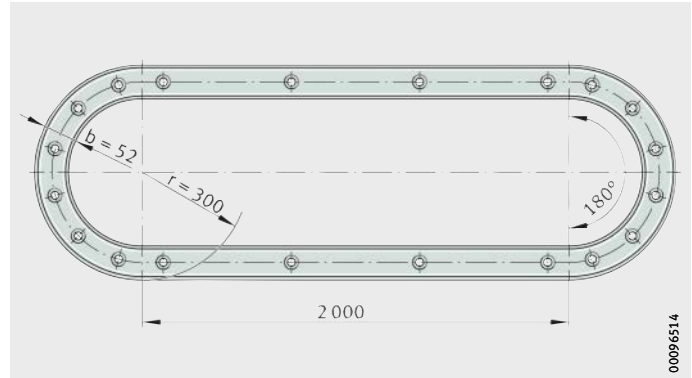
With guideway connectors VBS, *Figure 4*

**1×LFS52×2000-OV-300-VBS**

$b$  = width of guideways  
 $r$  = radius of arc

*Figure 3*

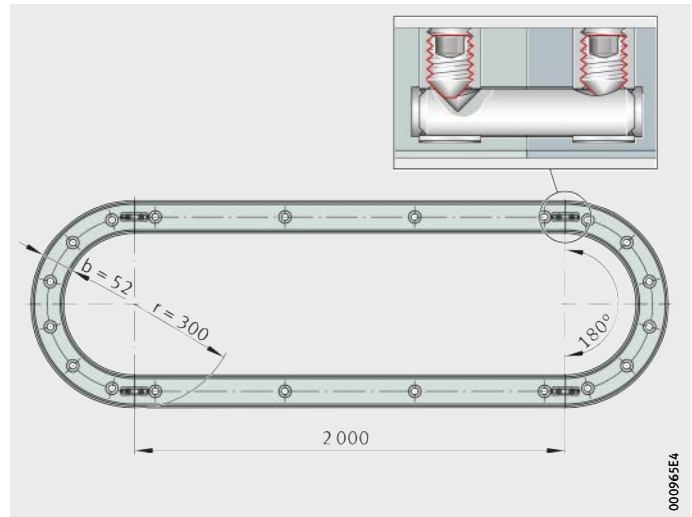
Closed oval track with 180° arcs  
LFS52×2000-OV-300



$b$  = width of guideways  
 $r$  = radius of arc

*Figure 4*

Closed oval track with 180° arcs and  
guideway connectors VBS  
LFS52×2000-OV-300-VBS





Oval track with four 90° arcs

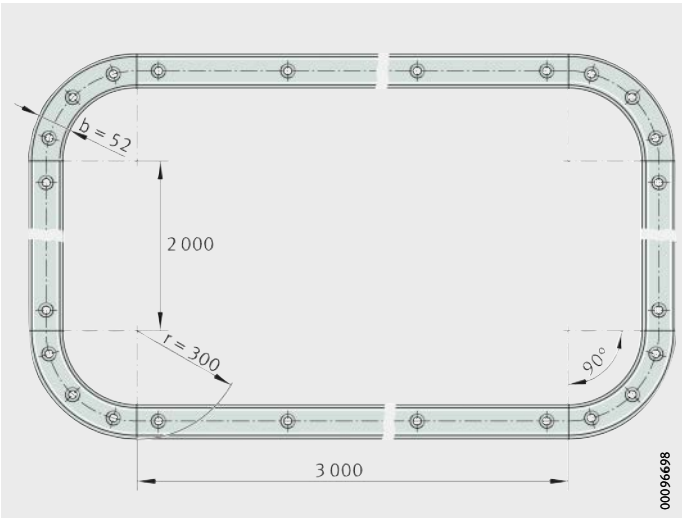
|                              |          |
|------------------------------|----------|
| Guideways                    | LFS      |
| Width of guideways b         | 52 mm    |
| Length of straight guideways |          |
| 1st straight guideway        | 2 000 mm |
| 2nd straight guideway        | 3 000 mm |
| Closed oval track            | OV       |
| Radius of arc r              | 300 mm   |

Ordering designation

Without guideway connectors VBS, *Figure 5*  
**1×LFS52×2000×3000-OV-300**  
 With guideway connectors VBS, *Figure 6*  
**1×LFS52×2000×3000-OV-300-VBS**

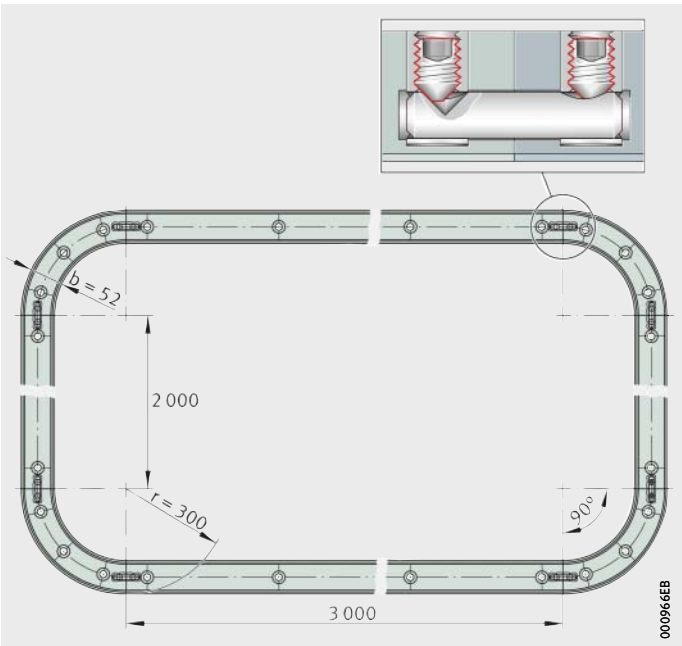
b = width of guideways  
 r = radius of arc

*Figure 5*  
 Closed oval track with 90° arcs  
 LFS52×2000×3000-OV-300



b = width of guideways  
 r = radius of arc

*Figure 6*  
 Closed oval track with 90° arcs and  
 guideway connectors VBS  
 LFS52×2000×3000-OV-300-VBS



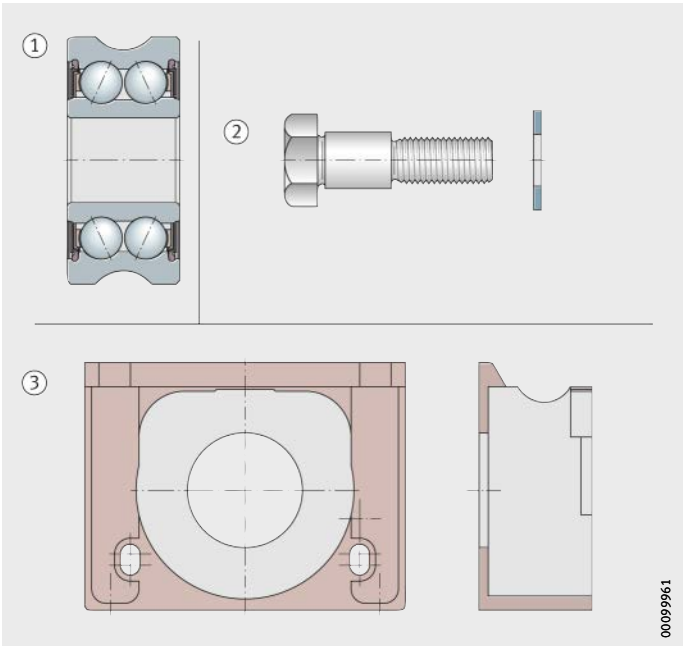
# Ordering example, ordering designation

**Individual components** In order to achieve versatile user designs, it is also possible to order individual components of the ready-to-fit systems; example, *Figure 7*.

|                      |                     |                         |
|----------------------|---------------------|-------------------------|
| Track roller         | Series              | LFR                     |
|                      | Size                | 50/8-6                  |
|                      | Sealing             | 2RS                     |
|                      | Corrosion-resistant | RB, <i>Figure 7</i>     |
| Ordering designation |                     | <b>LFR50/8-6-2RS-RB</b> |
| Bolt                 | Series              | LF                      |
|                      | Concentric          | Z                       |
|                      | Size                | 8                       |
|                      | Corrosion-resistant | RB, <i>Figure 7</i>     |
| Ordering designation |                     | <b>LFZ8-RB</b>          |
| Cap wiper            | Series              | AB.LFR                  |
|                      | Size                | 50/8, <i>Figure 7</i>   |
| Ordering designation |                     | <b>AB.LFR50/8</b>       |

- ① Track roller
- ② Bolt, concentric
- ③ Cap wiper

*Figure 7*  
Track roller, bolt, wiper

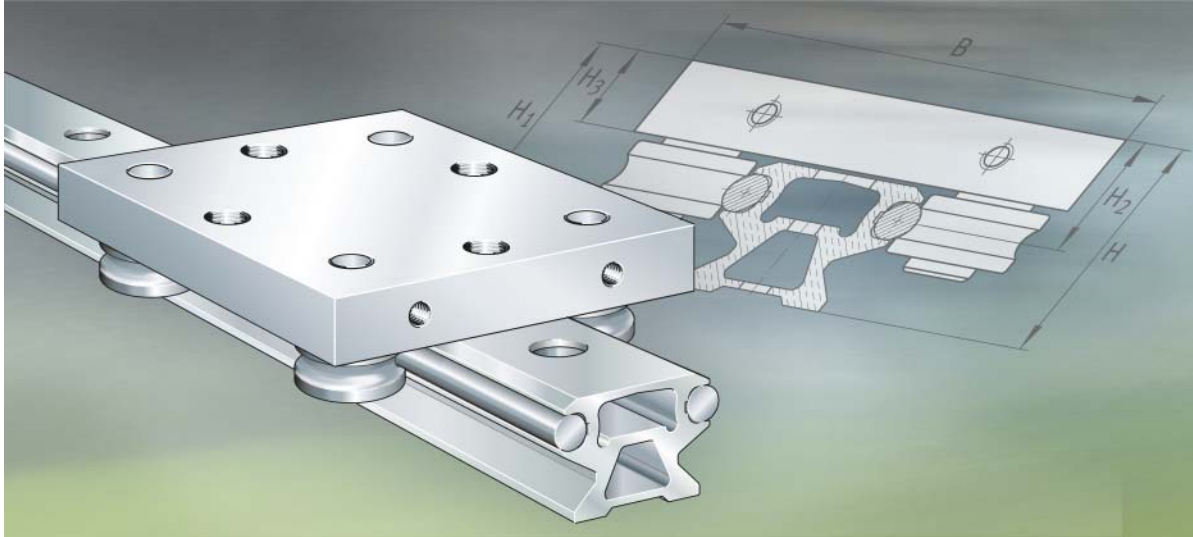


00099961

# Operating limits



- Operating temperature** Track roller guidance systems can be used at a temperature from  $-20\text{ }^{\circ}\text{C}$  to  $+80\text{ }^{\circ}\text{C}$ . For applications below  $-20\text{ }^{\circ}\text{C}$  and above  $+80\text{ }^{\circ}\text{C}$ , please contact us.  
The area of application is restricted by the lubricant, the plastics used and the composite materials.
- Velocities** The maximum possible speed of track roller guidance systems is  $10\text{ m/s}$ . Higher speeds may be possible by agreement.
- Acceleration** When using track roller guidance systems, accelerations of up to  $50\text{ m/s}^2$  can be achieved.



## Track roller guidance systems

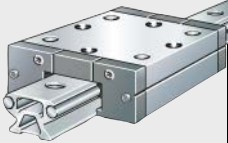
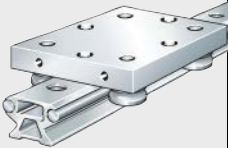
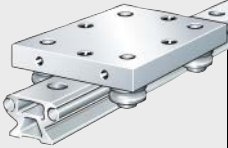
- With hollow section carriage
- With compact carriage
- With open carriage
- With non-locating bearing carriage
- With bogie carriage

# Track roller guidance systems

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**Matrix for preselection  
of track roller guidance systems**

| Track roller guidance systems<br>with                                                                                                           | Width of guideways |    |    |    |    |    | Corrosion-<br>resistant |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----|----|----|----|----|-------------------------|
|                                                                                                                                                 | 20                 | 25 | 32 | 42 | 52 | 86 |                         |
| <b>Hollow<br/>section<br/>carriage<br/>LFCL</b>                | –                  | ●  | –  | ●  | –  | ●  | ■                       |
| <b>Compact<br/>carriage<br/>LFKL...-SF</b>                     | ●                  | ●  | ●  | –  | ●  | –  | ■                       |
| <b>Open<br/>carriage<br/>LFL...-SF</b>                         | ●                  | –  | ●  | –  | ●  | –  | ■                       |
| <b>Non-locating<br/>bearing<br/>carriage<br/>LFLL...-SF</b>  | –                  | –  | ●  | –  | ●  | –  | ■                       |
| <b>Bogie<br/>carriage<br/>LFDL...-SF<br/>LFDL...-B</b>       | –                  | –  | ●  | –  | ●  | –  | ■                       |

● available sizes

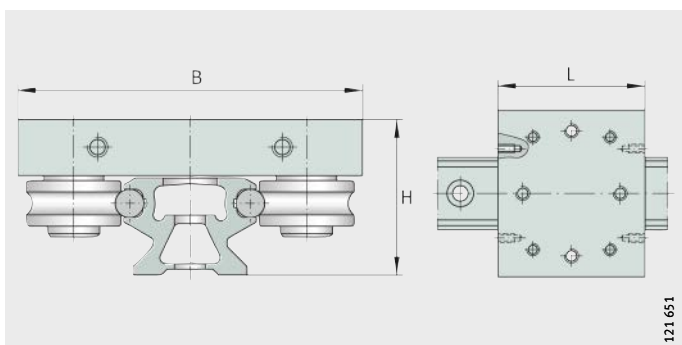
■ possible

1) The guideway LFS...-M can only be combined with carriages with adjustable clearance. If carriages LFCL and LFKL...-SF are to be used, please contact us in advance.

| Special features of guidance systems                                                                                                                         | Sizes                                 | Basic dimensions of guidance systems, dimensions, <i>Figure 1</i> |                                    |                                      |                                        |                                     |                                      |                                     |                                     |                                      | Description |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------|------------------------------------|--------------------------------------|----------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|-------------|
|                                                                                                                                                              |                                       | LFS (-C, -CE, -CEE, -E, -EE, -NZZ, -OV), LFSR...ST                |                                    |                                      | LFS...-F (-FE)                         |                                     |                                      | LFS...-M <sup>1)</sup>              |                                     |                                      |             |
|                                                                                                                                                              |                                       | H                                                                 | B                                  | L                                    | H                                      | B                                   | L                                    | H                                   | B                                   | L                                    |             |
|                                                                                                                                                              |                                       | see page                                                          |                                    |                                      |                                        |                                     |                                      |                                     |                                     |                                      |             |
| <div><div></div> economical</div> <div><div></div> low mass</div> <div><div></div> high moment load carrying capacity M<sub>x</sub></div>                    | 25<br>42<br>86                        | 32,1<br>39<br>59                                                  | 80<br>116<br>190                   | 110<br>150<br>235                    | –<br>33,9<br>–                         | 80<br>116<br>190                    | 110<br>150<br>235                    | 63,1<br>–<br>–                      | 80<br>116<br>190                    | 110<br>150<br>235                    | 46          |
| <div><div></div> closed series</div> <div><div></div> protected track rollers</div> <div><div></div> integrated lubrication unit</div>                       | 20<br>25<br>32<br>52<br>52-E<br>52-EE | 22<br>25<br>35,5<br>54,3<br>60,4<br>60,4                          | 56<br>65<br>86<br>13<br>145<br>155 | 69<br>85<br>112<br>136<br>186<br>205 | –<br>–<br>25,5<br>38,2<br>44,3<br>44,3 | 56<br>65<br>86<br>130<br>145<br>155 | 69<br>85<br>112<br>136<br>186<br>205 | –<br>56<br>–<br>118,9<br>125<br>125 | 56<br>65<br>86<br>130<br>145<br>155 | 69<br>85<br>112<br>136<br>186<br>205 | 48          |
| <div><div></div> very robust</div> <div><div></div> simple construction</div>                                                                                | 20<br>32<br>52<br>52-E                | 22<br>35,5<br>54,3<br>60,4                                        | 55<br>80<br>120<br>135             | 50<br>90<br>100<br>150               | –<br>25,5<br>38,2<br>44,3              | 55<br>80<br>120<br>135              | 50<br>90<br>100<br>150               | –<br>81,5<br>118,9<br>125           | 55<br>80<br>120<br>135              | 50<br>90<br>100<br>150               | 50          |
| <div><div></div> locating and non-locating bearing arrangement</div> <div><div></div> compensation of skewing in the adjacent construction up to ±1 mm</div> | 32<br>52                              | 35,5<br>54,3                                                      | 80<br>120                          | 90<br>100                            | 25,5<br>38,2                           | 80<br>120                           | 90<br>100                            | 81,5<br>118,9                       | 80<br>120                           | 90<br>100                            | 52          |
| <div><div></div> oval track guidance systems for unlimited stroke length</div>                                                                               | 32-B<br>32-SF<br>52-B<br>52-SF        | 44,2<br>44,2<br>66,1<br>60,1                                      | 80<br>80<br>120<br>120             | 100<br>100<br>150<br>150             | 34,2<br>34,2<br>50<br>50               | 80<br>80<br>120<br>120              | 100<br>100<br>150<br>150             | 90,2<br>90,2<br>130,7<br>130,7      | 80<br>80<br>120<br>120              | 100<br>100<br>150<br>150             | 54          |



*Figure 1*  
Dimensions H, B, L

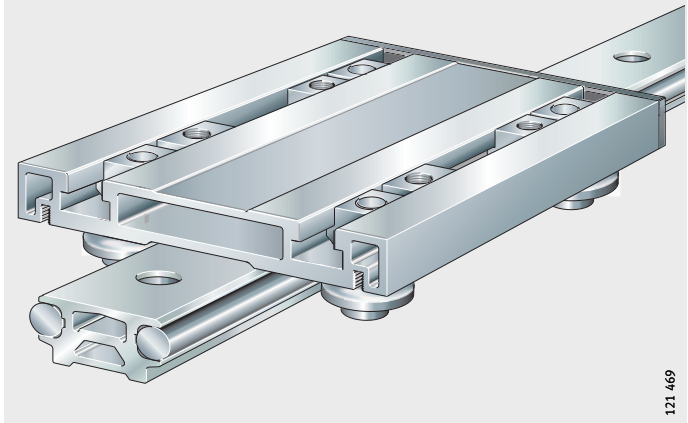


121 651

## Product overview    Track roller guidance systems

### With hollow section carriage Clearance-free

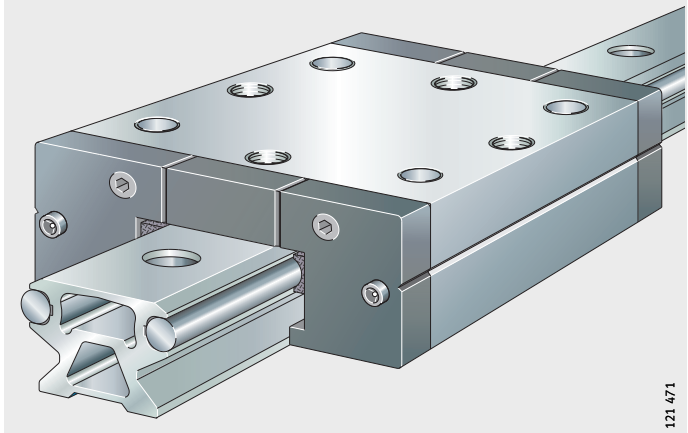
LFCL



121 469

### With compact carriage Clearance-free

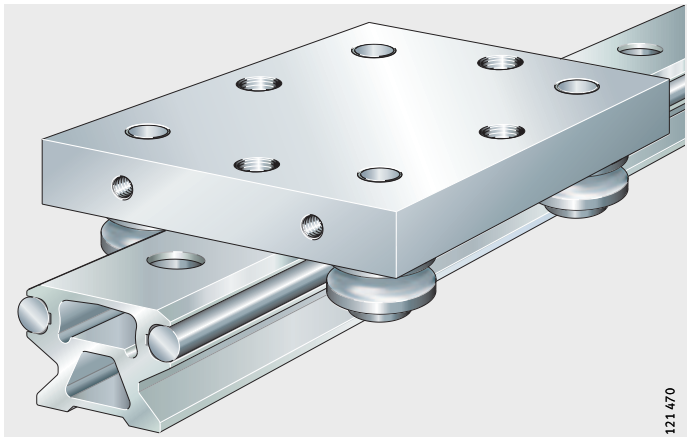
LFKL...-SF



121 471

### With open carriage Clearance-free

LFL...-SF

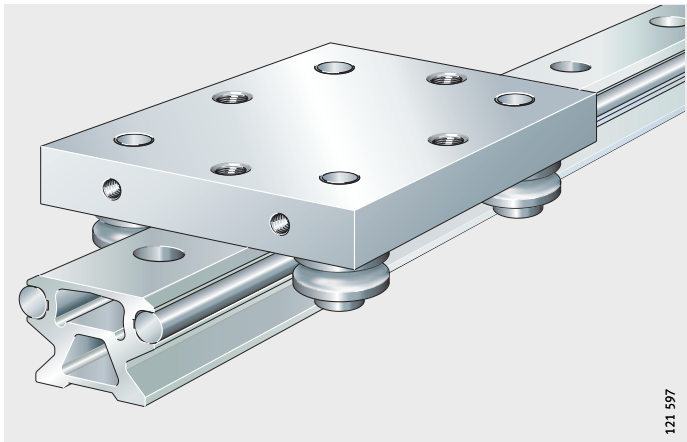


121 470

**With non-locating bearing carriage**

Clearance-free

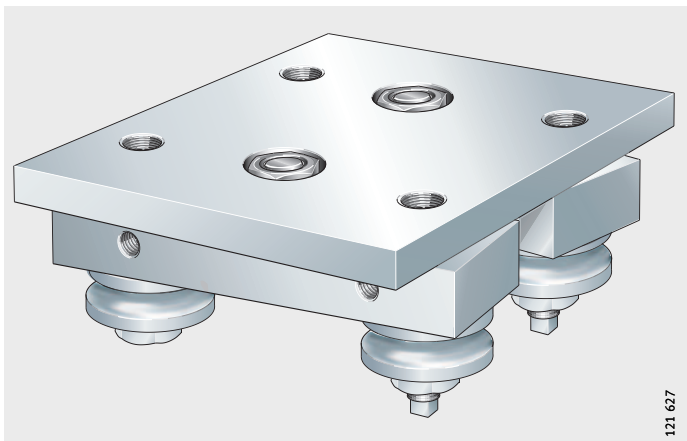
LFLL...-SF



121 597

**With bogie carriage**  
Concentric and eccentric bolts,  
adjustable clearance

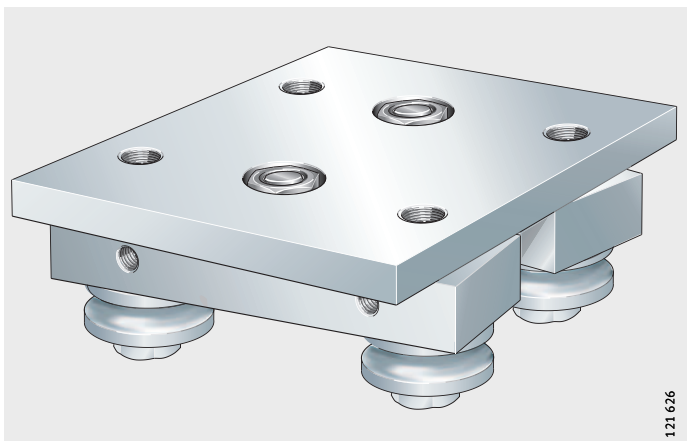
LFDL...-B



121 627

**Concentric bolts**  
clearance-free

LFDL...-SF



121 626

# Track roller guidance systems

## Features

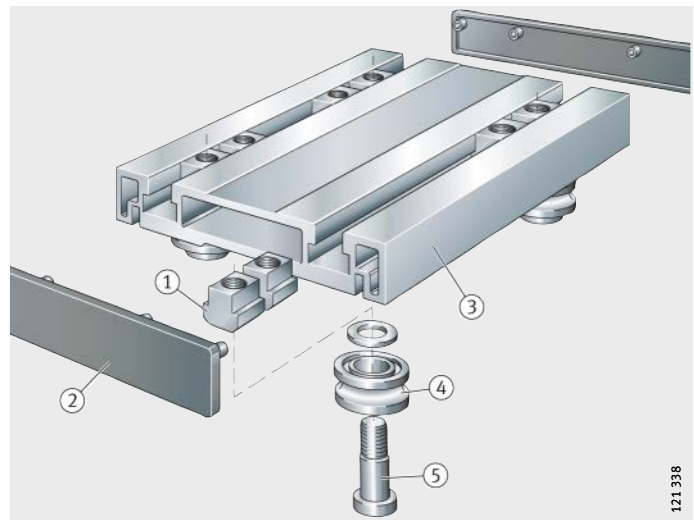
Track roller guidance systems are available with a hollow section carriage, compact carriage, open carriage, non-locating bearing carriage or bogie carriage.

## Track roller guidance system with hollow section carriage

The economical series LFCL is characterised in particular by its low mass and its high moment load carrying capacity  $M_x$ . In addition, more individual design of the adjacent construction is possible by means of four T-bolts that can be moved in a longitudinal direction.

A carriage comprises a carriage plate made from anodised aluminium, four concentric bolts, four track rollers, two end covers for the hollow sections and four T-nuts that can be used for the adjacent construction, *Figure 1*. The track rollers and end covers are already fitted.

- ① T-nut
- ② End cover
- ③ Carriage plate
- ④ Track roller
- ⑤ Concentric bolt



*Figure 1*  
Hollow section carriage

|                                   |                                                                                                                                                                                                                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preload and clearance</b>      | The carriages run clearance-free on all INA guideways, see page 42, and can be combined with all guideways of the relevant size, but not with the curved guideway elements LFSR. Due to the highly accurate guideways, it is not necessary to set the clearance.    |
| <b>Sealing and lubrication</b>    | <p>The track rollers have gap seals on both sides, are greased for life and are therefore maintenance-free.</p> <p>The raceways can be lubricated using cap wipers AB.LFR. Their fixing screws pass into the screw mounting channels of the carriage plate.</p>     |
| <b>Corrosion-resistant design</b> | <p>All steel parts, the inner and outer rings of the track rollers and the bolts, washers and nuts are made from corrosion-resistant steel. The rolling elements are protected against corrosion by the grease. Corrosion-resistant designs have the suffix RB.</p> |
| <b>Further information</b>        | <p>Further information is given on the following pages:</p> <ul style="list-style-type: none"> <li>■ dimension table, see page 56</li> <li>■ track rollers, see page 68</li> <li>■ guideways, see page 76</li> <li>■ accessories, see page 106.</li> </ul>          |



## Track roller guidance systems

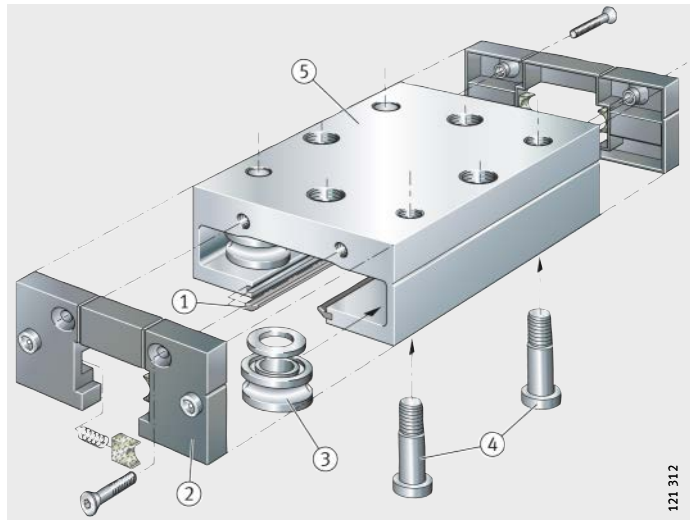
### Track roller guidance system with compact carriage

The closed compact carriage LFKL...-SF gives a simple means of achieving track roller guidance systems for operation in contaminated environments. The track rollers are protected against contamination by the closed design. It has two integrated lubrication units for lubrication of the raceways.

A carriage comprises a saddle plate made from anodised, profiled aluminium, four concentric bolts, four track rollers, two sealing strips and two lubrication and wiper units, *Figure 2*. The track rollers are already fitted, the sealing strips as well as the lubrication and wiper units are included loose in the delivery.

- ① Sealing strip
- ② Lubrication and wiper unit
- ③ Track roller
- ④ Concentric bolt
- ⑤ Saddle plate

*Figure 2*  
Compact carriage



|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preload and clearance</b>      | The carriages run clearance-free on all INA guideways, see page 42, and can be combined with all guideways of the relevant size, but not with the curved guideway elements LFSR. Due to the highly accurate guideways, it is not necessary to set the clearance.                                                                                                                                                |
| <b>Sealing and lubrication</b>    | <p>The track rollers have gap seals on both sides, are greased for life and are therefore maintenance-free.</p> <p>For lubrication of the raceways, the lubrication and wiper units have oil-soaked felt inserts that can be replenished with oil via lubrication nipples. In combination with the sealing strips (gap seals), these units protect the compact carriage on all sides against contamination.</p> |
| <b>Corrosion-resistant design</b> | <p>All steel parts, the inner and outer rings of the track rollers and the bolts, washers and nuts are made from corrosion-resistant steel. The rolling elements are protected against corrosion by the grease. Corrosion-resistant designs have the suffix RB.</p>                                                                                                                                             |
| <b>Further information</b>        | <p>Further information is given on the following pages:</p> <ul style="list-style-type: none"> <li>■ dimension table, see page 58</li> <li>■ track rollers, see page 68</li> <li>■ guideways, see page 76</li> <li>■ accessories, see page 106.</li> </ul>                                                                                                                                                      |



## Track roller guidance systems

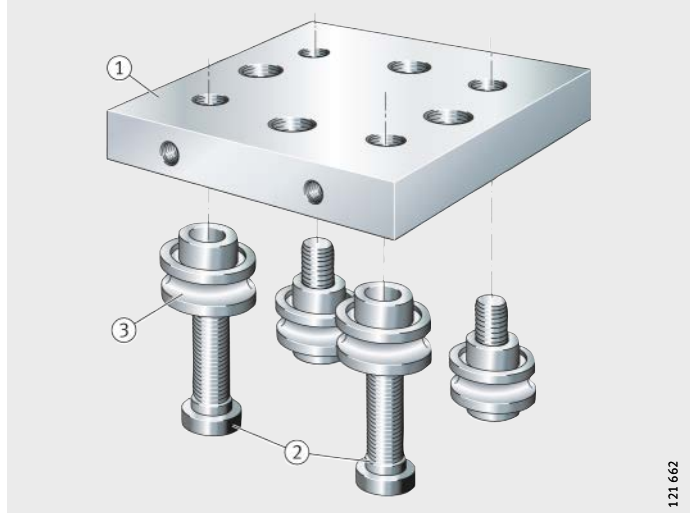
### Track roller guidance system with open carriage

The robust, open carriage LFL...-SF is suitable where high performance linear guidance systems of a simple construction are required.

A carriage comprises a carriage plate made from anodised aluminium, four screws and four track rollers, *Figure 3*. The track rollers are already fitted.

- ① Carriage plate
- ② Screws
- ③ Track roller

*Figure 3*  
Open carriage



|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preload and clearance</b>      | The carriages run clearance-free on all INA guideways, see page 42, and can be combined with all guideways of the relevant size, but not with the curved guideway elements LFSR. Due to the highly accurate guideways, it is not necessary to set the clearance.                                                                                                                                                                   |
| <b>Sealing and lubrication</b>    | <p>The track rollers have gap seals on both sides, are greased for life and are therefore maintenance-free.</p> <p>The raceways can be lubricated by means of lubrication and wiper units AB, see page 106. Their oil-soaked felt inserts can be replenished with oil via lubrication nipples. In combination with side plates ABAL, these units seal the end faces and longitudinal sides of the open carriage, see page 107.</p> |
| <b>Corrosion-resistant design</b> | <p>All steel parts, the inner and outer rings of the track rollers and the screws, washers and nuts are made from corrosion-resistant steel. The rolling elements are protected against corrosion by the grease.</p> <p>Corrosion-resistant designs have the suffix RB.</p>                                                                                                                                                        |
| <b>Further information</b>        | <p>Further information is given on the following pages:</p> <ul style="list-style-type: none"> <li>■ dimension table, see page 60</li> <li>■ track rollers, see page 68</li> <li>■ guideways, see page 76</li> <li>■ accessories, see page 106.</li> </ul>                                                                                                                                                                         |



# Track roller guidance systems

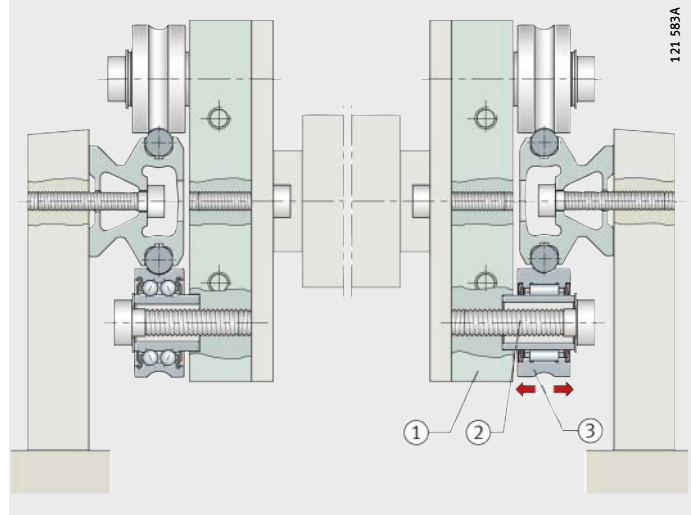
## Track roller guidance system with non-locating bearing carriage

Non-locating bearing carriages LFLL..-SF are robust, ready-to-fit linear guidance systems that are used exclusively in locating or non-locating bearing applications with two parallel guideway systems. The track rollers can be axially displaced. In this way, it is possible to compensate inaccuracies of  $\pm 1$  mm in relation to the spacing of the guideways.

A carriage comprises a carriage plate made from anodised aluminium, four screws and four non-locating bearing track rollers, *Figure 4*. The track rollers are already fitted.

- ① Carriage plate
- ② Screw
- ③ Non-locating bearing track roller

*Figure 4*  
Non-locating bearing carriage



|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preload and clearance</b>      | The carriages run clearance-free on all INA guideways, see page 42, and can be combined with all guideways of the relevant size, but not with the curved guideway elements LFSR. Due to the highly accurate guideways, it is not necessary to set the clearance.                                                                                                                                                                                                                                                                                                                                       |
| <b>Sealing and lubrication</b>    | <p>The track rollers have gap seals on both sides, are greased for life and are therefore maintenance-free.</p> <p>The contact zone between the raceways and track rollers must be lubricated via the shaft.</p>                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Corrosion-resistant design</b> | <p>All steel parts, the inner and outer rings of the track rollers and the screws, washers and nuts are made from corrosion-resistant steel.</p> <p>The rolling elements are protected against corrosion by the grease. Corrosion-resistant designs have the suffix RB (available by agreement only).</p> <p> Non-locating bearing carriages must never be used on their own but only ever in combination with locating bearing carriages.</p> <p>The track rollers can support loads in a radial direction only.</p> |
| <b>Further information</b>        | <p>Further information is given on the following pages:</p> <ul style="list-style-type: none"> <li>■ dimension table, see page 62</li> <li>■ track rollers, see page 68</li> <li>■ guideways, see page 76</li> <li>■ accessories, see page 106.</li> </ul>                                                                                                                                                                                                                                                                                                                                             |



## Track roller guidance systems

### Track roller guidance system with bogie carriage

Bogie carriages LFDL...-B and LFDL...-SF can be used in combination with curved guideway elements LFSR...-ST to achieve almost any variant of oval and circular track guidance systems. The straight guideway elements are precisely matched to the arc.

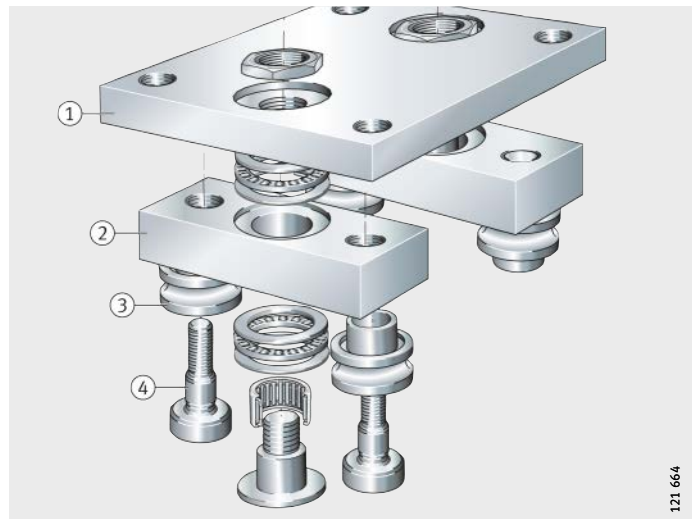
The carriages LFDL...-B and LFDL...-SF comprise a steel carriage plate, two aluminium swivel brackets (supported axially and radially by rolling bearings). In the case of LFDL...-B, the preload of the four profiled track rollers can be set by means of two concentric and two eccentric bolts. In the case of LFDL...-SF, the preload is already preset to the optimum value by means of four concentric bolts, *Figure 5*.



LFDL...-SF cannot be mounted on closed curved guideway systems.

- ① Carriage plate
- ② Bracket
- ③ Track roller
- ④ Concentric bolt

*Figure 5*  
Bogie carriage



121 664

**Sealing and lubrication**

The track rollers have gap seals on both sides, are greased for life and are therefore maintenance-free.

The contact zone between the raceways and track rollers must be lubricated via the shaft.

**Corrosion-resistant design**

All steel parts, the inner and outer rings of the track rollers and the bolts, washers and nuts are made from corrosion-resistant steel. The rolling elements are protected against corrosion by the grease.

Corrosion-resistant designs have the suffix RB (available by agreement only).



The adjustable carriage LFDL..-B must be used in combination with a 360° guideway.

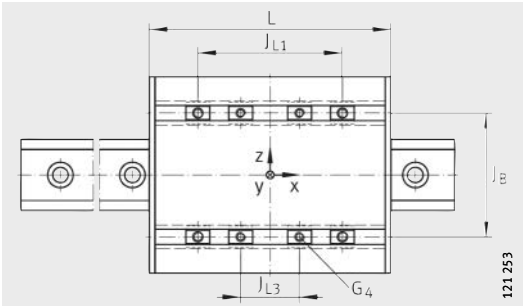
**Further information**

Further information is given on the following pages:

- dimension table, see page 64
- track rollers, see page 68
- guideways, see page 76
- accessories, see page 106.



# Track roller guidance system with hollow section carriage



LFCL with LFS (-C, -CE, -CEE, -E, -EE, -NZZ, -M, -F)  
View rotated 90°

| Dimension table - Dimensions in mm |               |                            |                    |                |     |     |                     |                 |                 |
|------------------------------------|---------------|----------------------------|--------------------|----------------|-----|-----|---------------------|-----------------|-----------------|
| Carriage <sup>1)</sup>             | Mass          | Track roller <sup>2)</sup> | For shaft diameter | Dimensions     |     |     | Mounting dimensions |                 |                 |
|                                    | m<br><br>≈ kg |                            |                    | H <sub>1</sub> | B   | L   | J <sub>B</sub>      | J <sub>B1</sub> | J <sub>B2</sub> |
| LFCL25                             | 0,44          | LFR50/8-6-2Z               | 6                  | 30,5           | 80  | 110 | 47                  | 47              | 69              |
| LFCL42                             | 1             | LFR5201-10-2Z              | 10                 | 38,1           | 116 | 150 | 73                  | 73              | 98,5            |
| LFCL86 <sup>4)</sup>               | 2,2           | LFR5301-10-2Z              | 10                 | 48,4           | 190 | 235 | 124                 | 124             | 151,5           |

## Ordering designations

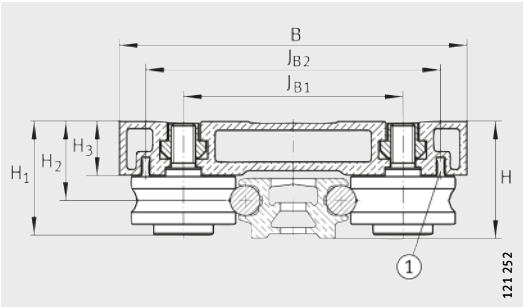
Corrosion-resistant design: LFCL...-RB, LFS...-RB with LFR...-2RSR-RB.  
 Guideways without holes: LFS...-OL.

- ① Threaded slot for screws M3.
- 1) The design of the hollow sections is dependent on the size.
- 2) For ordering of replacement parts, please contact us.
- 3) The guideway LFS...-M can only be combined with carriages with adjustable clearance.  
 If SF and LFCL carriages are to be used, please contact us in advance.
- 4) Additional T-slot in the centre of the carriage.

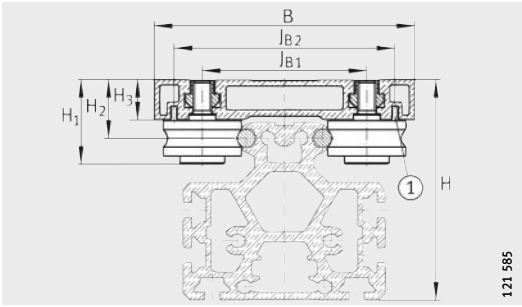
## Basic load ratings<sup>1)</sup>

| Carriage | Guideway | Track roller <sup>2)</sup> | Basic load ratings  |                      |                     |                      |                       |                       |                       |
|----------|----------|----------------------------|---------------------|----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|
|          |          |                            | C <sub>y</sub><br>N | C <sub>0y</sub><br>N | C <sub>z</sub><br>N | C <sub>0z</sub><br>N | M <sub>0x</sub><br>Nm | M <sub>0y</sub><br>Nm | M <sub>0z</sub><br>Nm |
| LFCL25   | LFS25    | LFR50/8-6-2Z               | 4 600               | 2 400                | 7 320               | 4 500                | 25                    | 120                   | 65                    |
| LFCL42   | LFS42    | LFR5201-10-2Z              | 10 200              | 5 480                | 16 900              | 10 000               | 85                    | 425                   | 230                   |
| LFCL86   | LFS86    | LFR5301-10-2Z              | 17 800              | 8 850                | 28 400              | 15 500               | 335                   | 1 190                 | 680                   |

- 1) Basic load ratings in combination with LFS...-RB: see page 18.
- 2) For ordering of replacement parts, please contact us.



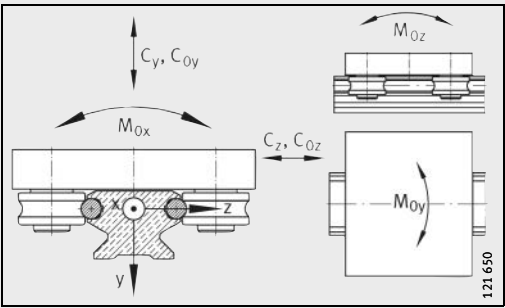
LFCL with LFS (-C, -CE, -CEE, -E, -EE, -N, -NZZ)



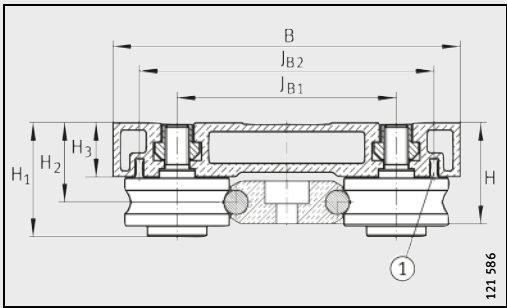
LFCL with LFS..-M<sup>3</sup>)



|                 |                 |      |                |                |                |                                              | Total height H<br>of carriage and guideway   |       |                       |
|-----------------|-----------------|------|----------------|----------------|----------------|----------------------------------------------|----------------------------------------------|-------|-----------------------|
| J <sub>L1</sub> | J <sub>L3</sub> |      | H <sub>2</sub> | H <sub>3</sub> | G <sub>4</sub> | Maximum<br>screw depth<br>for G <sub>4</sub> | LFS (-C, -CE,<br>-CEE, -E, -EE,<br>-N, -NZZ) | LFS-F | LFS...M <sup>3)</sup> |
|                 | min.            | max. |                |                |                |                                              |                                              |       |                       |
| 58              | 13              | 32   | +0,3           | 15,4           | M6             | 10                                           | 32,1                                         | –     | 63,1                  |
| 85              | 15              | 55   | 26,4           | 18             | M8             | 12                                           | 39                                           | 33,9  | –                     |
| 155             | 18              | 119  | 33,9           | 23,4           | M10            | 14                                           | 59                                           | –     | –                     |

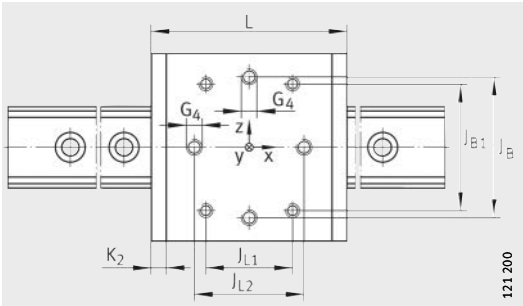


Load directions



LFCL with LFS..-F

# Track roller guidance system with compact carriage



LFKL-SF with LFS (-C, -CE, -CEE, -E, -EE, -NZZ, -M, -F, -FE)  
View rotated 90°

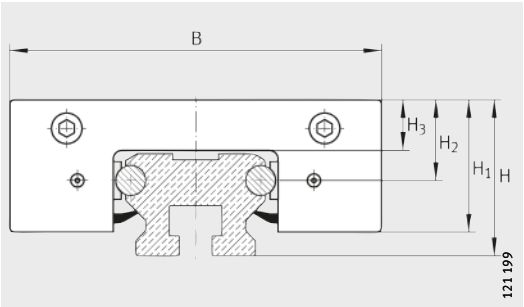
| Dimension table - Dimensions in mm |      |                            |                    |                |     |     |                     |                 |                |
|------------------------------------|------|----------------------------|--------------------|----------------|-----|-----|---------------------|-----------------|----------------|
| Carriage                           | Mass | Track roller <sup>1)</sup> | For shaft diameter | Dimensions     |     |     | Mounting dimensions |                 |                |
|                                    | m    |                            |                    | H <sub>1</sub> | B   | L   | J <sub>B</sub>      | J <sub>B1</sub> | K <sub>2</sub> |
|                                    | ≈ kg |                            |                    |                |     |     | ±0,2                |                 |                |
| LFKL20-SF                          | 0,2  | LFR50/5-4-2Z               | 4                  | 20,5           | 56  | 69  | 39                  | 34              | 5              |
| LFKL25-SF                          | 0,3  | LFR50/5-6-2Z               | 6                  | 23,5           | 65  | 85  | 50                  | 40              | 5              |
| LFKL32-SF                          | 0,7  | LFR50/8-6-2Z               | 6                  | 32             | 86  | 112 | 59                  | 54              | 7              |
| LFKL52-SF                          | 1,5  | LFR5201-10-2Z              | 10                 | 46,1           | 130 | 136 | 90                  | 83              | 10             |
| LFKL52-E-SF                        | 2,9  | LFR5301-10-2Z              | 10                 | 53,8           | 145 | 186 | 105                 | 90              | 10             |
| LFKL52-EE-SF                       | 4,3  | LFR5302-10-2Z              | 10                 | 55             | 155 | 205 | 115                 | 95,2            | 10             |

**Ordering designation**  
Corrosion-resistant design: LFKL...SF-RB, LFS...RB with LFR...2RSR-RB.  
Guideways without holes: LFS...OL.

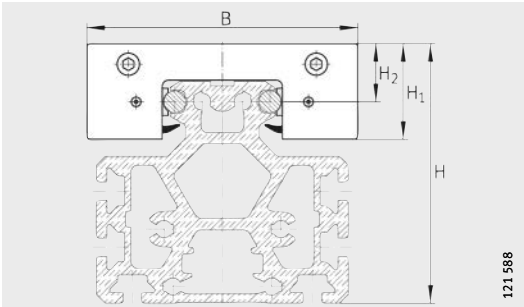
- 1) For ordering of replacement parts, please contact us.
- 2) Tightening torque for track roller bolts, concentric bolts are supplied tightened to M<sub>A</sub>.
- 3) The guideway LFS...M can only be combined with carriages with adjustable clearance.  
If these are to be used, please contact us in advance.

| Basic load ratings <sup>1)</sup> |          |                            |                     |                      |                     |                      |                       |                       |                       |
|----------------------------------|----------|----------------------------|---------------------|----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|
| Carriage                         | Guideway | Track roller <sup>2)</sup> | Basic load ratings  |                      |                     |                      |                       |                       |                       |
|                                  |          |                            | C <sub>y</sub><br>N | C <sub>0y</sub><br>N | C <sub>z</sub><br>N | C <sub>0z</sub><br>N | M <sub>0x</sub><br>Nm | M <sub>0y</sub><br>Nm | M <sub>0z</sub><br>Nm |
| LFKL20-SF                        | LFS20    | LFR50/5-4-2Z               | 1 350               | 870                  | 2 400               | 1 700                | 7                     | 28                    | 15                    |
| LFKL25-SF                        | LFS25    | LFR50/5-6-2Z               | 1 280               | 820                  | 2 580               | 1 800                | 8                     | 40                    | 18                    |
| LFKL32-SF                        | LFS32    | LFR50/8-6-2Z               | 4 100               | 2 400                | 6 600               | 4 200                | 30                    | 130                   | 70                    |
| LFKL52-SF                        | LFS52    | LFR5201-10-2Z              | 10 000              | 5 200                | 16 800              | 10 000               | 110                   | 290                   | 150                   |
| LFKL52-E-SF                      | LFS52-E  | LFR5301-10-2Z              | 17 800              | 8 900                | 28 400              | 15 500               | 180                   | 800                   | 460                   |
| LFKL52-EE-SF                     | LFS52-EE | LFR5302-10-2Z              | 20 000              | 10 000               | 32 400              | 18 200               | 215                   | 1 100                 | 620                   |

1) Basic load ratings in combination with LFS...RB: see page 18.  
2) For ordering of replacement parts, please contact us.



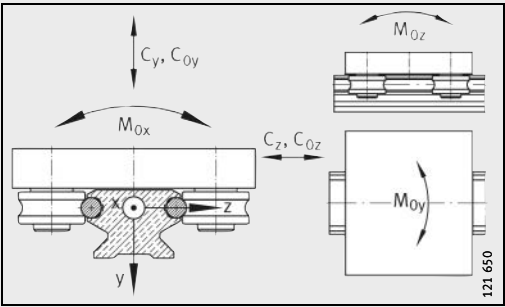
LFKL-SF with LFS (-C, -CE, -CEE, -E, -EE, -NZZ)



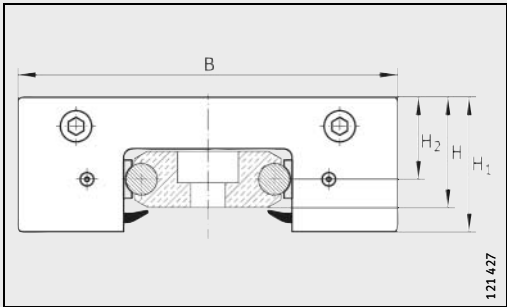
LFKL with LFS..M<sup>3)</sup>



|                 |                 |                |                |                |                              |                     | Total height H of carriage and guideway |             |                     |
|-----------------|-----------------|----------------|----------------|----------------|------------------------------|---------------------|-----------------------------------------|-------------|---------------------|
| J <sub>L1</sub> | J <sub>L2</sub> | H <sub>2</sub> | H <sub>3</sub> | G <sub>4</sub> | M <sub>A</sub> <sup>2)</sup> |                     | LFS (-C, -CE, -CEE, -E, -EE, -NZZ)      | LFS-F (-FE) | LFS-M <sup>3)</sup> |
|                 |                 |                |                |                | Standard                     | Corrosion-resistant |                                         |             |                     |
|                 | ±0,2            | +0,3           |                |                | Nm                           | Nm                  |                                         |             |                     |
| 34              | 49              | 13             | 8,7            | M5             | 2,5                          | 2,5                 | 22                                      | —           | —                   |
| 45              | 60              | 14,4           | 9              | M5             | 2,5                          | 2,5                 | 25                                      | —           | 56                  |
| 60              | 70              | 20,5           | 14             | M8             | 15                           | 12                  | 35,5                                    | 25,5        | 81,5                |
| 60              | 70              | 29,2           | 19,4           | M10            | 40                           | 23                  | 54,3                                    | 38,2        | 118,9               |
| 105             | 110             | 35,3           | 24             | M10            | 40                           | 23                  | 60,4                                    | 44,3        | 125                 |
| 120             | 140             | 35,3           | 24             | M12            | 70                           | 39                  | 60,4                                    | 44,3        | 125                 |

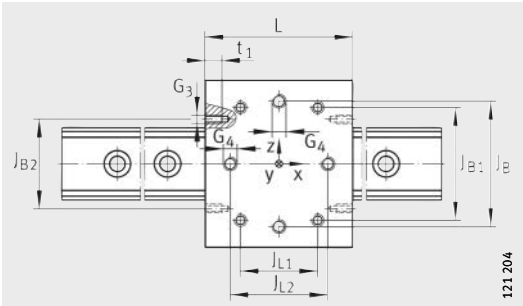


Load directions



LFKL-SF with LFS..F (-FE)

# Track roller guidance system with open carriage



LFL-SF with LFS (-C, -CE, -CEE, -E, -EE, -NZZ, -M, -F, -FE)  
View rotated 90°

**Dimension table** - Dimensions in mm

| Carriage          | Mass<br><br>m<br><br>≈ kg | Track roller <sup>1)</sup> | For shaft diameter | Dimensions     |     |     | Mounting dimensions |                 |                 |                 |                 |
|-------------------|---------------------------|----------------------------|--------------------|----------------|-----|-----|---------------------|-----------------|-----------------|-----------------|-----------------|
|                   |                           |                            |                    | H <sub>1</sub> | B   | L   | J <sub>B</sub>      | J <sub>B1</sub> | J <sub>B2</sub> | J <sub>L1</sub> | J <sub>L2</sub> |
|                   |                           |                            |                    |                |     |     | ±0,2                |                 |                 |                 | ±0,2            |
| <b>LFL20-SF</b>   | 0,16                      | <b>LFR50/5-4-2Z</b>        | <b>4</b>           | 20,5           | 55  | 50  | 40                  | 34              | –               | 24              | 38              |
| <b>LFL32-SF</b>   | 0,4                       | <b>LFRI50/8-6-2Z</b>       | <b>6</b>           | 30             | 80  | 90  | 59                  | 54              | 56              | 60              | 70              |
| <b>LFL52-SF</b>   | 1                         | <b>LFRI5201-10-2Z</b>      | <b>10</b>          | 43,2           | 120 | 100 | 90                  | 83,2            | 65              | 60              | 70              |
| <b>LFL52-E-SF</b> | 1,9                       | <b>LFR5301-10-2Z</b>       | <b>10</b>          | 53,8           | 135 | 150 | 105                 | 90              | 65              | 105             | 110             |

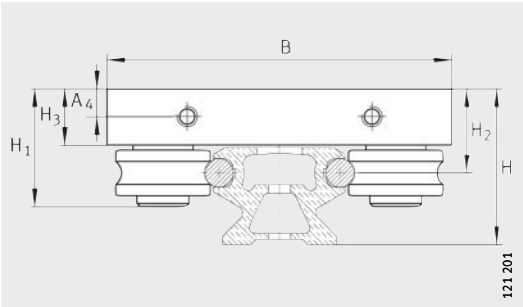
**Ordering designation**  
 Corrosion-resistant design: LFL...SF-RB, LFS...RB with LFR...2RSR-RB.  
 Guideways without holes: LFS...OL.  
 Corrosion-resistant design available by agreement.

- 1) For ordering of replacement parts, please contact us.
- 2) Tightening torque for track roller bolts, concentric bolts are supplied tightened to M<sub>A</sub>.
- 3) The guideway LFS...M can only be combined with carriages with adjustable clearance.  
 If SF and LFCL carriages are to be used, please contact us in advance.

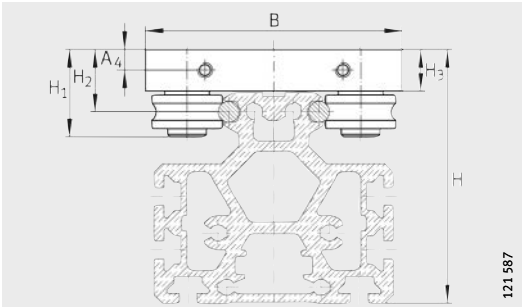
**Basic load ratings<sup>1)</sup>**

| Carriage          | Guideway       | Track roller <sup>2)</sup> | Basic load ratings  |                      |                     |                      |                       |                       |                       |
|-------------------|----------------|----------------------------|---------------------|----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|
|                   |                |                            | C <sub>y</sub><br>N | C <sub>0y</sub><br>N | C <sub>z</sub><br>N | C <sub>0z</sub><br>N | M <sub>0x</sub><br>Nm | M <sub>0y</sub><br>Nm | M <sub>0z</sub><br>Nm |
| <b>LFL20-SF</b>   | <b>LFS20</b>   | <b>LFR50/5-4-2Z</b>        | 1 350               | 870                  | 2 400               | 1 700                | 7                     | 20                    | 10                    |
| <b>LFL32-SF</b>   | <b>LFS32</b>   | <b>LFR50/8-6-2Z</b>        | 4 100               | 2 400                | 6 600               | 4 200                | 30                    | 130                   | 70                    |
| <b>LFL52-SF</b>   | <b>LFS52</b>   | <b>LFR5201-10-2Z</b>       | 10 000              | 5 200                | 16 800              | 10 000               | 110                   | 290                   | 150                   |
| <b>LFL52-E-SF</b> | <b>LFS52-E</b> | <b>LFR5301-10-2Z</b>       | 17 800              | 8 900                | 28 400              | 15 500               | 180                   | 800                   | 460                   |

- 1) Basic load ratings in combination with LFS...RB: see page 18.
- 2) For ordering of replacement parts, please contact us.



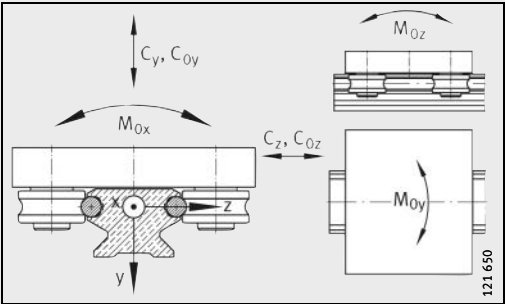
LFL-SF with LFS (-C, -CE, -CEE, -E, -EE, -NZZ)



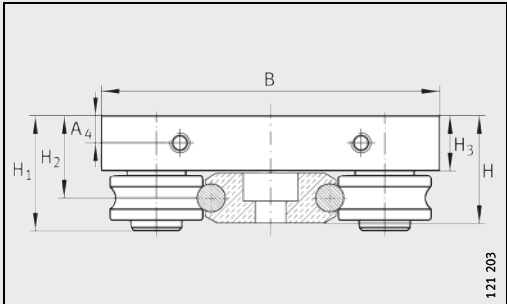
LFL with LFS..-M<sup>3</sup>)



|                |                |                |                |                |                |                              |                     | Total height H of carriage and guideway |             |                     |
|----------------|----------------|----------------|----------------|----------------|----------------|------------------------------|---------------------|-----------------------------------------|-------------|---------------------|
| t <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | A <sub>4</sub> | G <sub>3</sub> | G <sub>4</sub> | M <sub>A</sub> <sup>2)</sup> |                     | LFS (-C, -CE, -CEE, -E, -EE, -NZZ)      | LFS-F (-FE) | LFS-M <sup>3)</sup> |
|                |                |                |                |                |                | Standard                     | Corrosion-resistant |                                         |             |                     |
|                | +0,3           |                |                |                |                | Nm                           | Nm                  |                                         |             |                     |
| –              | 13             | 9              | –              | –              | M5             | 2,5                          | 2,5                 | 22                                      | –           | –                   |
| 7              | 20,5           | 14             | 7              | M6             | M8             | 15                           | 12                  | 35,5                                    | 25,5        | 81,5                |
| 12             | 29,2           | 19,5           | 9,75           | M6             | M10            | 40                           | 23                  | 54,3                                    | 38,2        | 118,9               |
| 12             | 35,3           | 24             | 12             | M6             | M10            | 40                           | 23                  | 60,4                                    | 44,3        | 125                 |

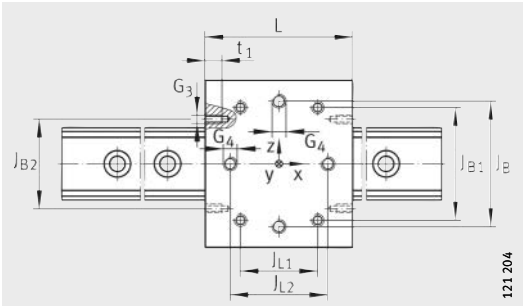


Load directions



LFL-SF with LFS..-F (-FE)

# Track roller guidance system with non-locating bearing carriage



LFL with LFS (-C, -CE, -CEE, -E, -EE, -NZZ, -M, -F, -FE)  
View rotated 90°

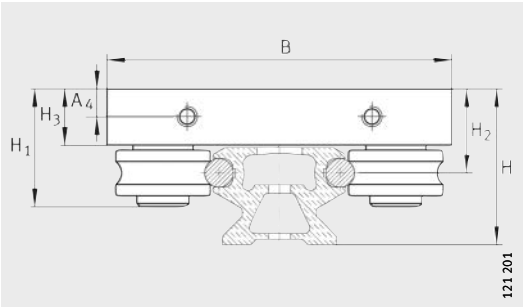
| Dimension table - Dimensions in mm |                           |                    |                |     |     |                            |                 |                 |                 |
|------------------------------------|---------------------------|--------------------|----------------|-----|-----|----------------------------|-----------------|-----------------|-----------------|
| Carriage                           | Mass<br><br>m<br><br>≈ kg | For shaft diameter | Dimensions     |     |     | Mounting dimensions        |                 |                 |                 |
|                                    |                           |                    | H <sub>1</sub> | B   | L   | J <sub>B</sub><br><br>±0,2 | J <sub>B1</sub> | J <sub>B2</sub> | J <sub>L1</sub> |
| LFL32-SF                           | 0,4                       | 6                  | 32,5           | 80  | 90  | 59                         | 54              | 56              | 60              |
| LFL52-SF                           | 1                         | 10                 | 45             | 120 | 100 | 90                         | 83              | 65              | 60              |

**Ordering designation**  
 Guideways without holes: LFS...-OL.  
 Corrosion-resistant design available by agreement.

- 1) LFL32-SF: ±0,5 axial displacement capacity.
- 2) LFL52-SF: ±1 axial displacement capacity.

| Basic load ratings <sup>1)</sup> |          |                                |                     |                      |                       |
|----------------------------------|----------|--------------------------------|---------------------|----------------------|-----------------------|
| Carriage                         | Guideway | Track roller <sup>2)</sup>     | Basic load ratings  |                      |                       |
|                                  |          |                                | C <sub>z</sub><br>N | C <sub>0z</sub><br>N | M <sub>0y</sub><br>Nm |
| LFL32-SF                         | LFS32    | LFR22/8-6-2RSR-RNA + IR.LFL32  | 9 000               | 8 000                | 250                   |
| LFL52-SF                         | LFS52    | LFR2202-10-2RSR-RNA + IR.LFL52 | 17 000              | 19 000               | 550                   |

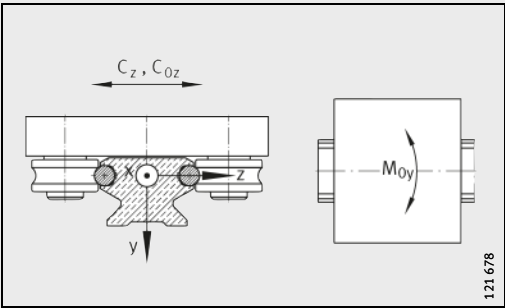
- 1) Basic load ratings in combination with LFS...-RB: see page 18.
- 2) For ordering of replacement parts, please contact us.



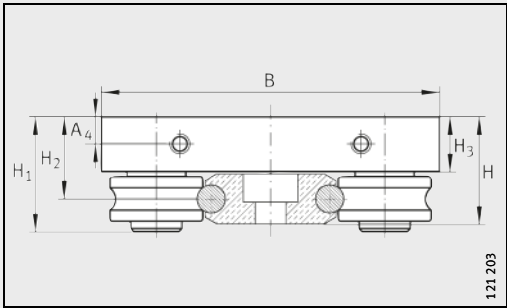
LFL with LFS (-C, -CE, -CEE, -E, -EE, -NZZ)



|           |       |                    |       |       |       |       | Total height H<br>of carriage and guideway |                    |
|-----------|-------|--------------------|-------|-------|-------|-------|--------------------------------------------|--------------------|
| $l_{L2}$  | $t_1$ | $H_2$              | $H_3$ | $A_4$ | $G_3$ | $G_4$ | LFS (-C, -CE, -CEE, -E, -EE, -NZZ)         | LFS-F (-FE)        |
| $\pm 0,2$ |       |                    |       |       |       |       |                                            |                    |
| 70        | 7     | 20,5 <sup>1)</sup> | 13,75 | 7     | M6    | M8    | 35,5 <sup>1)</sup>                         | 25,5 <sup>1)</sup> |
| 70        | 12    | 29,2 <sup>2)</sup> | 19,5  | 9,75  | M6    | M10   | 54,3 <sup>2)</sup>                         | 38,2 <sup>2)</sup> |

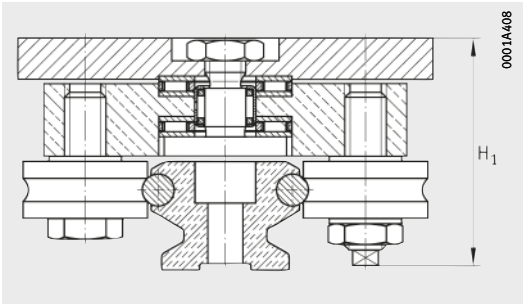


Load directions



LFL with LFS...F (-FE)

# Track roller guidance system with bogie carriage



LFDL...-B with LFS (-C, -CE, -CEE, -E, -EE, -NZZ)

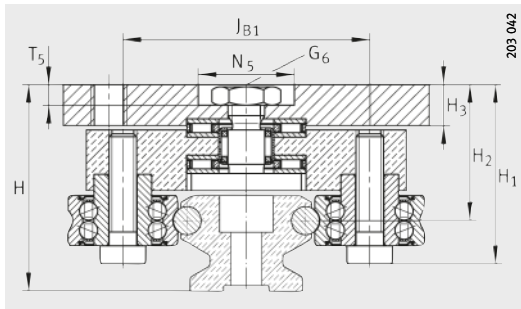
| Dimension table - Dimensions in mm |                           |                            |                    |                |     |     |                     |                 |
|------------------------------------|---------------------------|----------------------------|--------------------|----------------|-----|-----|---------------------|-----------------|
| Carriage <sup>1)</sup>             | Mass<br><br>m<br><br>≈ kg | Track roller <sup>2)</sup> | For shaft diameter | Dimensions     |     |     | Mounting dimensions |                 |
|                                    |                           |                            |                    | H <sub>1</sub> | B   | L   | J <sub>B</sub>      | J <sub>B1</sub> |
| LFDL32-B                           | 1                         | LFR50/8-6-2Z               | 6                  | 43             | 80  | 100 | 60                  | 54              |
| LFDL32-SF                          |                           |                            |                    | 37             |     |     |                     |                 |
| LFDL52-B                           | 2,5                       | LFR5201-10-2Z              | 10                 | 65,1           | 120 | 150 | 90                  | 83              |
| LFDL52-SF                          |                           |                            |                    | 55             |     |     |                     |                 |

Corrosion-resistant design available by agreement.

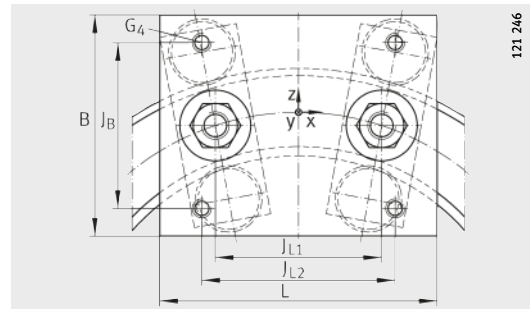
- <sup>1)</sup> In order to protect the raceways, the carriages can also be fitted with the lubrication and wiper unit AB (special accessory). Please contact us.
- <sup>2)</sup> For ordering of replacement parts, please contact us.
- <sup>3)</sup> Tightening torque for track roller bolts, concentric bolts are supplied tightened to M<sub>A</sub>.

| Basic load ratings <sup>1)</sup> |          |                            |                     |                      |                     |                      |                       |                       |                       |
|----------------------------------|----------|----------------------------|---------------------|----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|
| Carriage                         | Guideway | Track roller <sup>2)</sup> | Basic load ratings  |                      |                     |                      |                       |                       |                       |
|                                  |          |                            | C <sub>y</sub><br>N | C <sub>0y</sub><br>N | C <sub>z</sub><br>N | C <sub>0z</sub><br>N | M <sub>0x</sub><br>Nm | M <sub>0y</sub><br>Nm | M <sub>0z</sub><br>Nm |
| LFDL32-B                         | LFS32    | LFR50/8-6-2Z               | 4 100               | 2 400                | 6 600               | 4 200                | 30                    | 130                   | 70                    |
| LFDL32-SF                        | LFS32    | LFR50/8-6-2Z               |                     |                      |                     |                      |                       |                       |                       |
| LFDL52-B                         | LFS52    | LFR5201-10-2Z              | 10 000              | 5 200                | 16 800              | 10 000               | 110                   | 380                   | 200                   |
| LFDL52-B-SF                      | LFS52    | LFR5201-10-2Z              |                     |                      |                     |                      |                       |                       |                       |

- <sup>1)</sup> Basic load ratings in combination with LFS...-RB: see page 18.
- <sup>2)</sup> For ordering of replacement parts, please contact us.



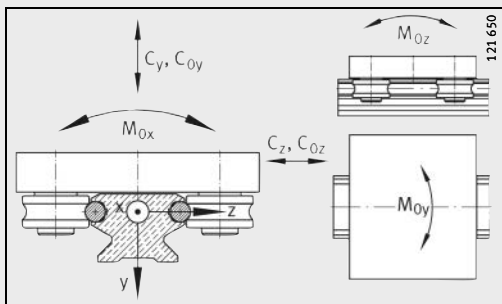
LFDL-SF with LFS (-C, -CE, -CEE, -E, -EE, -NZZ)



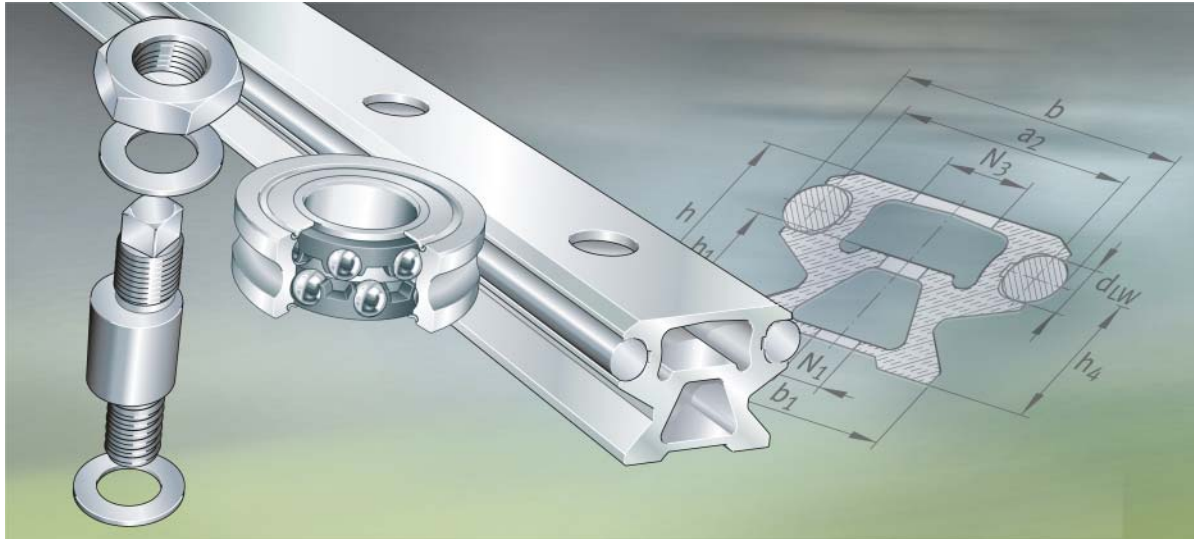
Top view



|                 |                 |                        |                |                |                |                |                |                                                | Total height H<br>of carriage and guideway |
|-----------------|-----------------|------------------------|----------------|----------------|----------------|----------------|----------------|------------------------------------------------|--------------------------------------------|
| J <sub>L1</sub> | J <sub>L2</sub> | H <sub>2</sub><br>+0,3 | H <sub>3</sub> | T <sub>5</sub> | G <sub>4</sub> | N <sub>5</sub> | G <sub>6</sub> | M <sub>A</sub> <sup>3)</sup><br>Standard<br>Nm |                                            |
| 60              | 70              | 29,2                   | 9              | 5              | M8             | 21             | M8             | 15                                             | 44,2                                       |
| 76              | 90              | 41                     | 11             | 6              | M10            | 26             | M10            | 40                                             | 66,1                                       |



### Load directions



Track rollers  
Bolts  
Guideways

# Track rollers, bolts, guideways

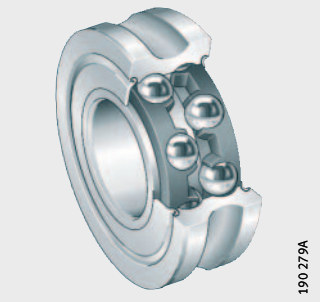
|                                     |                                                                   | Page |
|-------------------------------------|-------------------------------------------------------------------|------|
| <b>Product overview</b>             | Track rollers .....                                               | 68   |
| <b>Features</b>                     | .....                                                             | 69   |
|                                     | Possible combinations of track rollers and guideways .....        | 71   |
| <b>Design and safety guidelines</b> | Adjacent construction for non-locating bearing track rollers..... | 72   |
| <b>Product overview</b>             | Bolts .....                                                       | 73   |
| <b>Features</b>                     | .....                                                             | 74   |
| <b>Product overview</b>             | Guideways .....                                                   | 76   |
| <b>Features</b>                     | .....                                                             | 78   |
| <b>Design and safety guidelines</b> | Hole patterns of guideways.....                                   | 80   |
| <b>Dimension tables</b>             | Locating bearing track rollers .....                              | 84   |
|                                     | Bolts .....                                                       | 88   |
|                                     | Non-locating bearing track rollers .....                          | 90   |
|                                     | Possible combinations of track rollers and bolts .....            | 91   |
|                                     | Guideways .....                                                   | 94   |
|                                     | Closed oval tracks with guideway connectors VBS .....             | 102  |



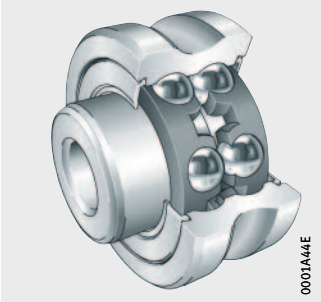
# Product overview    Track rollers

## Locating bearing track roller

LFR

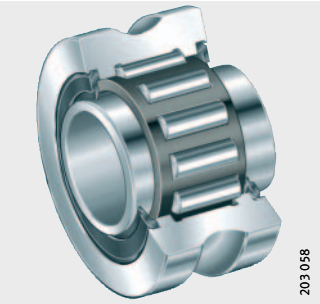


LFRI

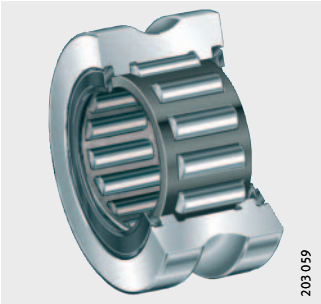


## Non-locating bearing track roller

LFR..-2RSR-NA



LFR..-2RSR-RNA



# Track rollers

## Features

Track rollers LFR are double row angular contact ball bearings comprising an outer ring with a gothic arch profile, an inner ring and two ball and cage assemblies with plastic cages. The inner ring and outer ring are made from rolling bearing steel 100Cr6.

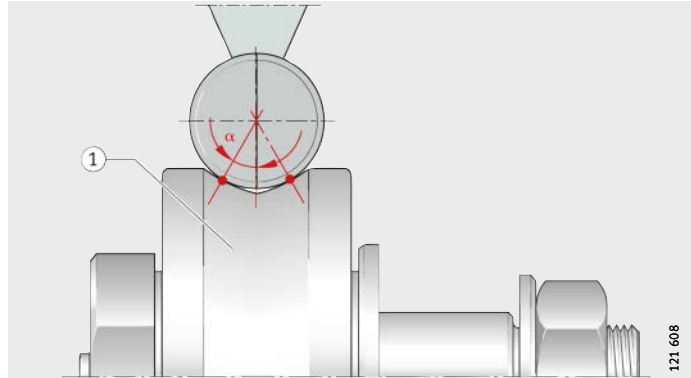
The special outer ring gives two point contact in the contact zone with the raceway, *Figure 1*. The contact angle  $\alpha$  is a maximum of  $30^\circ$ .

The bearings can support axial forces from both directions as well as radial forces.

$$\alpha = 30^\circ$$

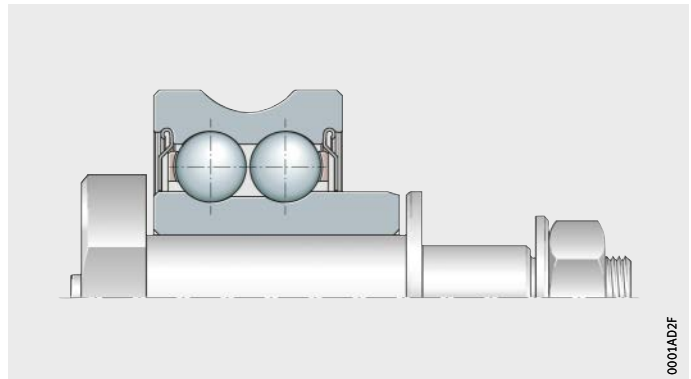
① Gothic arch raceway groove

*Figure 1*  
Gothic arch, two point contact,  
contact angle



## Track roller with extended inner ring

Track rollers LFRI are double row angular contact ball bearings. They differ from track rollers LFR in that they have an extended inner ring. This allows exact positioning in the adjacent construction. The inner ring is mounted by means of a standard screw (for example ISO 4762) in a fit hole (preferably grade F6). The fixing screw is not included in the scope of delivery. The operating clearance of track rollers with an extended inner ring cannot be set by means of eccentric bolts.



*Figure 2*  
Track roller LFRI with fixing screw



# Track rollers

## Sealing and lubrication

Gap seals on both sides protect the rolling element system against contamination. Bearings with this seal type have the suffix 2Z.

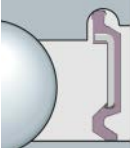
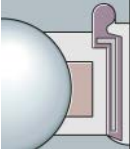
The track rollers are also available on request with contact seals on both sides, suffix 2RS and 2RSR.

The track rollers are greased for life and are therefore maintenance-free. From outside diameter  $\geq 52$  mm, the inner ring has a lubrication bore.

## Seal types

Seal types and their specific features: see table.

### Specific features

| 2Z seal                                                                            |                                                                                                                                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Gap seal: <ul style="list-style-type: none"><li>not radially preloaded</li><li>low friction</li><li>to be used with low levels of contamination</li></ul>                     |
| 2RSR seal                                                                          |                                                                                                                                                                               |
|   | Contact seal: <ul style="list-style-type: none"><li>radially preloaded</li><li>to be used with higher requirements for sealing action and under heavy contamination</li></ul> |
| 2RS seal                                                                           |                                                                                                                                                                               |
|  | Contact seal: <ul style="list-style-type: none"><li>axially preloaded</li><li>to be used with higher requirements for sealing action and under heavy contamination</li></ul>  |

## Corrosion-resistant design

The inner ring and outer ring are made from corrosion-resistant steel. The rolling elements are protected against corrosion by the grease.

Corrosion-resistant designs have contact seals and the suffix 2RS-RB or 2RSR-RB.

## Accuracy and internal clearance

The dimensional and geometrical accuracies correspond to tolerance class PN to DIN 620.

The radial internal bearing clearance corresponds approximately to internal clearance group Group N in accordance with ISO 5753-1; internal clearance classes: see Catalogue HR 1, Rolling Bearings.

## Further information

Further information is given on the following pages:

- dimension tables, see page 90 and page 91
- bolts, see page 73
- guideways, see page 76
- accessories, see page 106.

# Possible combinations of track rollers and guideways

## Combinations with guideways LFS

The tables show the possible combinations of track rollers with the guideways LFS and shaft and support rail unit TS.

| Width and shaft diameter <sup>1)</sup> |                 | Track roller LFR |        |        |         |         |         |
|----------------------------------------|-----------------|------------------|--------|--------|---------|---------|---------|
| LFS                                    | d <sub>LW</sub> | 50/5-4           | 50/5-6 | 50/8-6 | 5201-10 | 5301-10 | 5302-10 |
| 20                                     | 4               | ●                | —      | —      | —       | —       | —       |
| 25                                     | 6               | —                | ●      | ●      | —       | —       | —       |
| 32                                     | 6               | —                | —      | ●      | —       | —       | —       |
| 42                                     | 10              | —                | —      | —      | ●       | ●       | ●       |
| 52                                     | 10              | —                | —      | —      | ●       | ●       | ●       |
| 86                                     | 10              | —                | —      | —      | ●       | ●       | ●       |
| 120                                    | 10              | —                | —      | —      | ●       | ●       | ●       |

● available size

<sup>1)</sup> Width b and shaft diameter d<sub>LW</sub>: see dimension tables for guideways.

## Combinations with guideways LFS (continued)

| Width and shaft diameter <sup>1)</sup> |                 | Track roller LFRl |      |
|----------------------------------------|-----------------|-------------------|------|
| LFS                                    | d <sub>LW</sub> | 50/8-6            | 5201 |
| 20                                     | 4               | —                 | —    |
| 25                                     | 6               | ●                 | —    |
| 32                                     | 6               | ●                 | —    |
| 42                                     | 10              | —                 | ●    |
| 52                                     | 10              | —                 | ●    |
| 86                                     | 10              | —                 | ●    |
| 120                                    | 10              | —                 | ●    |

● available size

<sup>1)</sup> Width b and shaft diameter d<sub>LW</sub>: see dimension tables for guideways.



## Combinations with shaft and support rail units TS<sup>1)</sup>

| Shaft diameter<br>d <sub>LW</sub> <sup>1)</sup> | Track roller LFR |         |         |         |         |         |         |
|-------------------------------------------------|------------------|---------|---------|---------|---------|---------|---------|
|                                                 | 5201-12          | 5204-16 | 5206-20 | 5206-25 | 5207-30 | 5208-40 | 5308-50 |
| 12                                              | ●                | —       | —       | —       | —       | —       | —       |
| 16                                              | —                | ●       | —       | —       | —       | —       | —       |
| 20                                              | —                | —       | ●       | —       | —       | —       | —       |
| 25                                              | —                | —       | —       | ●       | —       | —       | —       |
| 30                                              | —                | —       | —       | —       | ●       | —       | —       |
| 40                                              | —                | —       | —       | —       | —       | ●       | —       |
| 50                                              | —                | —       | —       | —       | —       | —       | ●       |

● available size

<sup>1)</sup> Shaft and support rail units TS and shaft diameter d<sub>LW</sub>: see Catalogue WF 1, Shaft Guidance Systems.



# Track rollers

**Design and  
safety guidelines**  
**Adjacent construction  
for non-locating bearing  
track rollers**

For non-locating bearing track rollers without an inner ring, the rolling element raceway on the shaft must be hardened and ground. The surface hardness must be 670 HV + 170 HV. The hardening depth CHD or SHD must be sufficiently large.

Design of the shaft: see table.

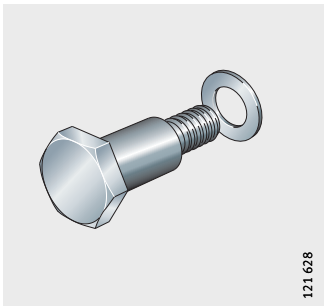
**Tolerances and surface data  
for the shaft raceway**

| Diameter tolerance of shafts |                       | Roughness     | Roundness                 | Parallelism               |
|------------------------------|-----------------------|---------------|---------------------------|---------------------------|
| without inner ring           | with inner ring       | max.          | max.                      | max.                      |
| k5                           | g6 (under point load) | Ra 0,4 (Rz 2) | 25% of diameter tolerance | 50% of diameter tolerance |

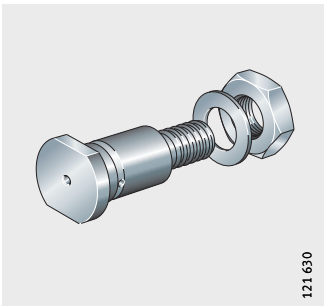
Product overview    Bolts

Concentric

LFZ

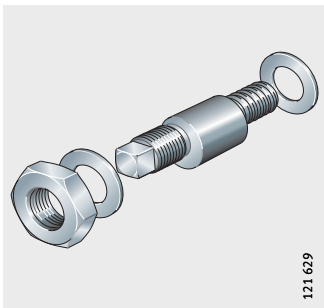


LFZ...A1

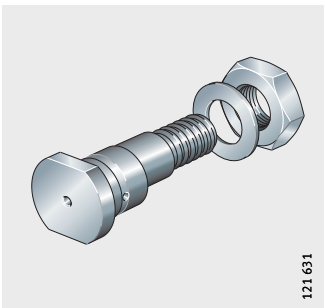


Eccentric

LFE



LFE...A1



# Bolts

## Features

The bolts, which are made from high strength screw steel, are available with a concentric and eccentric collar; designation LFZ or LFE. Depending on their intended purpose, they are supplied with a washer, nut, drive fit lubrication nipple and sealing cap, see table. The eccentric designs LFE and LFE...A1 allow the track roller guidance systems to be set clearance-free.

## Delivered condition

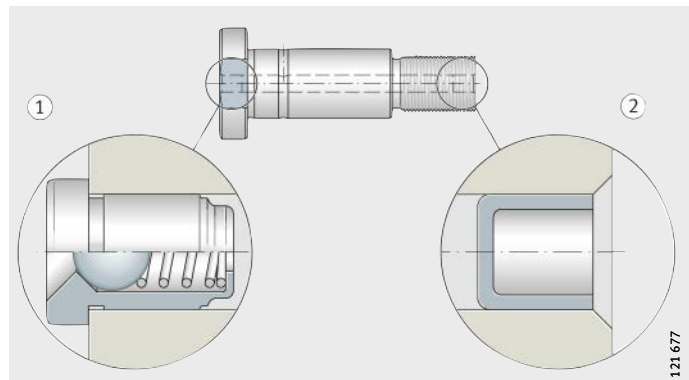
| Designation and suffix | Scope of delivery                                                                              | Design    |
|------------------------|------------------------------------------------------------------------------------------------|-----------|
| LFZ                    | Concentric bolt with washer                                                                    | Standard  |
| LFE                    | Eccentric bolt with washer and nut                                                             | Standard  |
| LFZ...A1<br>LFE...A1   | Concentric or eccentric bolt with washer and nut, drive fit lubrication nipple and sealing cap | Standard  |
| NIP-A2                 | Drive fit lubrication nipple                                                                   | Accessory |
| VD2                    | Sealing cap                                                                                    | Accessory |

## Lubrication

Bolts LFZ...A1 and LFE...A1 (from size 20) have a lubrication hole. Track rollers of outside diameter  $\geq 52$  mm can be lubricated via this hole. A lubrication nipple NIP-A2 can be pressed into the hole, *Figure 1*. If the hole will not be used for relubrication, it must be closed off using the sealing cap VD2.

- ① Drive fit lubrication nipple NIP-A2
- ② Sealing cap VD2

*Figure 1*  
Drive fit lubrication nipple  
and sealing cap



### Corrosion-resistant design

In this case, the bolts, washers and nuts are made from corrosion-resistant steel. These designs have the suffix RB.

### Further information

Further information is given on the following pages:

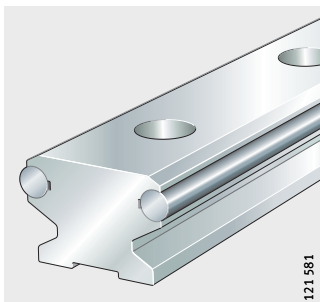
- dimension tables, see page 84
- track rollers, see page 68
- guideways, see page 76
- accessories, see page 106.



## Product overview    Guideways

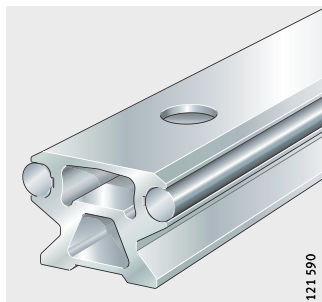
**Solid profile**  
**Hollow section profile**

LFS



121 581

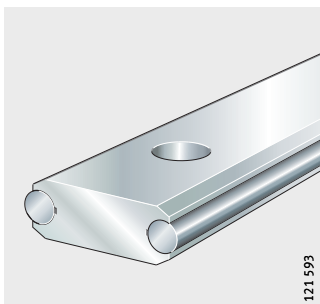
LFS..-C



121 590

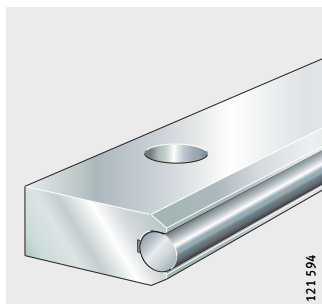
**Flat design**  
**Two raceways or one raceway**

LFS..-F



121 593

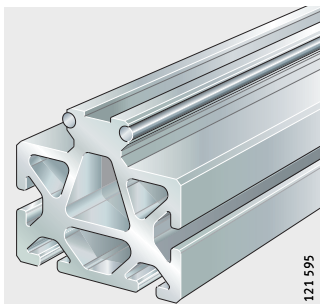
LFS..-FH



121 594

**Profiled section support rail**

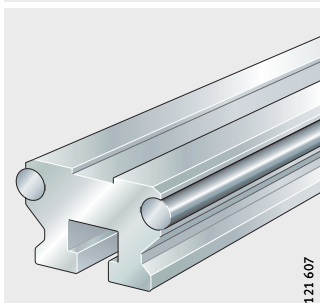
LFS..-M



121 595

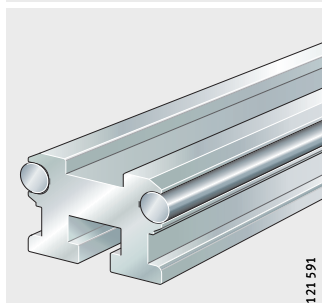
**With slots**  
**For toothed racks or toothed belts**

LFS..-N



121 607

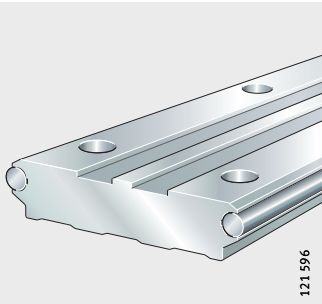
LFS..-NZZ



121 591

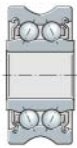
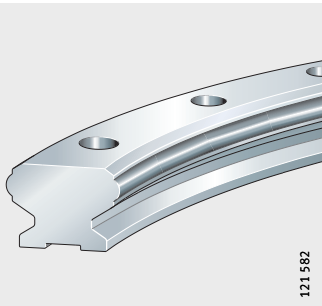
**Wide, flat design**  
For toothed racks or toothed belts

LFS120



**Curved guideway element**

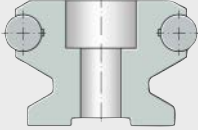
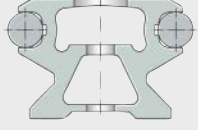
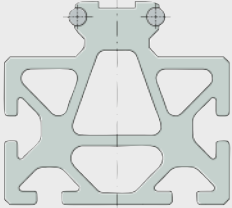
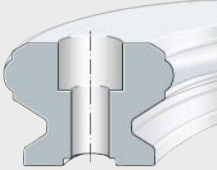
LFSR



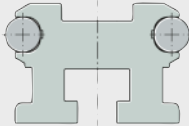
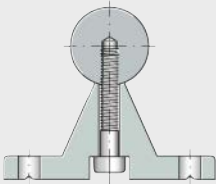
# Guideways

**Features** Guideway designs: see table.

## Designs

| Guideway                                                                                                  | Design                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LFS</b><br><br>       | <ul style="list-style-type: none"> <li>With solid profile for location from above through holes</li> </ul>                                                                                                                                                                                                                                                                                                 |
| <b>LFS..-C</b><br><br>   | <ul style="list-style-type: none"> <li>With hollow section profile (low mass)</li> <li>Location from above through holes</li> <li>The end faces of the hollow sections are closed off using plastic end covers</li> </ul>                                                                                                                                                                                  |
| <b>LFS..-F</b><br><br> | <ul style="list-style-type: none"> <li>Flat guideway</li> <li>Preferably for applications with stationary carriage and moving guideway</li> <li>Location from above through holes</li> </ul>                                                                                                                                                                                                               |
| <b>LFS..-M</b><br><br> | <ul style="list-style-type: none"> <li>With support rail giving high bending rigidity</li> <li>The guideway can be incorporated in modular constructions by means of slots. The slots are designed for nuts to DIN EN ISO 4032 and T-nuts to DIN 508</li> <li>The hollow sections are closed off using plastic end covers. Special plastic end covers are available for the slot closing strips</li> </ul> |
| <b>LFSR</b><br><br>    | <ul style="list-style-type: none"> <li>Curved guideway element made from steel</li> <li>Location from above through holes</li> <li>Combinations of curved guideway elements or of curved guideway elements and straight guideways should be treated in the same way as multi-piece guideways and must <b>always be ordered together</b></li> </ul>                                                         |

Designs continued

| Guideway                                                                                                        | Design                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LFS120</b><br>              | <ul style="list-style-type: none"><li>■ Wide, low guideway</li><li>■ With recesses for toothed racks or toothed belts</li><li>■ Location from above through holes</li></ul>                                                                                                                                                      |
| <b>LFS...FH</b><br>            | <ul style="list-style-type: none"><li>■ Flat guideway with only one shaft as raceway</li><li>■ Mainly for applications with increased support spacing</li><li>■ Location from above through holes</li></ul>                                                                                                                      |
| <b>LFS32-N, LFS...NZZ</b><br> | <ul style="list-style-type: none"><li>■ With T-slot for location from below</li><li>■ The upper slot in the guideways and the lateral slots are suitable for toothed racks or toothed belts</li><li>■ Supplied with special support washers for the fixing screws; the quantity is based on the length of the guideway</li></ul> |
| <b>TSN</b><br>               | <ul style="list-style-type: none"><li>■ Composite guideway, aluminium support rail with screw mounted raceway shaft</li><li>■ Location from above</li><li>■ See Catalogue WF 1, Shaft Guidance Systems</li></ul>                                                                                                                 |



Guideways without fixing holes

All LFS guidances with the exception of LFSR are also available without fixing holes; suffix OL.

# Guideways

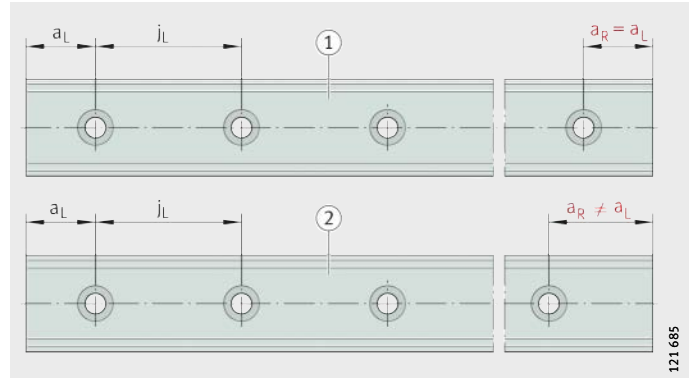
## Design and safety guidelines Guideway hole patterns

Unless specified otherwise, guideways have a symmetrical hole pattern, *Figure 1*.

Upon request, an asymmetrical hole pattern may be available. In this case,  $a_L \geq a_{L \min}$  and  $a_R \geq a_{R \min}$ .

- ① Symmetrical hole pattern
- ② Asymmetrical hole pattern

*Figure 1*  
Hole patterns of guideways  
with one row of holes

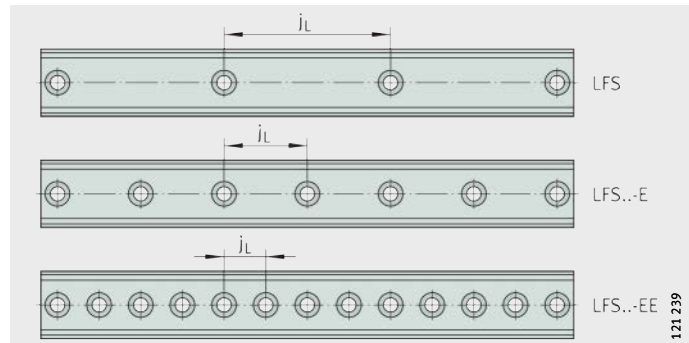


### Hole pitch values

The hole pitch values  $j_L$  are stated in the dimension tables. For high loads, guideways are available with reduced hole pitch values  $j_L$ , *Figure 2*.

These guideways have the suffix E or EE; examples: LFS...-E, LFS...-EE.

*Figure 2*  
Hole spacings  $j_L$



**Maximum number of pitches between holes**

The number of pitches between holes is the rounded down whole number equivalent to:

$$n = \frac{l - 2 \cdot a_{L \min}}{j_L}$$

The spacings  $a_L$  and  $a_R$  are generally determined as follows:

$$a_L + a_R = l - n \cdot j_L$$

For guideways with a symmetrical hole pattern:

$$a_L = a_R = \frac{1}{2} \cdot (l - n \cdot j_L)$$

Number of holes:

$$x = n + 1$$

|                                                           |    |
|-----------------------------------------------------------|----|
| n                                                         | —  |
| Maximum possible number of pitches between holes          |    |
| l                                                         | mm |
| Guideway length                                           |    |
| $a_{L \min}, a_{R \min}$                                  | mm |
| Minimum values for $a_L, a_R$ , see dimension tables      |    |
| $j_L$                                                     | mm |
| Spacing between holes                                     |    |
| $a_L, a_R$                                                | mm |
| Spacing between start or end of guideway and nearest hole |    |
| x                                                         | —  |
| Number of holes.                                          |    |



If the minimum values for  $a_L$  and  $a_R$  are not observed, the counter-bores of the holes may be intersected.



# Guideways

## Guideways without holes

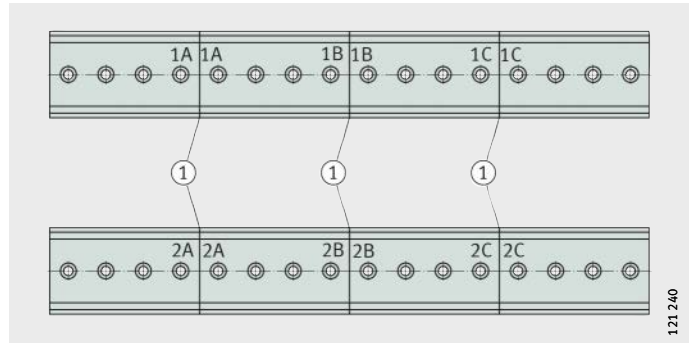
All guideways LFS are also available without holes, with the exception of LFSR. These guideways have the suffix OL, for example LFS.-OL.

## Multi-piece guideways

If the guideway length required is greater than  $l_{\max}$ , the guideways are assembled from two or more sections matched to each other and marked accordingly. The sections may be of different lengths. The guideway joint is always arranged centrally between the fixing holes, *Figure 3*.

① Marked joints

*Figure 3*  
Multi-piece guideways



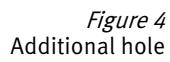
## Accuracy of joint position

In order to achieve accuracy of the joint position, additional fixing is recommended for guideways from size 32 if the spacing C7 is larger than the stated limit value, see table and *Figure 4*, page 83.

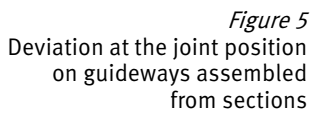
In these cases, the guideways are supplied with the additional fixing hole already made.

## Spacings for additional hole

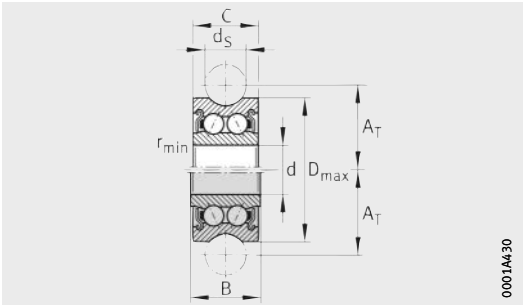
| Guideway       | Spacing between hole and end of guideway |                         |
|----------------|------------------------------------------|-------------------------|
|                | C7<br>Limit value<br>mm                  | C8<br>Limit value<br>mm |
| LFS32 (-C, -F) | 30                                       | 11                      |
| LFS42-C        | 50                                       | 17                      |
| LFS52 (-C, -F) | 50                                       | 17                      |
| LFS86-C        | 50                                       | 17                      |
| LFS120         | 50                                       | 17                      |



- $\Delta b = \pm 0,01 \text{ mm}$
- $\Delta h_4 = \pm 0,05 \text{ mm}$ , *Figure 5.*



# Locating bearing track rollers

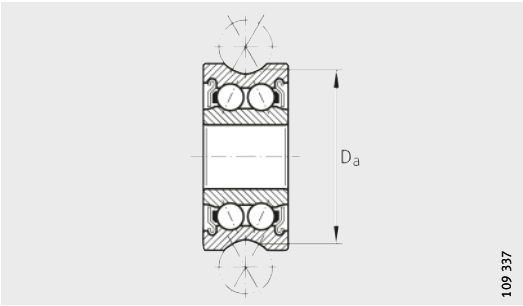


LFR..-2Z

| Dimension table - Dimensions in mm |                   |            |                  |      |                |      |
|------------------------------------|-------------------|------------|------------------|------|----------------|------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions |                  |      |                |      |
|                                    |                   | d          | D <sub>max</sub> | B    | A <sub>T</sub> | C    |
| LFR50/5-4-2Z-HLC <sup>8)</sup>     | 0,01              | 5          | 16               | 8    | 9              | 7    |
| LFR50/5-4-2RS-RB-HLC <sup>8)</sup> |                   |            |                  |      |                |      |
| LFR50/5-6-2Z-HLC <sup>8)</sup>     | 0,01              | 5          | 17               | 8    | 10,5           | 7    |
| LFR50/5-6-2RS-RB-HLC <sup>8)</sup> |                   |            |                  |      |                |      |
| LFR50/8-6-2Z <sup>8)</sup>         | 0,02              | 8          | 24               | 11   | 14             | 11   |
| LFR50/8-6-2RS-RB <sup>8)</sup>     |                   |            |                  |      |                |      |
| LFR5201-10-2Z <sup>8)</sup>        | 0,08              | 12         | 35               | 15,9 | 20,63          | 15,9 |
| LFR5201-10-2RS-RB <sup>8)</sup>    |                   |            |                  |      |                |      |
| LFR5301-10-2Z <sup>8)</sup>        | 0,1               | 12         | 42               | 19   | 24             | 19   |
| LFR5301-10-2RS-RB <sup>8)</sup>    |                   |            |                  |      |                |      |
| LFR5302-10-2Z <sup>8)</sup>        | 0,17              | 15         | 47               | 19   | 26,63          | 19   |
| LFR5302-10-2RS-RB <sup>8)</sup>    |                   |            |                  |      |                |      |
| LFR5201-12-2Z <sup>8)</sup>        | 0,08              | 12         | 35               | 15,9 | 21,75          | 15,9 |
| LFR5201-12-2RS-RB <sup>8)</sup>    |                   |            |                  |      |                |      |
| LFR5204-16-2Z <sup>9)</sup>        | 0,23              | 20         | 52               | 22,6 | 31,5           | 20,6 |
| LFR5204-16-2RS-RB <sup>9)</sup>    |                   |            |                  |      |                |      |
| LFR5206-20-2Z <sup>9)</sup>        | 0,43              | 25         | 72               | 25,8 | 41             | 23,8 |
| LFR5206-20-2RS-RB <sup>7)9)</sup>  |                   |            |                  |      |                |      |
| LFR5206-25-2Z <sup>9)</sup>        | 0,43              | 25         | 72               | 25,8 | 43,5           | 23,8 |
| LFR5206-25-2RS-RB <sup>9)</sup>    |                   |            |                  |      |                |      |
| LFR5207-30-2Z <sup>9)</sup>        | 0,66              | 30         | 80               | 29   | 51             | 27   |
| LFR5207-30-2RS-RB <sup>7)9)</sup>  |                   |            |                  |      |                |      |
| LFR5208-40-2Z <sup>9)</sup>        | 1,36              | 40         | 98               | 38   | 62,5           | 36   |
| LFR5208-40-2RS-RB <sup>7)9)</sup>  |                   |            |                  |      |                |      |
| LFR5308-50-2Z <sup>9)</sup>        | 1,4               | 40         | 110              | 46   | 72,5           | 44   |
| LFR5308-50-2Z-RB <sup>7)9)</sup>   |                   |            |                  |      |                |      |

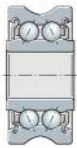
Corrosion-resistant design with suffix ...RB.

- 1) Rolling contact diameter.
- 2) Effective dynamic load rating as track roller (radial).
- 3) Effective static load rating as track roller (radial).
- 4) Fatigue limit load.
- 5) Permissible dynamic limit load.
- 6) Permissible static limit load.
- 7) Corrosion-resistant design available by agreement.
- 8) Lubricated for life, see page 19.
- 9) Relubrication facility via inner ring, see page 19.



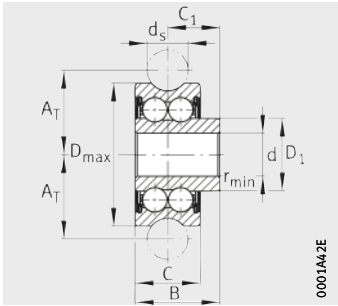
LFR...-2Z

|       |            |           | Load carrying capacity |                     |                    |                        |                         |
|-------|------------|-----------|------------------------|---------------------|--------------------|------------------------|-------------------------|
| $d_s$ | $D_a^{1)}$ | $r_{min}$ | $C_{rw}^{2)}$<br>N     | $C_{0rw}^{3)}$<br>N | $C_{ur}^{4)}$<br>N | $F_{r\ per}^{5)}$<br>N | $F_{0r\ per}^{6)}$<br>N |
| 4     | 14,54      | 0,2       | 1 560                  | 850                 | 43                 | 1 700                  | 1 700                   |
| 6     | 15,8       | 0,2       | 1 630                  | 900                 | 44,5               | 2 270                  | 1 800                   |
| 6     | 22,8       | 0,3       | 4 100                  | 2 300               | 115                | 2 550                  | 4 600                   |
| 10    | 32,25      | 0,6       | 8 400                  | 5 000               | 250                | 4 750                  | 10 000                  |
| 10    | 38,95      | 0,6       | 13 200                 | 7 700               | 370                | 6 400                  | 15 400                  |
|       |            |           | 13 900                 | 8 200               | 390                | 19 600                 | 16 400                  |
| 10    | 44,25      | 1         | 14 500                 | 9 100               | 455                | 9 400                  | 18 200                  |
| 12    | 33,1       | 0,6       | 8 300                  | 5 000               | 250                | 4 650                  | 10 000                  |
| 16    | 49,14      | 1         | 15 300                 | 10 100              | 520                | 10 500                 | 20 200                  |
| 20    | 64,68      | 1         | 23 100                 | 16 400              | 870                | 21 100                 | 33 000                  |
| 25    | 65,35      | 1         | 22 700                 | 16 100              | 850                | 18 800                 | 32 000                  |
| 30    | 76,02      | 1         | 23 100                 | 16 400              | 1 100              | 18 500                 | 41 500                  |
| 40    | 90,36      | 1,1       | 38 500                 | 29 000              | 1 480              | 51 000                 | 58 000                  |
| 50    | 101,7      | 1,1       | 54 000                 | 40 500              | 2 000              | 69 000                 | 81 000                  |



# Track rollers

With extended inner ring  
Locating bearing track roller



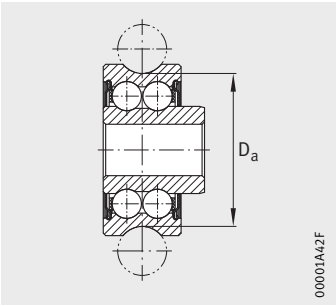
LFRI

Dimension table - Dimensions in mm

| Designation    | Mass<br>m<br>≈ kg | Dimensions |                  |      |                |      |                |
|----------------|-------------------|------------|------------------|------|----------------|------|----------------|
|                |                   | d          | D <sub>max</sub> | B    | A <sub>T</sub> | C    | C <sub>1</sub> |
| LFRI50/8-6-2Z  | 0,025             | 6,1        | 24               | 15,1 | 14             | 11   | 9,6            |
| LFRI5201-10-2Z | 0,09              | 10,5       | 35               | 20,7 | 20,63          | 15,9 | 12,75          |

Corrosion-resistant design available by agreement.

- 1) Rolling contact diameter.
- 2) Effective dynamic load rating as track roller (radial).
- 3) Effective static load rating as track roller (radial).
- 4) Fatigue limit load.
- 5) Permissible dynamic limit load.
- 6) Permissible static limit load.

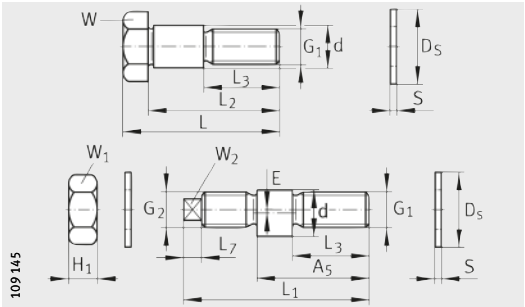


LFRI

|             |       |            |           | Load carrying capacity |                     |                    |                        |                         |
|-------------|-------|------------|-----------|------------------------|---------------------|--------------------|------------------------|-------------------------|
| $D_1$<br>j6 | $d_s$ | $D_a^{1)}$ | $r_{min}$ | $C_{rw}^{2)}$<br>N     | $C_{Orw}^{3)}$<br>N | $C_{ur}^{4)}$<br>N | $F_{r\ per}^{5)}$<br>N | $F_{Or\ per}^{6)}$<br>N |
| 12,6        | 6     | 22,8       | 0,5       | 4 100                  | 2 300               | 115                | 2 550                  | 4 600                   |
| 17,8        | 10    | 32,25      | 0,5       | 8 300                  | 5 000               | 250                | 4 550                  | 8 300                   |



Bolts



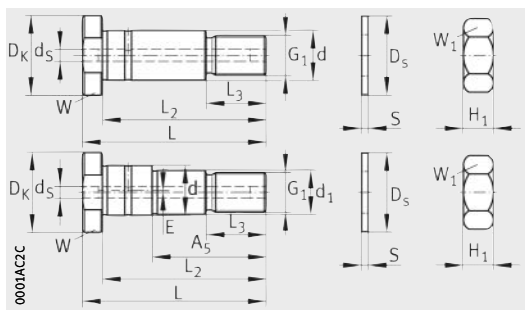
LFZ, LFE

Dimension table - Dimensions in mm

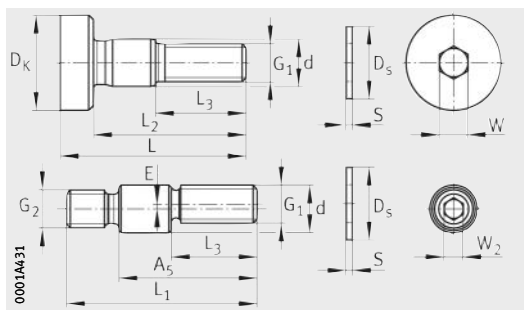
| Designation               | Mass<br><br>m<br>≈ kg | Dimensions |                |                |      |                |                |                |                |
|---------------------------|-----------------------|------------|----------------|----------------|------|----------------|----------------|----------------|----------------|
|                           |                       | d          | G <sub>1</sub> | G <sub>2</sub> | L    | L <sub>2</sub> | L <sub>3</sub> | L <sub>1</sub> | A <sub>5</sub> |
| LFZ05                     | 0,01                  | 5          | M4             | —              | 19,5 | 16             | 9,5            | —              | —              |
| LFE05-0,5                 |                       |            |                | M4             | —    | —              | 9              | 20             | 15             |
| LFZ08                     | 0,02                  | 8          | M8             | —              | 28,3 | 24,3           | 15             | —              | —              |
| LFE08-1                   |                       |            |                | M8×0,75        | —    | —              | 13             | 32,5           | 21,6           |
| LFZ12                     | 0,04                  | 12         | M10            | —              | 43   | 36             | 22             | —              | —              |
| LFE12-1                   |                       |            |                | M10            | —    | —              | 19,5           | 50             | 33,5           |
| LFZ12/M12                 | 0,06                  |            | M12            | —              | 50,8 | 43,8           | 24             | —              | —              |
| LFE12-1/M12               |                       |            |                | M12            | —    | —              | —              | 57             | 41             |
| LFZ15                     | 0,06                  | 15         | M12            | —              | 50,8 | 43,8           | 23,8           | —              | —              |
| LFE15-1                   |                       |            |                | M12            | —    | —              | 24             | 57             | 41             |
| LFZ12×45-A1 <sup>2)</sup> | 0,04                  | 12         | M10×1,5        | —              | 50   | 45             | 16             | —              | —              |
| LFE12×45-A1 <sup>2)</sup> |                       |            |                | —              | —    | —              | —              | —              | 30             |
| LFZ20×67-A1               | 0,2                   | 20         | M16×1,5        | —              | 75   | 67             | 23             | —              | —              |
| LFE20×67-A1               |                       |            |                | —              | —    | —              | —              | —              | 45             |
| LFZ25×82-A1               | 0,4                   | 25         | M20×1,5        | —              | 92   | 82             | 30             | —              | —              |
| LFE25×82-A1               |                       |            |                | —              | —    | —              | —              | —              | 57             |
| LFZ30×95-A1               | 0,62                  | 30         | M24×1,5        | —              | 107  | 95             | 32             | —              | —              |
| LFE30×95-A1               |                       |            |                | —              | —    | —              | —              | —              | 67             |
| LFZ40×107-A1              | 1,1                   | 40         | M30×1,5        | —              | 117  | 107            | 42             | —              | —              |
| LFE40×107-A1              |                       |            |                |                | —    | —              |                |                | —              |
| LFZ40×115-A1              | 1,2                   |            |                |                | 125  | 115            | —              |                | —              |
| LFE40×115-A1              |                       |            |                |                | —    | —              | —              |                | 72             |

Corrosion-resistant design available by agreement.

- 1) No washer required.  
2) Without lubrication hole.



LFZ...A1, LFE...A1

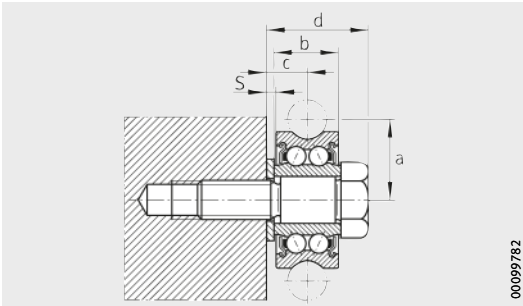


LFZ05 and LFE05-0,5

| L7     | Ds | E    | H1  | S   | DK | ds  | d1 | Width across flats |    |    |
|--------|----|------|-----|-----|----|-----|----|--------------------|----|----|
|        |    |      |     |     |    |     |    | W                  | W1 | W2 |
| –      | 10 | –    | –   | –1) | 10 | –   | –  | 3                  | –  | –  |
|        |    | 0,5  | 2,9 |     | –  |     |    | –                  | 7  | 2  |
| –<br>3 | 14 | –    | –   | 1   | –  | –   | –  | 13                 | –  | –  |
|        |    | 1    | 4   |     |    |     |    | –                  | 13 | 5  |
| –<br>5 | 21 | –    | –   | 1,8 | –  | –   | –  | 17                 | –  | –  |
|        |    | 1    | 8,4 |     |    |     |    | –                  | 17 | 6  |
| –<br>5 | 19 | –    | –   |     |    |     |    | 17                 | –  | –  |
|        |    | 1    | 6,5 |     |    |     |    | –                  | 17 | 6  |
| –<br>4 | 21 | –    | –   | 2   | –  | –   | –  | 19                 | –  | –  |
|        |    | 1    | 6,5 |     |    |     |    | –                  | 19 | 6  |
| –      | 21 | –    | 8   | 2   | 20 | –   | –  | 17                 | 17 | –  |
|        |    | 0,75 |     |     |    |     | 10 |                    |    |    |
| –      | 30 | –    | 13  | 3   | 30 | 5,9 | –  | 27                 | 24 | –  |
|        |    | 1    |     |     |    |     | 17 |                    |    |    |
| –      | 37 | –    | 16  | 3   | 40 | 5,9 | –  | 36                 | 30 | –  |
|        |    | 1    |     |     |    |     | 22 |                    |    |    |
| –      | 44 | –    | 19  | 4   | 45 | 5,9 | –  | 41                 | 36 | –  |
|        |    | 1    |     |     |    |     | 27 |                    |    |    |
| –      | 56 | –    | 24  | 4   | 55 | 5,9 | –  | 46                 | 46 | –  |
|        |    | 1    |     |     |    |     | 36 |                    |    |    |
|        |    | –    |     |     |    |     | –  |                    |    |    |
|        |    | 1    |     |     |    |     | 36 |                    |    |    |



# Non-locating bearing track rollers



LFR..-2RSR-NA

| Dimension table - Dimensions in mm |                          |                   |            |                  |                                 |                |      |    |                |                  |                                    |                                     |                                     |
|------------------------------------|--------------------------|-------------------|------------|------------------|---------------------------------|----------------|------|----|----------------|------------------|------------------------------------|-------------------------------------|-------------------------------------|
| Designation                        | Inner ring <sup>1)</sup> | Mass<br>m<br>≈ kg | Dimensions |                  |                                 |                |      |    |                |                  | Load carrying capacity             |                                     |                                     |
|                                    |                          |                   | d          | D <sub>max</sub> | B <sup>0</sup> <sub>-0,12</sub> | A <sub>T</sub> | C    | D  | d <sub>S</sub> | r <sub>min</sub> | C <sub>rw</sub> <sup>2)</sup><br>N | C <sub>0rw</sub> <sup>3)</sup><br>N | C <sub>urw</sub> <sup>4)</sup><br>N |
| LFR22/8-6-2RSR-NA                  | IR8×12×14                | 0,032             | 8          | 24               | 14                              | 14             | 11,8 | 12 | 6              | 0,3              | 4 000                              | 4 300                               | 630                                 |
| LFR2202-10-2RSR-NA                 | IR15×20×16               | 0,079             | 15         | 35               | 16                              | 20,63          | 13,8 | 20 | 10             | 0,3              | 6 500                              | 9 300                               | 1 310                               |
| LFR2204-10-2RSR-NA                 | IR20×25×20               | 0,17              | 20         | 47               | 20                              | 26,64          | 17,8 | 25 | 10             | 0,3              | 13 700                             | 18 600                              | 2 550                               |

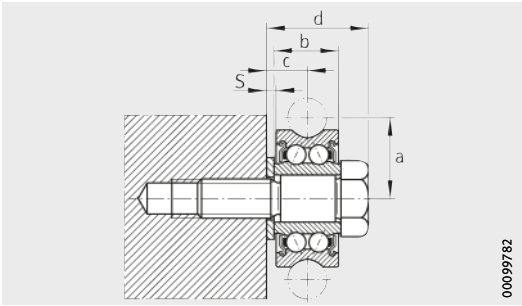
Non-locating bearing track rollers are also available without an inner ring: LFR..-2RSR-RNA.

Observe the guidelines relating to the adjacent construction, see page 72.

Corrosion-resistant design available by agreement.

- <sup>1)</sup> Lubrication hole in inner ring (diameter) 2 mm.
- <sup>2)</sup> Effective dynamic load rating as track roller (radial).
- <sup>3)</sup> Effective static load rating as track roller (radial).
- <sup>4)</sup> Fatigue limit load.

# Possible combinations of track rollers and bolts



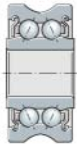
00099782

Mounting situation

| Dimension table · Dimensions in mm |                     |                 |      |     |      |      |
|------------------------------------|---------------------|-----------------|------|-----|------|------|
| Designation                        |                     | Dimensions      |      |     |      |      |
| Locating bearing track roller      | Bolt                | a <sup>1)</sup> | b    | S   | c    | d    |
| <b>LFR50/5-4-2Z<sup>2)</sup></b>   | <b>LFZ05</b>        | 9               | 8    | –   | 4    | 11,5 |
|                                    | <b>LFE05-0,5</b>    |                 |      |     |      |      |
| <b>LFR50/5-6-2Z</b>                | <b>LFZ05</b>        | 10,5            | 8    | 1   | 5    | 11,5 |
|                                    | <b>LFE05-0,5</b>    |                 |      |     |      |      |
| <b>LFR50/8-6-2Z</b>                | <b>LFZ08</b>        | 14              | 12   | 1   | 6,5  | 16   |
|                                    | <b>LFE08-1</b>      |                 |      |     |      | 20,5 |
| <b>LFR5201-10-2Z</b>               | <b>LFZ12</b>        | 20,65           | 17,7 | 1,8 | 9,7  | 24,7 |
|                                    | <b>LFE12-1</b>      |                 |      |     |      | 32,3 |
| <b>LFR5301-10-2Z</b>               | <b>LFZ12/M12</b>    | 24              | 20,8 | 1,8 | 11,3 | 27,8 |
|                                    | <b>LFE12-1/M12</b>  |                 |      |     |      | 34,8 |
| <b>LFR5302-10-2Z</b>               | <b>LFZ15</b>        | 26,65           | 21   | 2   | 11,5 | 28   |
|                                    | <b>LFE15-1</b>      |                 |      |     |      | 35   |
| <b>LFR5201-12-2Z</b>               | <b>LFZ12×45-A1</b>  | 21,75           | 17,9 | 2   | 9,9  | 22,9 |
|                                    | <b>LFE12×45-A1</b>  |                 |      |     |      |      |
| <b>LFR5204-16-2Z</b>               | <b>LFZ20×67-A1</b>  | 31,5            | 25,6 | 3   | 14,3 | 33,6 |
|                                    | <b>LFE20×67-A1</b>  |                 |      |     |      |      |
| <b>LFR5206-20-2Z</b>               | <b>LFZ25×82-A1</b>  | 41              | 28,8 | 3   | 15,9 | 38,8 |
|                                    | <b>LFE25×82-A1</b>  |                 |      |     |      |      |
| <b>LFR5206-25-2Z</b>               | <b>LFZ25×82-A1</b>  | 43,5            | 28,8 | 3   | 15,9 | 38,8 |
|                                    | <b>LFE25×82-A1</b>  |                 |      |     |      |      |
| <b>LFR5207-30-2Z</b>               | <b>LFZ30×95-A1</b>  | 51              | 33   | 4   | 18,5 | 45   |
|                                    | <b>LFE30×95-A1</b>  |                 |      |     |      |      |
| <b>LFR5208-40-2Z</b>               | <b>LFZ40×107-A1</b> | 62,5            | 42   | 4   | 23   | 52   |
|                                    | <b>LFE40×107-A1</b> |                 |      |     |      |      |
| <b>LFR5308-50-2Z</b>               | <b>LFZ40×115-A1</b> | 72,5            | 50   | 4   | 27   | 60   |
|                                    | <b>LFE40×115-A1</b> |                 |      |     |      |      |

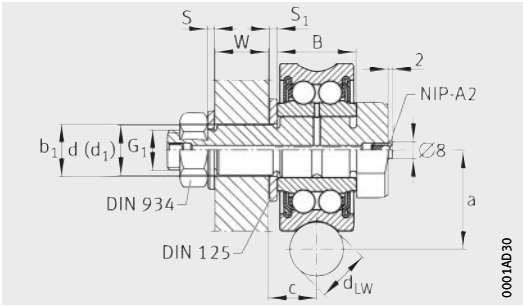
1) With eccentric bolts, the dimension a varies by ±E in accordance with the table, page 89.

2) No washer required.



# Possible combinations of track rollers and bolts

Flying bearing arrangement with bolt ...A1



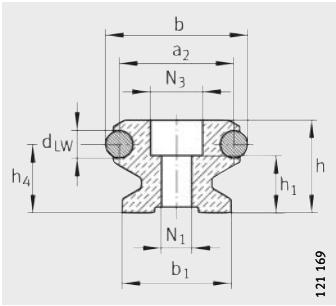
Bolt ...A1

| Dimension table · Dimensions in mm |              |            |      |    |                |                              |                 |                 |                     |                |                 |      |
|------------------------------------|--------------|------------|------|----|----------------|------------------------------|-----------------|-----------------|---------------------|----------------|-----------------|------|
| Designation                        |              | Dimensions |      |    |                |                              |                 |                 |                     |                |                 |      |
| Locating bearing<br>track roller   | Bolt         | a          | c    | d  | d <sub>1</sub> | G <sub>1</sub> <sup>1)</sup> | S <sup>2)</sup> | W <sup>3)</sup> | Washer<br>DIN 125-A |                | d <sub>LW</sub> | B    |
|                                    |              |            |      |    |                |                              |                 |                 | S <sub>1</sub>      | b <sub>1</sub> |                 |      |
| LFR5201-12-2Z                      | LFZ12×45-A1  | 21,75      | 9,75 | 12 | –              | M10×1,5                      | 2               | 12              | 2,5                 | 13             | 12              | 15,9 |
|                                    | LFE12×45-A1  |            |      | –  | 10             |                              |                 |                 | 2                   | 10,5           |                 |      |
| LFR5204-16-2Z                      | LFZ20×67-A1  | 31,5       | 11,3 | 20 | –              | M16×1,5                      | 3               | 20              | 3                   | 21             | 20              | 22,6 |
|                                    | LFE20×67-A1  |            |      | –  | 17             |                              |                 |                 | 3                   | 17             |                 |      |
| LFR5206-20-2Z                      | LFZ25×82-A1  | 41         | 12,9 | 25 | –              | M20×1,5                      | 3               | 25              | 4                   | 27             | 20              | 25,8 |
|                                    | LFE25×82-A1  |            |      | –  | 22             |                              |                 |                 | 3                   | 23             |                 |      |
| LFR5206-25-2Z                      | LFZ25×82-A1  | 43,5       | 12,9 | 25 | –              | M20×1,5                      | 3               | 25              | 4                   | 27             | 25              | 25,8 |
|                                    | LFE25×82-A1  |            |      | –  | 22             |                              |                 |                 | 3                   | 23             |                 |      |
| LFR5207-30-2Z                      | LFZ30×95-A1  | 51         | 14,5 | 30 | –              | M24×1,5                      | 4               | 32              | 4                   | 31             | 30              | 29   |
|                                    | LFE30×95-A1  |            |      | –  | 27             |                              |                 |                 | 4                   | 28             |                 |      |
| LFR5208-40-2Z                      | LFZ40×107-A1 | 62,5       | 19   | 40 | –              | M30×1,5                      | 4               | 40              | 6                   | 41             | 40              | 38   |
|                                    | LFE40×107-A1 |            |      | –  | 36             |                              |                 |                 | 5                   | 37             |                 |      |
| LFR5308-50-2Z                      | LFZ40×115-A1 | 72,5       | 23   | 40 | –              | M30×1,5                      | 4               | 40              | 6                   | 41             | 40              | 46   |
|                                    | LFE40×115-A1 |            |      | –  | 36             |                              |                 |                 | 5                   | 37             |                 |      |

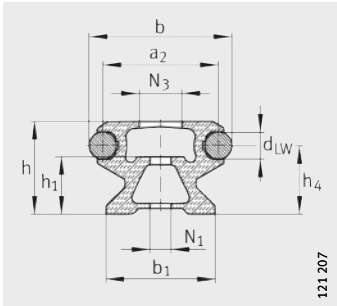
1) For nuts in accordance with DIN 934, included in the scope of delivery.  
2) For washers in accordance with DIN 125, included in the scope of delivery.  
3) Recommended minimum wall thickness.



# Guideways



LFS



LFS...C

Dimension table - Dimensions in mm

| Designation             | Mass<br>m<br><br>≈ kg | Dimensions |      |                 | Mounting dimensions |       |       |            |      |            |      |
|-------------------------|-----------------------|------------|------|-----------------|---------------------|-------|-------|------------|------|------------|------|
|                         |                       | b          | h    | $l_{\max}^{1)}$ | $b_1$               | $a_2$ | $j_L$ | $a_L^{2)}$ |      | $a_R^{2)}$ |      |
|                         |                       |            |      |                 |                     |       |       | min.       | max. | min.       | max. |
| LFS20                   | 0,6                   | 20         | 12,2 | 2 400           | 17                  | 16    | 62,5  | 9          | 54   | 9          | 54   |
| LFS25                   | 1,1                   | 25         | 15   | 2 400           | 21                  | 19    | 62,5  | 10         | 54   | 10         | 54   |
| LFS32                   | 1,6                   | 32         | 20   | 6 000           | 24                  | 26    | 125   | 11         | 116  | 11         | 116  |
| LFS32-E                 |                       |            |      |                 |                     |       | 62,5  |            | 52   |            | 52   |
| LFS32-C <sup>4)</sup>   | 1,1                   |            |      |                 |                     |       | 125   |            | 116  |            | 116  |
| LFS32-CE <sup>4)</sup>  |                       |            |      |                 |                     |       | 62,5  |            | 52   |            | 52   |
| LFS32-F                 | 1                     |            | 10   | 4 000           | —                   |       | 125   |            | 116  |            | 116  |
| LFS42-C <sup>4)</sup>   |                       | 42         | 20   | 6 000           | 28                  | 32    | 125   | 20         | 113  | 20         | 113  |
| LFS42-CE <sup>4)</sup>  | 2,2                   |            |      |                 |                     |       | 62,5  |            | 51   |            | 51   |
| LFS42-F                 |                       |            |      |                 |                     |       | 125   |            | 17   |            | 17   |
| LFS52                   |                       | 52         | 34   | 6 000           | 40                  | 42    | 250   | 17         | 235  | 17         | 235  |
| LFS52-E                 | 4,4                   |            |      |                 |                     |       | 125   |            | 110  |            | 110  |
| LFS52-EE                |                       |            |      |                 |                     |       | 62,5  |            | 49   |            | 49   |
| LFS52-C <sup>4)</sup>   |                       |            |      |                 |                     |       | 250   |            | 235  |            | 235  |
| LFS52-CE <sup>4)</sup>  |                       |            |      |                 |                     |       | 125   |            | 110  |            | 110  |
| LFS52-CEE <sup>4)</sup> | 3                     |            |      |                 |                     |       | 62,5  |            | 49   |            | 49   |
| LFS52-F                 |                       |            | 18   | —               | —                   | —     | 250   |            | 235  |            | 235  |
| LFS52-FE                |                       |            |      |                 |                     |       | 125   |            | 110  |            | 110  |
| LFS86-C <sup>4)</sup>   |                       | 86         | 34   | 6 000           | 71                  | 76    | 250   | 17         | 235  | 17         | 235  |
| LFS86-CE <sup>4)</sup>  | 4,4                   |            |      |                 |                     |       | 125   |            | 110  |            | 110  |
| LFS120                  |                       | 120        | 25   | 8 000           | 100                 | 110   | 250   | 17         | 235  | 17         | 235  |
| LFS120-E                | 7,9                   |            |      |                 |                     |       | 125   |            | 110  |            | 110  |

Guideways of corrosion-resistant design: LFS...RB, observe note on page 18.

Modulus of elasticity for LFS...C (-CE, -CEE, -E, -EE, -F, -FE): 72 000 N/mm<sup>2</sup>.

Guideways LFS, LFS...C and LFS...F available without holes: LFS...OL (-C-OL, -F-OL).

① Underside marked

1) Maximum length of single-piece guideways; longer guideways are supplied in several sections and are marked accordingly.  
Observe the length tolerances, see page 30.

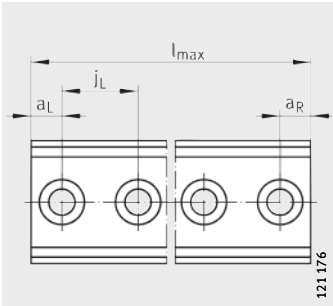
2)  $a_L$  and  $a_R$  are dependent on the guideway length  $l_{\max}$ , calculation: see page 80.

3) Under maximum load  $F_z$  and  $F_{0z}$ , support washers to DIN 433 and the maximum tightening torque according to the table, page 29, are required.

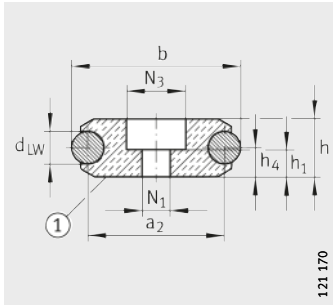
4) The design of the hollow sections is dependent on the size.

5) Counterbore depth for screws to DIN 7984.

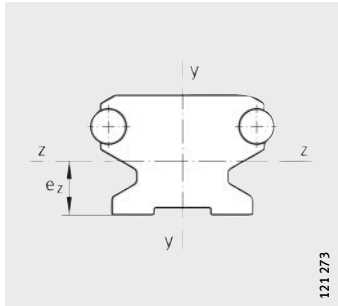
6) If support washers to DIN 433 are used, screws to DIN 7984 are recommended.



LFS, LFS...-C (-F)  
View rotated 90°

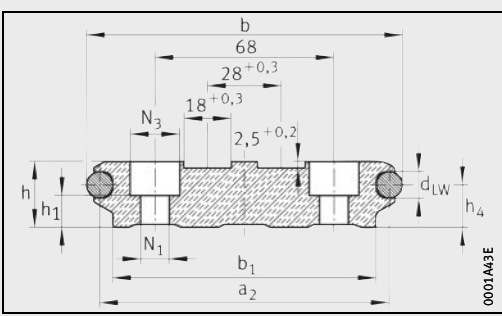
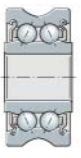


LFS...-F

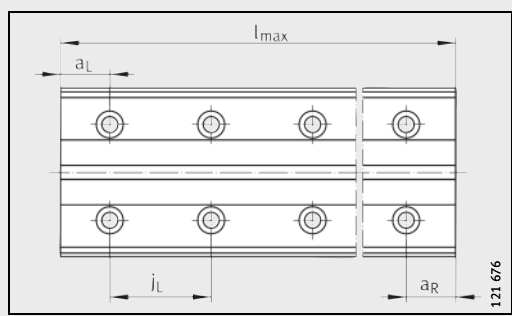


Bending axes

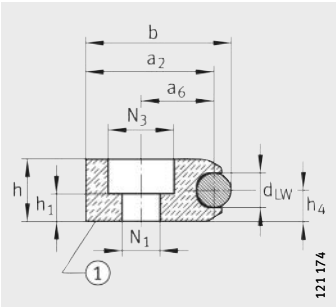
|                 |                |                   |                |                              | Surface data                            |                                   |                                   |                      |                                   |                                   |
|-----------------|----------------|-------------------|----------------|------------------------------|-----------------------------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------------------|-----------------------------------|
| d <sub>LW</sub> | h <sub>4</sub> | h <sub>1</sub>    | N <sub>1</sub> | N <sub>3</sub> <sup>3)</sup> | Cross-sectional area<br>mm <sup>2</sup> | y-y                               |                                   | z-z                  |                                   |                                   |
|                 |                |                   |                |                              |                                         | I <sub>y</sub><br>mm <sup>4</sup> | W <sub>y</sub><br>mm <sup>3</sup> | e <sub>z</sub><br>mm | I <sub>z</sub><br>mm <sup>4</sup> | W <sub>z</sub><br>mm <sup>3</sup> |
| 4               | 9              | 7,6               | 4,5            | 8                            | 165                                     | 3 065                             | 362                               | 6,4                  | 2 053                             | 324                               |
| 6               | 10,6           | 8,5               | 5,5            | 10                           | 237                                     | 6 390                             | 608                               | 7,5                  | 4 510                             | 600                               |
| 6               | 15             | 12                | 6,5            | 12                           | 440                                     | 20 100                            | 1 440                             | 10,4                 | 14 100                            | 1 360                             |
|                 |                |                   |                |                              | 261                                     | 18 305                            | 1 165                             | 10,1                 | 10 072                            | 995                               |
|                 | 5              | 3,5 <sup>5)</sup> |                |                              | 230                                     | 11 300                            | 810                               | 5                    | 2 190                             | 438                               |
| 10              | 12,6           | 12 <sup>6)</sup>  | 9              | 15                           | 358                                     | 33 929                            | 1 858                             | 10,1                 | 14 052                            | 1 391                             |
|                 | 7,5            | 8 <sup>5)</sup>   |                |                              | 370                                     | 29 280                            | 1 864                             | 7,5                  | 16 200                            | 2 160                             |
| 10              | 25,1           | 21                | 11             | 19                           | 1 170                                   | 138 624                           | 5 878                             | 17,8                 | 113 037                           | 6 350                             |
|                 |                |                   |                |                              | 649                                     | 113 821                           | 4 896                             | 17,1                 | 74 878                            | 4 378                             |
|                 | 9              | 8 <sup>5)</sup>   |                |                              | 670                                     | 84 000                            | 3 610                             | 9                    | 19 900                            | 2 211                             |
| 10              | 25,1           | 21 <sup>6)</sup>  | 13             | 21                           | 1 185                                   | 613 720                           | 16 587                            | 17,5                 | 155 160                           | 8 866                             |
| 10              | 16,1           | 12                | 11             | 19                           | 2 468                                   | 2 330 980                         | 40 751                            | 12,5                 | 9 365                             | 117 074                           |



LFS120



LFS120



LFS...-FH

| Dimension table · Dimensions in mm |                       |            |    |                                |                     |                |                |                              |      |                              |      |
|------------------------------------|-----------------------|------------|----|--------------------------------|---------------------|----------------|----------------|------------------------------|------|------------------------------|------|
| Designation                        | Mass<br>m<br><br>≈ kg | Dimensions |    |                                | Mounting dimensions |                |                |                              |      |                              |      |
|                                    |                       | b          | h  | l <sub>max</sub> <sup>1)</sup> | a <sub>2</sub>      | a <sub>6</sub> | j <sub>L</sub> | a <sub>L</sub> <sup>2)</sup> |      | a <sub>R</sub> <sup>2)</sup> |      |
|                                    |                       |            |    |                                |                     |                |                | min.                         | max. | min.                         | max. |
| LFS32-FH                           | 0,8                   | 26         | 10 | 4 000                          | 23                  | 13             | 125            | 11                           | 116  | 6                            | 116  |
| LFS32-FHE                          |                       |            |    |                                |                     |                | 62,5           |                              | 52   |                              | 52   |
| LFS52-FH                           | 2,3                   | 42         | 18 | 6 000                          | 37                  | 21             | 250            | 17                           | 235  | 10                           | 235  |
| LFS52-FHE                          |                       |            |    |                                |                     |                | 125            |                              | 110  |                              | 110  |
| LFS52-FHEE                         |                       |            |    |                                |                     |                | 62,5           |                              | 49   |                              | 49   |

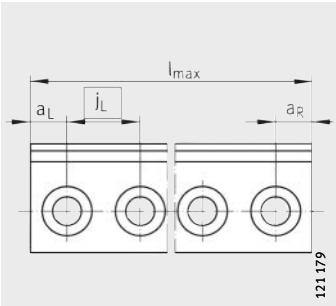
Guideways of corrosion-resistant design: LFS...-RB, observe note on page 18.

Guideways LFS...-FH available without holes: LFS...-FH-OL.

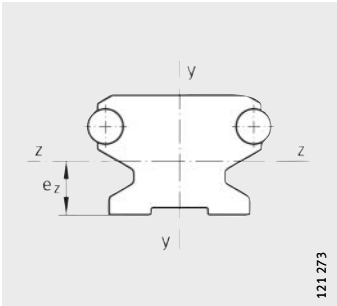
Modulus of elasticity for LFS...-FH (-FHE, -FHEE): 72 000 N/mm<sup>2</sup>.

① Underside marked

- 1) Maximum length of single-piece guideways; longer guideways are supplied in several sections and are marked accordingly. Observe the length tolerances, see page 30.
- 2) a<sub>L</sub> and a<sub>R</sub> are dependent on the guideway length l<sub>max</sub>, calculation: see page 80.
- 3) For screw to DIN 912-8.8 (DIN EN ISO 4762), under maximum load support washers to DIN 433 (DIN EN ISO 7092) are required.
- 4) Counterbore depth for screws to DIN 7984.



LFS...FH  
View rotated 90°

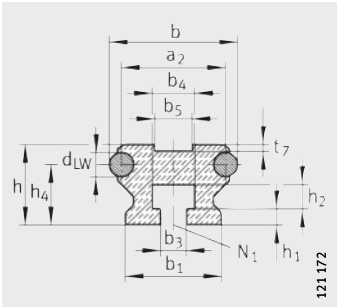


Bending axes

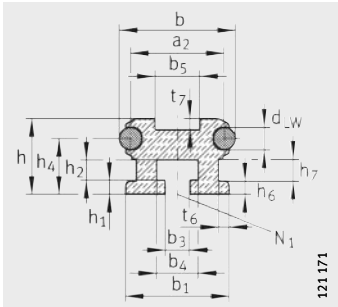
|                 |                 |                |                              |                | Surface data                            |                                   |                                   |                      |                                   |                                   |
|-----------------|-----------------|----------------|------------------------------|----------------|-----------------------------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------------------|-----------------------------------|
| d <sub>LW</sub> | h <sub>1</sub>  | h <sub>4</sub> | N <sub>1</sub> <sup>3)</sup> | N <sub>3</sub> | Cross-sectional area<br>mm <sup>2</sup> | y-y                               |                                   | z-z                  |                                   |                                   |
|                 |                 |                |                              |                |                                         | I <sub>y</sub><br>mm <sup>4</sup> | W <sub>y</sub><br>mm <sup>3</sup> | e <sub>z</sub><br>mm | I <sub>z</sub><br>mm <sup>4</sup> | W <sub>z</sub><br>mm <sup>3</sup> |
| 6               | 3,5             | 5              | 6,5                          | 12             | 216                                     | 8 681                             | 790                               | 5                    | 1 897                             | 379                               |
| 10              | 8 <sup>4)</sup> | 9              | 11                           | 19             | 629                                     | 66 642                            | 3 765                             | 9                    | 17 798                            | 1 977                             |



Guideways



LFS32-N



LFS52-NZZ

Dimension table · Dimensions in mm

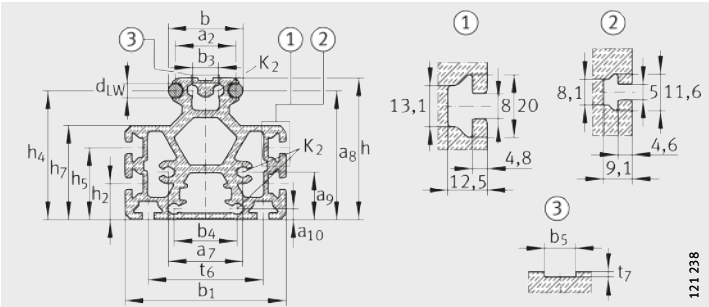
| Designation           | Mass<br>m | Dimensions |      |                                | Mounting dimensions |                |                              |                |                |                |                |                              |                 |                |                |                |                |
|-----------------------|-----------|------------|------|--------------------------------|---------------------|----------------|------------------------------|----------------|----------------|----------------|----------------|------------------------------|-----------------|----------------|----------------|----------------|----------------|
|                       |           | b          | h    | l <sub>max</sub> <sup>1)</sup> | b <sub>1</sub>      | a <sub>2</sub> | b <sub>3</sub> <sup>2)</sup> | b <sub>4</sub> | b <sub>5</sub> | t <sub>6</sub> | a <sub>7</sub> | j <sub>L</sub> <sup>3)</sup> | d <sub>LW</sub> | h <sub>1</sub> | h <sub>2</sub> | h <sub>5</sub> | h <sub>4</sub> |
|                       | ≈ kg/m    |            |      |                                |                     |                |                              |                |                |                |                |                              |                 |                |                |                |                |
| LFS25-M <sup>5)</sup> | 3,5       | 25         | 46   | 4 000                          | 56                  | 19             | –                            | –              | 5,2            | 30             | –              | –                            | 6               | –              | 22             | –              | 41,6           |
| LFS32-M <sup>5)</sup> | 6,4       | 32         | 66,5 | 8 000                          | 75                  | 26             | –                            | –              | 10,2           | 43             | –              | –                            | 6               | –              | 25             | –              | 61             |
| LFS32-N               | 1,4       |            | 20   | 4 000                          | 24                  |                | 6,5                          | 10,5           | 10,5           | –              | –              | 125                          |                 | 4              | 6              | 15             |                |
| LFS52-M <sup>5)</sup> | 11,2      | 52         | 98,6 | 8 000                          | 112                 | 42             | 18                           | 44             | 10,2           | 80             | 52             | –                            | 10              | –              | 25             | 50             | 89,7           |
| LFS52-NZZ             | 3,9       |            | 34   |                                | 46,5                |                | 11                           | 18,5           | 18,5           | 4,7            | –              | 250                          |                 | 6,4            | 9              | –              | 25,1           |

Guideways of corrosion-resistant design: LFS..-RB, observe note on page 18.

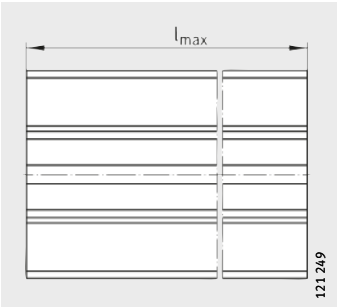
Modulus of elasticity for LFS..-M (-N, -NZZ, -ZZ): 72 000 N/mm<sup>2</sup>.

① For LFS52-M and LFS32-M; ② For LFS25-M; ③ Detail of slot

- 1) Maximum length of single-piece guideways; longer guideways are supplied in several sections and are marked accordingly. Observe the length tolerances, see page 30.
- 2) For screw to DIN 931 (DIN EN ISO 4014), DIN 933-8.8 (DIN EN ISO 4017), special support washers included in scope of delivery for guideways LFS52-NZZ.
- 3) Recommended screw pitch (hole spacing), see page 80.
- 4) One core hole for non-cutting thread drill or self-tapping screws to DIN 7513.
- 5) The guideway LFS..-M can only be combined with carriages with adjustable clearance. If SF and LFCL carriages are to be used, please contact us in advance.

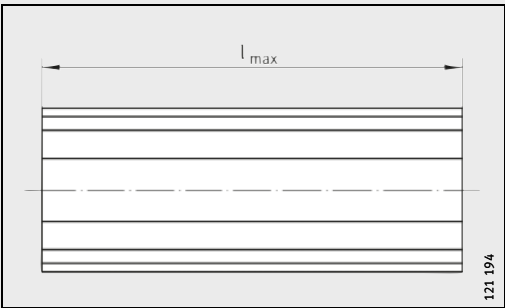


LFS...-M

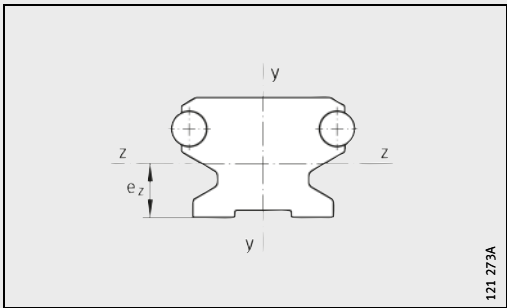


LFS...-M  
View rotated 90°

|       |       |       |          |       |       |       |                     | Surface data         |                 |                 |       |                 |                 |
|-------|-------|-------|----------|-------|-------|-------|---------------------|----------------------|-----------------|-----------------|-------|-----------------|-----------------|
| $h_7$ | $h_6$ | $t_7$ | $a_{10}$ | $a_9$ | $a_8$ | $N_1$ | $K_2$               | Cross-sectional area | y-y             |                 | z-z   |                 |                 |
|       |       |       |          |       |       |       | $\varnothing^{(4)}$ |                      | $I_y$           | $W_y$           | $e_z$ | $I_z$           | $W_z$           |
|       |       |       |          |       |       |       |                     | mm <sup>2</sup>      | mm <sup>4</sup> | mm <sup>3</sup> | mm    | mm <sup>4</sup> | mm <sup>3</sup> |
| 31,5  | –     | 1,6   | –        | –     | –     | –     | 4,65                | 1 156                | 314 429         | 11 230          | 19,4  | 186 693         | 9 623           |
| 47    | –     | 1,6   | –        | –     | –     | –     | –                   | 2 206                | 1 000 234       | 26 672          | 36,8  | 762 105         | 20 707          |
| –     | –     | –     | –        | –     | –     | M6    | –                   | 360                  | 19 600          | 1 400           | 11,1  | 12 600          | 1 135           |
| 65,4  | –     | 1,8   | 7,5      | 33    | 89,7  | –     | 7,45                | 3 691                | 3 717 250       | 66 380          | 42,6  | 3 014 470       | 55 462          |
| 10    | 6     | 5     | –        | –     | –     | M10   | –                   | 994                  | 170 350         | 7 327           | 16,8  | 82 786          | 4 927           |

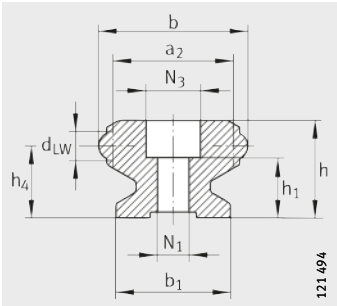


LSF52-NZZ  
View rotated 90°

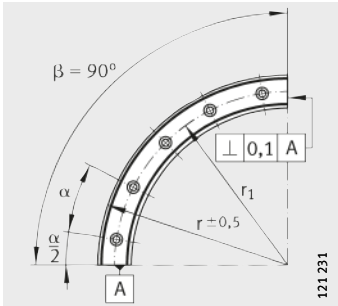


Bending axes

Guideways



LFSR...-ST



LFSR../90-ST

Dimension table · Dimensions in mm

| Designation       | Mass<br>m<br>≈ kg | Dimensions |    |     |        |                |                |
|-------------------|-------------------|------------|----|-----|--------|----------------|----------------|
|                   |                   | b          | h  | r   | β<br>° | b <sub>1</sub> | a <sub>2</sub> |
| LFSR32-100/90-ST  | 0,5               | 32         | 20 | 100 | 90     | 24             | 26             |
| LFSR32-100/180-ST | 1                 |            |    |     | 180    |                |                |
| LFSR32-100/360-ST | 2                 |            |    |     | 360    |                |                |
| LFSR32-150/90-ST  | 0,8               |            |    | 150 | 90     |                |                |
| LFSR32-150/180-ST | 1,6               |            |    |     | 180    |                |                |
| LFSR32-150/360-ST | 3,2               |            |    |     | 360    |                |                |
| LFSR32-300/90-ST  | 1,7               |            |    | 300 | 90     |                |                |
| LFSR32-300/180-ST | 3,4               |            |    |     | 180    |                |                |
| LFSR32-300/360-ST | 6,8               |            |    |     | 360    |                |                |
| LFSR32-500/90-ST  | 2,9               |            |    | 500 | 90     |                |                |
| LFSR32-500/180-ST | 5,8               |            |    |     | 180    |                |                |
| LFSR32-500/360-ST | 11,6              |            |    |     | 360    |                |                |
| LFSR52-150/90-ST  | 2                 | 52         | 34 | 150 | 90     | 40             | 42             |
| LFSR52-150/180-ST | 4                 |            |    |     | 180    |                |                |
| LFSR52-150/360-ST | 8                 |            |    |     | 360    |                |                |
| LFSR52-300/90-ST  | 4,5               |            |    | 300 | 90     |                |                |
| LFSR52-300/180-ST | 9                 |            |    |     | 180    |                |                |
| LFSR52-300/360-ST | 18                |            |    |     | 360    |                |                |
| LFSR52-500/90-ST  | 7,8               |            |    | 500 | 90     |                |                |
| LFSR52-500/180-ST | 15,6              |            |    |     | 180    |                |                |
| LFSR52-500/360-ST | 31,2              |            |    |     | 360    |                |                |

Attention!

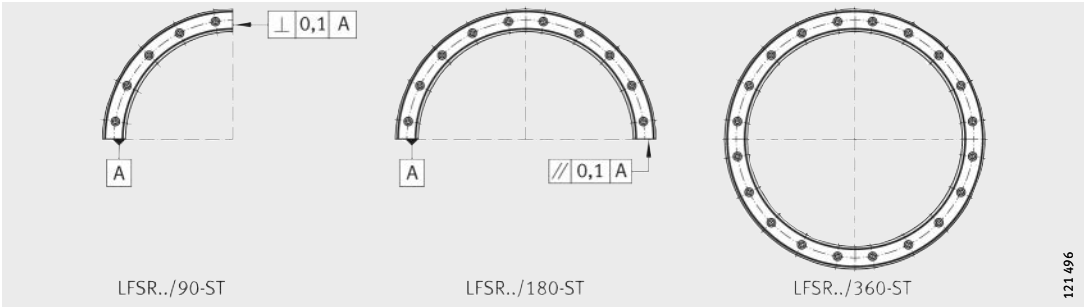
If curved guideway elements are required in combination with straight guideway sections, these must always be ordered together as a unit.

Note the guidelines relating to mounting of curved guideway elements, see page 27.

Corrosion-resistant design available by agreement.

1) For screw to DIN ISO 4762-8.8.

2) Number of holes on the pitch circle r<sub>1</sub>.

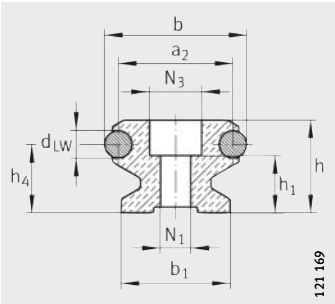


LFSR..-ST

| $d_{LW}$ | $h_1$ | $h_4$ | $N_1^{1)}$ | $N_3$ | $x^{2)}$ | $r_1$ | $\alpha_o$ | $\alpha/2_o$ |
|----------|-------|-------|------------|-------|----------|-------|------------|--------------|
| 6        | 13,5  | 15    | 6,5        | 12    | 3        | 84    | 30         | 15           |
|          |       |       |            |       | 6        |       |            |              |
|          |       |       |            |       | 12       |       |            |              |
|          |       |       |            |       | 3        | 134   | 30         | 15           |
|          |       |       |            |       | 6        |       |            |              |
|          |       |       |            |       | 12       |       |            |              |
|          |       |       |            |       | 4        | 284   | 22,5       | 11,25        |
|          |       |       |            |       | 8        |       |            |              |
|          |       |       |            |       | 16       |       |            |              |
|          |       |       |            |       | 5        | 484   | 18         | 9            |
| 10       | 21    | 25,1  | 11         | 19    | 10       |       |            |              |
|          |       |       |            |       | 20       |       |            |              |
|          |       |       |            |       | 3        | 124   | 30         | 15           |
|          |       |       |            |       | 6        |       |            |              |
|          |       |       |            |       | 12       |       |            |              |
|          |       |       |            |       | 4        | 274   | 22,5       | 11,25        |
|          |       |       |            |       | 8        |       |            |              |
|          |       |       |            |       | 16       |       |            |              |
|          |       |       |            |       | 5        | 474   | 18         | 9            |
|          |       |       |            |       | 10       |       |            |              |
|          |       |       |            |       | 20       |       |            |              |



# Closed oval tracks with guideway connectors VBS

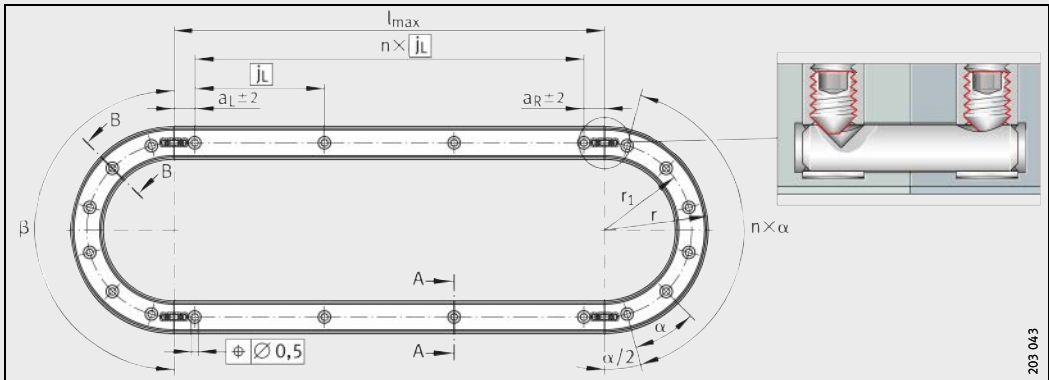


LFS (section A–A)

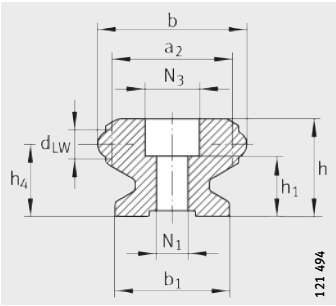
| Dimension table · Dimensions in mm |                                 |            |    |              |                 |                     |       |
|------------------------------------|---------------------------------|------------|----|--------------|-----------------|---------------------|-------|
| Closed oval tracks                 |                                 | Dimensions |    |              |                 | Mounting dimensions |       |
| Designation                        |                                 | b          | h  | $\beta$<br>° | $l_{\max}^{1)}$ | $b_1$               | $a_2$ |
| with two 180° arcs                 | with four 90° arcs              |            |    |              |                 |                     |       |
| –                                  | <b>LFS32×...×...-OV-100-VBS</b> | 32         | 20 | 90           | 6 000           | 24                  | 26    |
| <b>LFS32×...-OV-100-VBS</b>        | –                               |            |    | 180          |                 |                     |       |
| –                                  | <b>LFS32×...×...-OV-150-VBS</b> |            |    | 90           |                 |                     |       |
| <b>LFS32×...-OV-150-VBS</b>        | –                               |            |    | 180          |                 |                     |       |
| –                                  | <b>LFS32×...×...-OV-300-VBS</b> |            |    | 90           |                 |                     |       |
| <b>LFS32×...-OV-300-VBS</b>        | –                               |            |    | 180          |                 |                     |       |
| –                                  | <b>LFS32×...×...-OV-500-VBS</b> |            |    | 90           |                 |                     |       |
| <b>LFS32×...-OV-500-VBS</b>        | –                               |            |    | 180          |                 |                     |       |
| –                                  | <b>LFS52×...×...-OV-150-VBS</b> | 52         | 34 | 90           | 6 000           | 40                  | 42    |
| <b>LFS52×...-OV-150-VBS</b>        | –                               |            |    | 180          |                 |                     |       |
| –                                  | <b>LFS52×...×...-OV-300-VBS</b> |            |    | 90           |                 |                     |       |
| <b>LFS52×...-OV-300-VBS</b>        | –                               |            |    | 180          |                 |                     |       |
| –                                  | <b>LFS52×...×...-OV-500-VBS</b> |            |    | 90           |                 |                     |       |
| <b>LFS52×...-OV-500-VBS</b>        | –                               |            |    | 180          |                 |                     |       |

Attention!  
 If curved guideway elements are required in combination with straight guideway sections, these must always be ordered together as a unit.  
 Closed oval tracks can only be ordered as a single unit.  
 A unit consists of two curved guideway elements LFSR with an arc dimension 180° and two straight guideways LFS or a unit of four curved guideways LFSR with an arc dimension 90° and four straight guideways LFS.  
 Note the guidelines relating to mounting of curved guideway elements, see page 27.

- 1) Maximum length of single-piece guideways.
- 2) For screw to DIN ISO 4762-8.8.
- 3) Number of holes on the pitch circle  $r_1$ .

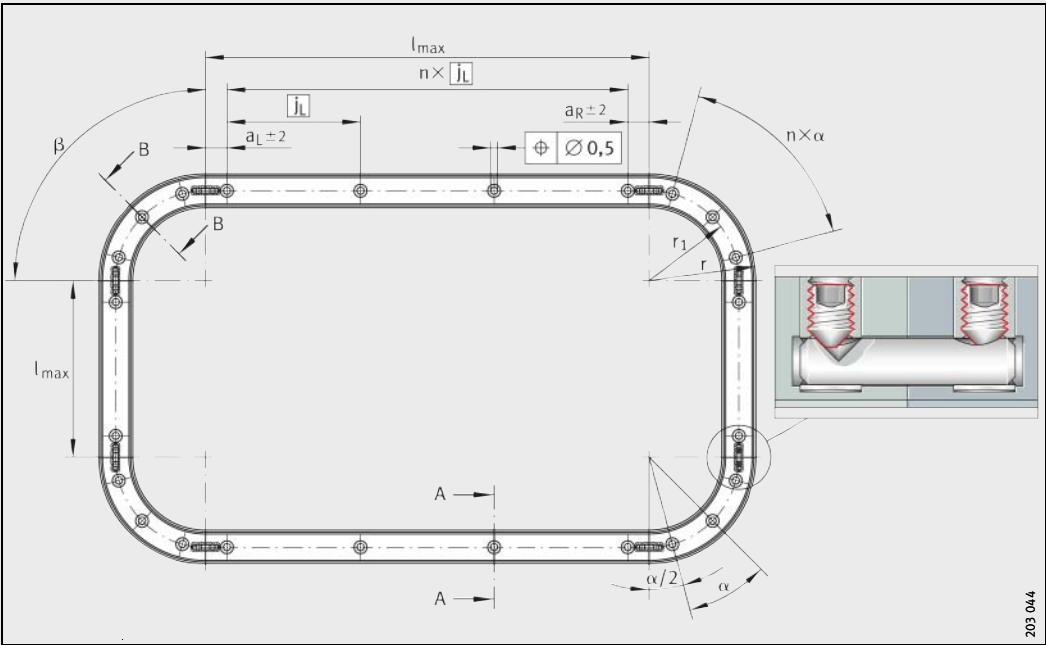


Closed oval track with two 180° arcs

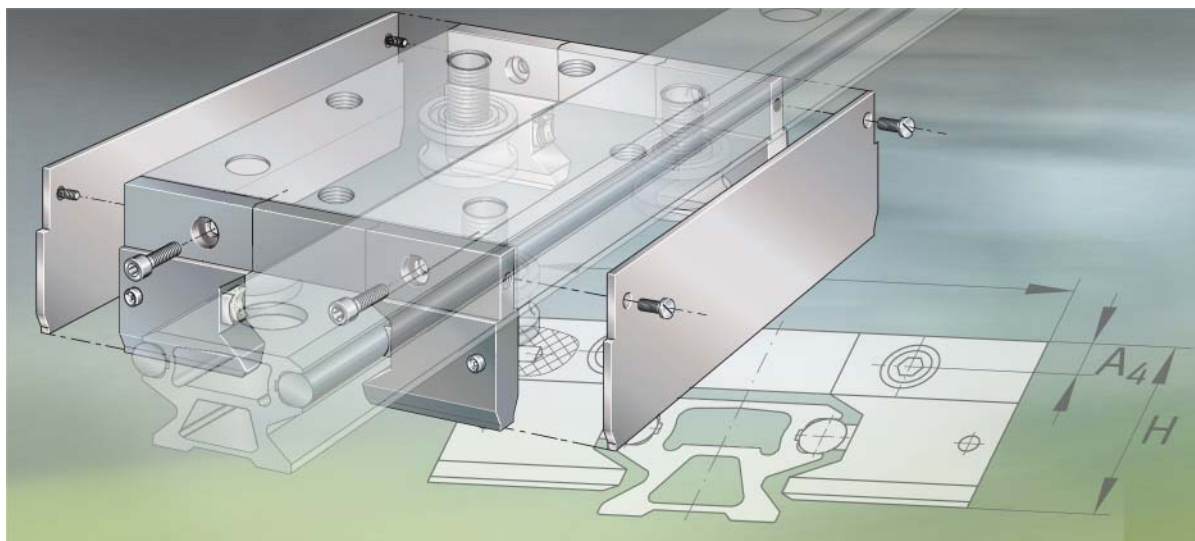


LFSR (section B–B)

| j <sub>L</sub> | a <sub>L</sub> , a <sub>R</sub> |      | d <sub>LW</sub> | h <sub>1</sub> | h <sub>4</sub> | N <sub>1</sub> <sup>2)</sup> | N <sub>3</sub> | x <sup>3)</sup> | r   | r <sub>1</sub> | α <sub>o</sub> |
|----------------|---------------------------------|------|-----------------|----------------|----------------|------------------------------|----------------|-----------------|-----|----------------|----------------|
|                | min.                            | max. |                 |                |                |                              |                |                 |     |                |                |
| 125            | 36                              | 116  | 6               | 12             | 15             | 6,5                          | 12             | 3               | 100 | 84             | 30             |
|                | 6                               |      |                 |                |                |                              |                |                 |     |                |                |
|                | 3                               |      |                 |                |                |                              |                | 150             | 134 | 22,5           |                |
|                | 6                               |      |                 |                |                |                              |                |                 |     |                |                |
|                | 4                               |      |                 |                |                |                              |                | 300             | 284 | 18             |                |
|                | 8                               |      |                 |                |                |                              |                |                 |     |                |                |
|                | 5                               |      |                 |                |                |                              |                | 500             | 484 | 18             |                |
| 10             |                                 |      |                 |                |                |                              |                |                 |     |                |                |
| 250            | 49                              | 235  | 10              | 21             | 25             | 11                           | 19             | 3               | 150 | 124            | 30             |
|                | 6                               |      |                 |                |                |                              |                |                 |     |                |                |
|                | 4                               |      |                 |                |                |                              |                | 300             | 274 | 22,5           |                |
|                | 8                               |      |                 |                |                |                              |                |                 |     |                |                |
|                | 5                               |      |                 |                |                |                              |                | 500             | 474 | 18             |                |
|                | 10                              |      |                 |                |                |                              |                |                 |     |                |                |



Closed oval track with four 90° arcs



## Accessories

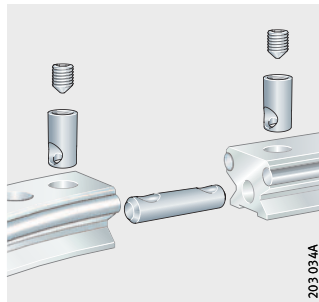
# Accessories

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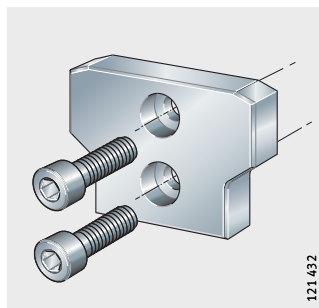
**Guideway connector  
for guideways**

VBS



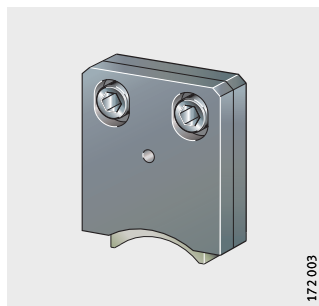
**End plate**

ANS.LFS

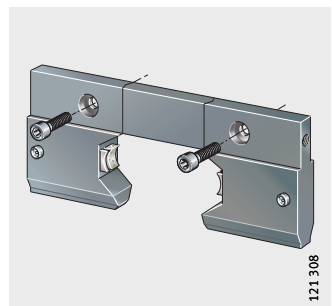


**Lubrication and  
wiper units**

AB.W

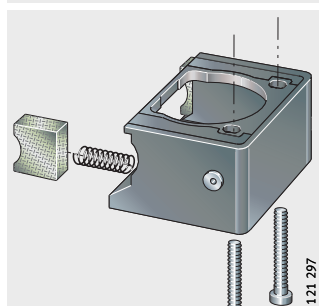


AB



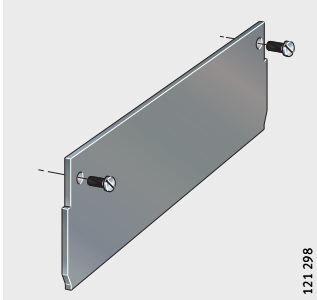
**Cap wipers**

AB.LFR



## Side plate

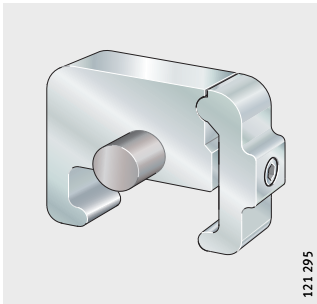
ABAL



121 298

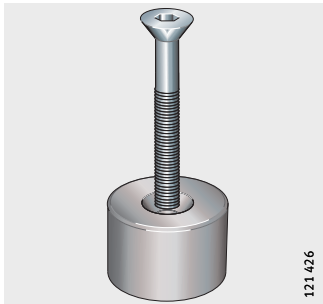
## Stops

PAH



121 295

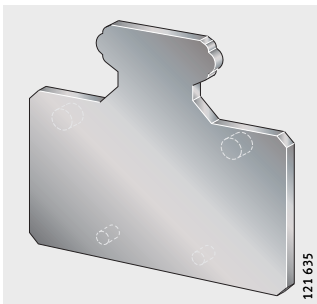
PASTP



121 426

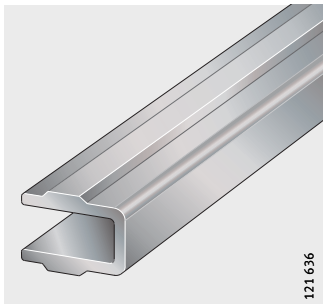
## End cover Slot closing strip

KA.LFS



121 635

NAD

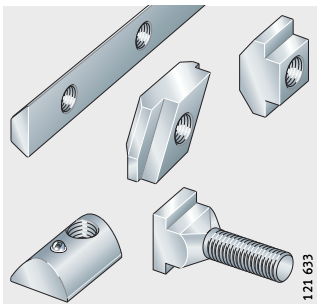


121 636

## Fasteners

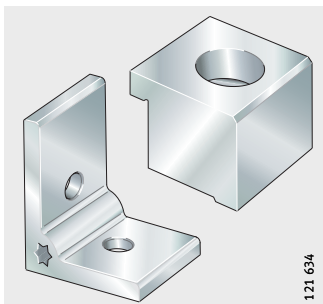
- Fixing screw
- T-nuts
- T-bolt
- T-strip
- Fixing bracket
- Fixing lug

MU, SHR, LEIS-M



121 633

WKL, SPPR



121 634



# Accessories

## Features

### Guideway connector for guideways

Guideway connectors VBS are accessories for curved and straight LFS guideways.

They comprise:

- pins
- bushes
- grub screws.

The guideway connectors are suitable for all LF guideways. Joined curved guideways are supplied as standard with the guideway connector. Joined straight guideways are available as an option with the guideway connector.

The VBS reduces running noise at the joint, ensures an increased operating life for the guidance system and improves the operational reliability.

### End plate

End plates ANS.LFS (also for use with hollow section guideways) are made from steel. They secure the rolled-in raceway shafts by means of form fit. In the case of solid section guideways, holes must be made in the end faces (by the customer) for screw mounting of the end plates.

The end plates prevent the shaft creep that can occur under unfavourable conditions on all guideways that comprise an aluminium support rail into which a steel shaft is rolled or pressed.



These can be supplied already fitted, but this must be indicated when ordering.

# Lubrication and wiper units

## Design AB.W

The lubrication and wiper unit AB.W comprises a plastic housing and is fixed to the adjacent construction. It contains a felt lubrication insert. This is supplied soaked with oil that has H1 approval and can be replenished with oil via a hole in the housing if necessary.

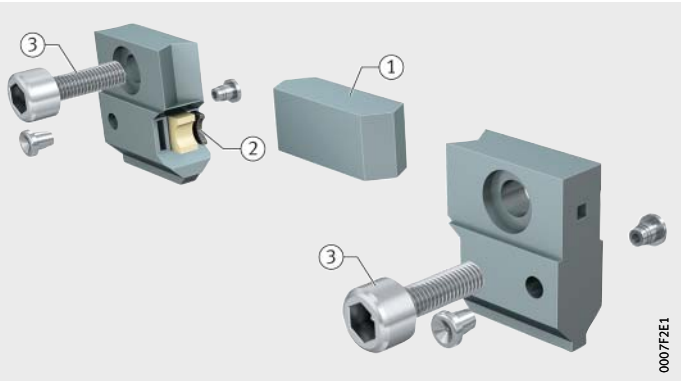
Lubrication and wiper units AB.W are supplied with fixing screws.

## Design AB

The lubrication and wiper unit AB comprises a plastic housing and is screw mounted to the end of the carriage LFL-SF or LFDL. It contains felt lubrication inserts on both sides. These are supplied soaked with oil that has H1 approval and can be replenished with oil via lubrication nipples if necessary. The lubrication and wiper units AB can be fixed to carriages using two screws.

If the lubrication and wiper unit AB is used together with a stop PAH or PASTP, the central section must be removed, see *Figure 1*.

- ① Central section, supplied loose
- ② Felt lubrication inserts
- ③ Fixing screws, supplied loose



*Figure 1*  
Lubrication and wiper unit AB



## Accessories

### Cap wipers

The cap wipers comprise a plastic housing and are slid over the track roller from below. They contain felt lubrication inserts on both sides. These are supplied soaked with oil that has H1 approval and can be replenished with oil via lubrication nipples if necessary.

The cap wipers can be fixed using two screws to the screw mounting channels in the carriage LFCL and thus seal the track rollers from below at the screw head. When bolts LFZ and LFE are used in an application design, this gives a gap.

Cap wipers are supplied with fixing screws.

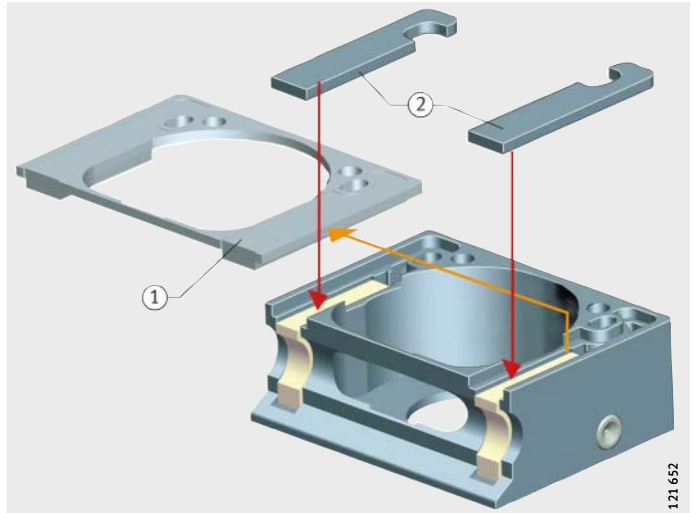
### Design AB.LFR

If two or more AB.LFR are used per side, the displacement resistance can be reduced by removing the felt insert on the inner side.

AB.LFR are suitable for mounting on the carriage LFCL42 as well as customer designs. For mounting on the carriage LFCL42, the upper cover must be replaced by the two covers supplied, *Figure 2*.

- ① For mounting on the customer design
- ② For mounting on LFCL42

*Figure 2*  
Mounting on carriage LFCL



### Design AB.LFR5302

An exception is the cap wiper AB.LFR5302. This comprises an end cover and a relubrication and wiper unit AB.W10 that can be screw mounted to either the right or left of the end cover. Its function and location correspond to those of the other sizes.

**Side plate** The side plate ABAL is made from plastic and can be screw mounted to the sides of carriages LFL...SF. The side plates are used to supplement the lubrication and wiper units AB. The carriage can be sealed on all sides, with the exception of the underside, by means of two side plates and two lubrication and wiper units.

The side plate is supplied with fixing screws.

It can only be mounted in conjunction with the lubrication and wiper unit AB.

## **Stops**

**Design PAH** The stop PAH comprises anodised aluminium and a buffer made from shock-absorbent plastic. The stop can be placed at any position on guideways. It is then clamped in place by means of a screw.

The stop is used as an end stop or restricts the travel of the carriage.

The central section of lubrication and wiper units must be removed if the carriage is to run up against a stop PAH, see page 109.

**Design PASTP** The stop PASTP is made from plastic. It can be screw mounted in a threaded hole (to be made by the customer) in guideways. This hole can be drilled at any position on guideways LFS. The stop is used as an end stop or restricts the travel of the carriage.

The central section of lubrication and wiper units must be removed if the carriage is to run up against a stop PASTP, see page 109.

**End cover** End covers KA are made from plastic. The end covers close off the end faces of the hollow sections in guideways LFS...C and LFS...M as well as in the hollow section carriage LFCL.

**Slot closing strip** Slot closing strips NAD are made from plastic. They close off the slots in the guideway LFS...M. For information on NAD, see publication AL 1, Driven Linear Units.



# Accessories

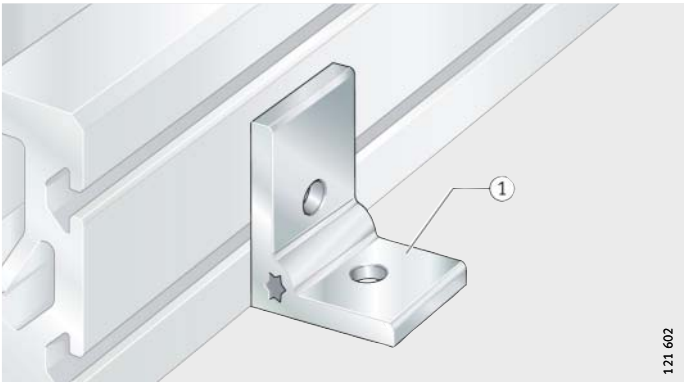
## Fasteners

### Fixing brackets, fixing lugs

For location of LFS-M with the integral profiled aluminium support rail, fixing brackets and fixing lugs are available, *Figure 3, Figure 4, Figure 5* and table, page 113.

① WKL

Figure 3  
Fixing brackets



① SPPR

Figure 4  
Fixing lug

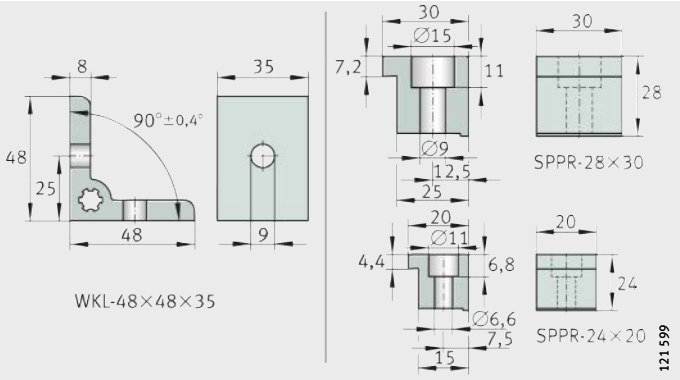
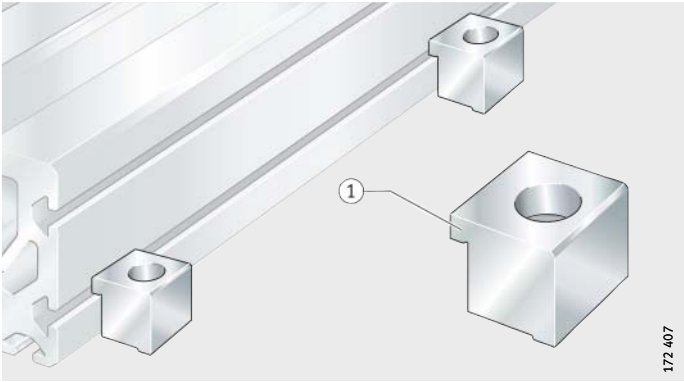


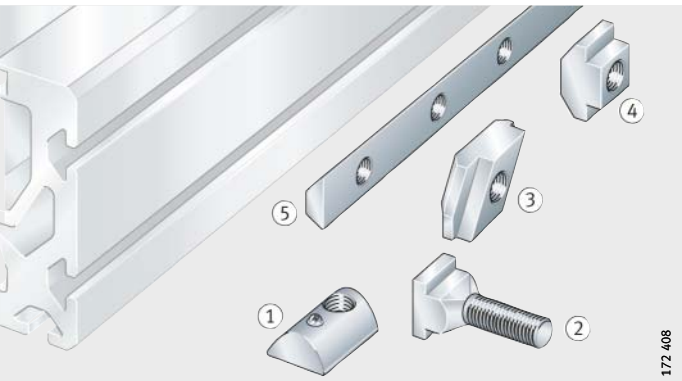
Figure 5  
Fixing brackets and fixing lugs

T-strip, T-nuts, T-bolts

For integration in existing systems or for extension, T-strips, T-nuts and corresponding T-bolts are available, *Figure 6* and table.

- ① MU...POS
- ② SHR-DIN787-M8×8×32
- ③ MU-M
- ④ MU-DIN508
- ⑤ LEIS-M, T-slot

Figure 6  
Fixing screws and T-nuts



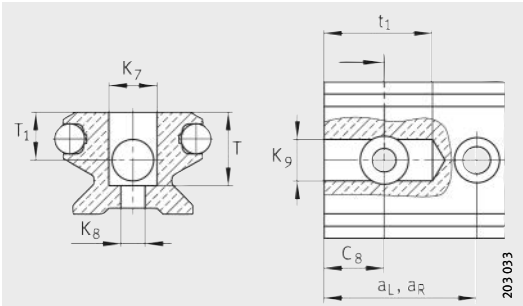
Fasteners and designations

| Fastener                               | Designation                                                                                  |
|----------------------------------------|----------------------------------------------------------------------------------------------|
| Fixing bracket                         | WKL-48×48×35                                                                                 |
| For slot width 8 mm (LFS32-M, LFS52-M) |                                                                                              |
| Clamping lug                           | SPPR-28×30                                                                                   |
| T-nut                                  | MU-DIN508-M4×8<br>MU-DIN508-M6×8                                                             |
| Rotatable T-nut                        | MU-M4×8-Rhombus<br>MU-M6×8-Rhombus                                                           |
| Positionable T-nut                     | MU-M6×8-POS<br>MU-M8×8-POS                                                                   |
| T-bolt                                 | SHR-DIN787-M8×8×32                                                                           |
| T-strip (steel)<br>Hole spacing 50 mm  | LEIS-M6/8-T-Nut (state length) <sup>1)</sup><br>LEIS-M8/8-T-Nut (state length) <sup>1)</sup> |
| For slot width 5 mm (LFS25-M)          |                                                                                              |
| Clamping lug                           | SPPR-24×20                                                                                   |
| T-nut                                  | MU-DIN508-M4×5                                                                               |
| Positionable T-nut                     | MU-M5×5-POS                                                                                  |

<sup>1)</sup> Maximum single-piece length: 2 000 mm.



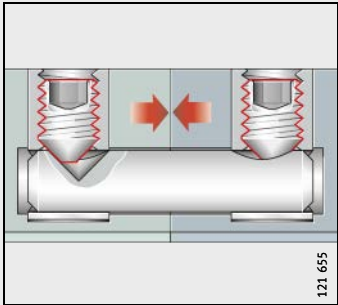
# Guideway connectors for guideways LFS



VBS

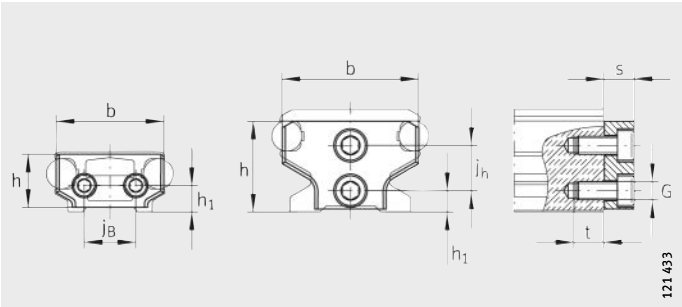
| Dimension table - Dimensions in mm |            |                        |                        |                        |                        |                        |                        |                |                        |                                                           |
|------------------------------------|------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|------------------------|-----------------------------------------------------------|
| Designation                        | Dimensions |                        |                        |                        |                        |                        |                        |                |                        | For guideway                                              |
|                                    | T          | T <sub>1</sub><br>±0,1 | t <sub>1</sub><br>+0,5 | a <sub>L</sub><br>min. | a <sub>R</sub><br>min. | C <sub>8</sub><br>±0,1 | K <sub>7</sub><br>+0,2 | K <sub>8</sub> | K <sub>9</sub><br>+0,5 |                                                           |
| VBS32                              | 16,5       | 10                     | 25                     | 30                     | 30                     | 15                     | 12                     | 6,5            | 9                      | LFS32, LFS32-E                                            |
| VBS32-R100                         |            |                        | 17                     | 22                     |                        | 9                      |                        |                |                        | LFS32, LFS32-E                                            |
| VBS42                              | 16,5       | 10                     | 25                     | 30                     | 30                     | 15                     | 12                     | 6,5            | 9                      | LFS42-C, LFS42-CE                                         |
| VBS52                              | 30         | 22                     | 30                     | 40                     | 40                     | 20                     | 16                     | 8              | 13                     | LFS52, LFS52-E, LFS52-EE,<br>LFS52-C, LFS52-CE, LFS52-CEE |
| VBS52-R150                         |            |                        | 23                     | 33                     |                        | 14                     |                        |                |                        | LFS52, LFS52-E, LFS52-EE,<br>LFS52-C, LFS52-CE, LFS52-CEE |

Attention!  
If these are to be used with curved guideways LFSR or with straight guideways not included in the table, please contact us.



Guideway connector VBS

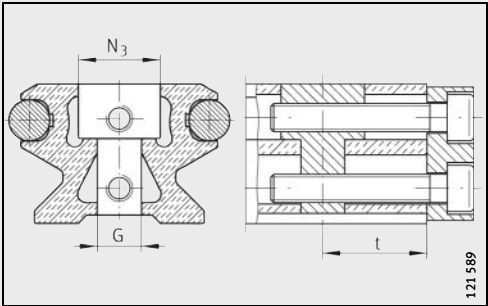
End plate



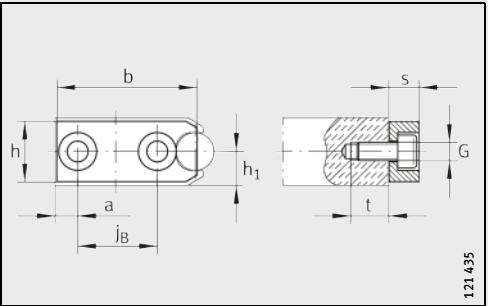
ANS.LFS, ANS.LFS42-C, ANS.LFS86-C, ANS.LFS..-NZZ

| Dimension table · Dimensions in mm |            |                |     |    |    |                     |    |                |                |         |                 |
|------------------------------------|------------|----------------|-----|----|----|---------------------|----|----------------|----------------|---------|-----------------|
| Designation                        | Dimensions |                |     |    |    |                     |    |                |                |         | For<br>guideway |
|                                    | b          | j <sub>B</sub> | a   | s  | t  | N <sub>3</sub><br>Ø | h  | h <sub>1</sub> | j <sub>h</sub> | G       |                 |
| ANS.LFS20                          | 15,4       | –              | –   | 6  | 12 | –                   | 11 | 6,2            | –              | M5      | LFS20           |
| ANS.LFS25                          | 20         | –              | –   | 5  | 7  | –                   | 14 | 4              | 7              | M3      | LFS25           |
| ANS.LFS32                          | 30         | –              | –   | 8  | 7  | –                   | 19 | 5              | 10             | M4      | LFS32           |
| ANS.LFS32-C                        |            |                |     |    | 15 | 12H13               | –  | –              | –              | Ø6,5H13 | LFS32-C         |
| ANS.LFS32-F                        | 26         | 11             | 9   | 6  | –  | –                   | 9  | 5              | –              | M4      | LFS32-F         |
| ANS.LFS32-FH                       | 22         | 9              |     |    | 7  |                     |    | –              |                | M3      | LFS32-FH        |
| ANS.LFS32-N                        | 26         | 11             |     |    | –  |                     |    | 15             |                | M4      | LFS32-N         |
| ANS.LFS42-C                        | 35,5       | 17             | –   | 8  | 7  | –                   | 18 | 8              | –              | M4      | LFS42-C         |
| ANS.LFS52                          | 45         | –              | –   | 10 | 10 | –                   | 30 | 7              | 15             | M6      | LFS52           |
| ANS.LFS52-C                        |            |                |     |    | 20 | 19H13               | 30 | –              | –              | Ø11H13  | LFS52-C         |
| ANS.LFS52-F                        | 42         | 21             | 6,5 | 8  | 10 | –                   | 16 | 9              | –              | M5      | LFS52-F         |
| ANS.LFS52-FH                       | 37         | 20             |     |    |    |                     |    | –              |                |         | LFS52-FH        |
| ANS.LFS52-NZZ                      | 42         | 21             |     |    |    |                     |    | 24             |                |         | LFS52-NZZ       |
| ANS.LFS86-C                        | 80         | 54,1           | –   | 9  | 20 | –                   | 30 | 17,5           | –              | M6      | LFS86-C         |
| ANS.LFS120                         | 114        | 80             | –   | 5  | 10 | –                   | 16 | 8              | –              | M6      | LFS120          |

ANS cannot be mounted on:  
LFS32-C: a<sub>L</sub>, a<sub>R</sub> < 28 mm  
LFS52-C: a<sub>L</sub>, a<sub>R</sub> < 40 mm.



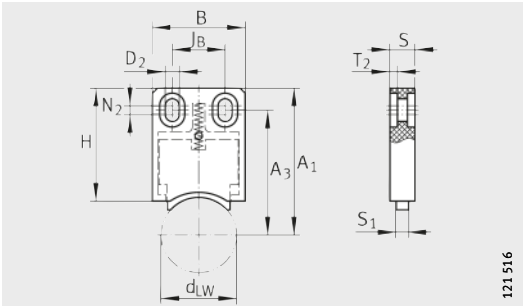
ANS.LFS32-C, ANS.LFS-52-C (hollow section)



ANS.LFS..-F (-FH)



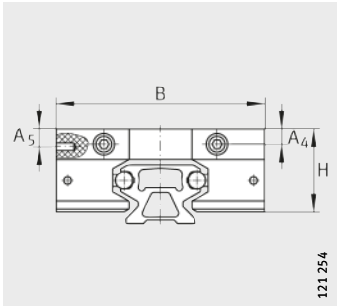
# Lubrication and wiper units



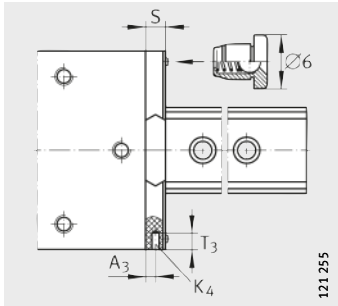
AB.W

| Dimension table - Dimensions in mm |                   |                 |      |    |    |                        |                |                |                |                |                |                |                                 |
|------------------------------------|-------------------|-----------------|------|----|----|------------------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------------------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions      |      |    |    |                        |                |                |                |                |                |                | For track roller                |
|                                    |                   | d <sub>LW</sub> | B    | S  | H  | J <sub>B</sub><br>±0,1 | D <sub>2</sub> | T <sub>2</sub> | S <sub>1</sub> | A <sub>1</sub> | N <sub>2</sub> | A <sub>3</sub> |                                 |
| AB.W10                             | 0,03              | 10              | 22,5 | 10 | 45 | 10                     | 4,5            | 3              | 5              | 49             | 4              | 40,3           | LFR5201,<br>LFR5301,<br>LFR5302 |
| AB.W12                             | 0,03              | 12              | 22,5 | 10 | 45 | 10                     | 4,5            | 3              | 5              | 51             | 4              | 42,3           | LFR5201-12                      |
| AB.W16                             | 0,03              | 16              | 22,5 | 10 | 45 | 10                     | 4,5            | 3              | 5              | 52             | 4              | 43,3           | LFR5204-16                      |
| AB.W20                             | 0,03              | 20              | 22,5 | 10 | 45 | 10                     | 4,5            | 3              | 5              | 54             | 4              | 45,3           | LFR5206-20                      |
| AB.W25                             | 0,03              | 25              | 37   | 10 | 45 | 21                     | 5,5            | 3              | 5              | 54             | 3,5            | 45,3           | LFR5206-25                      |
| AB.W30                             | 0,03              | 30              | 37   | 10 | 45 | 21                     | 5,5            | 3              | 5              | 59             | 3,5            | 50,3           | LFR5207-30                      |
| AB.W40                             | 0,03              | 45              | 37   | 10 | 45 | 21                     | 5,5            | 3              | 5              | 71             | 3,5            | 62,3           | LFR5208-40                      |
| AB.W50                             | 0,03              | 50              | 37   | 10 | 45 | 21                     | 5,5            | 3              | 5              | 76             | 3,5            | 67,3           | LFR5308-50                      |

# Lubrication and wiper units



AB

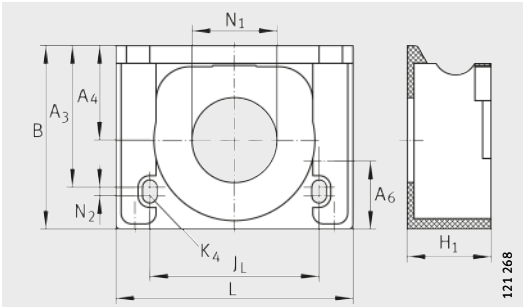


AB  
View rotated 90°

| Dimension table - Dimensions in mm |                       |            |                |    |                |      |                |                |                                             |                                                                         |
|------------------------------------|-----------------------|------------|----------------|----|----------------|------|----------------|----------------|---------------------------------------------|-------------------------------------------------------------------------|
| Designation                        | Mass<br>m<br><br>≈ kg | Dimensions |                |    |                |      |                |                |                                             | For carriage                                                            |
|                                    |                       | B          | T <sub>3</sub> | S  | A <sub>3</sub> | H    | A <sub>4</sub> | A <sub>5</sub> | K <sub>4</sub><br>For screws<br>to DIN 7972 |                                                                         |
| AB32                               | 0,03                  | 80         | 6              | 11 | 5              | 32   | 7              | 7              | ST2,9                                       | LFL32-SF, LFL52-SF,<br>LFL52-E-SF, LFDL32-SF,<br>LFDL32-B <sup>1)</sup> |
| AB52                               | 0,1                   | 120        | 20             | 18 | 8,5            | 45,5 | 9,7            | 15             | ST4,8                                       | LFL32-SF, LFL52-SF,<br>LFL52-E-SF, LFDL32-SF,<br>LFDL32-B               |
| AB52-E                             | 0,13                  | 135        | 20             | 18 | 8,5            | 55   | 12             | 20,6           | ST4,8                                       | LFL32-SF, LFL52-SF,<br>LFL52-E-SF                                       |
| AB.LFLL32                          | 0,03                  | 80         | 6              | 11 | 5              | 32   | 7              | 7              | ST2,9                                       | LFLL32-SF <sup>1)</sup>                                                 |
| AB.LFLL52                          | 0,1                   | 120        | 20             | 18 | 8,5            | 45,5 | 9,7            | 15             | ST4,8                                       | LFLL52-SF                                                               |

1) Please contact us.

Cap wipers

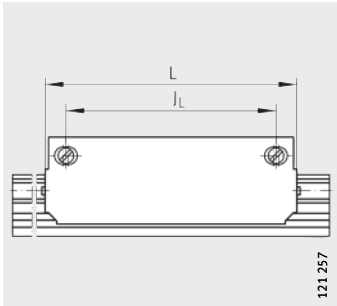


AB.LFR

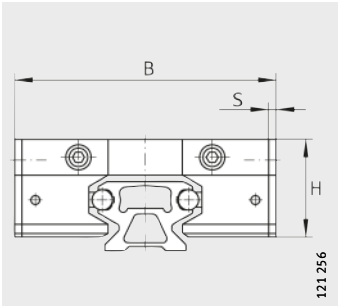
| Dimension table - Dimensions in mm |                   |            |                |                |                |                |           |                |                |                |                        |              |          |
|------------------------------------|-------------------|------------|----------------|----------------|----------------|----------------|-----------|----------------|----------------|----------------|------------------------|--------------|----------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions |                |                |                |                |           |                |                |                |                        | For          |          |
|                                    |                   | B          | A <sub>3</sub> | A <sub>4</sub> | N <sub>2</sub> | A <sub>6</sub> | L<br>±0,1 | J <sub>L</sub> | H <sub>1</sub> | K <sub>4</sub> | N <sub>1</sub><br>+0,1 | track roller | carriage |
| AB.LFR50/8                         | 0,02              | 31,6       | 25,9           | 15,6           | 2              | 6,4            | 51        | 28,5           | 15             | M3             | 15                     | LFR50/8      | LFCL25   |
| AB.LFR5201                         | 0,02              | 43,3       | 33,4           | 22,3           | 2              | 16             | 56        | 40             | 21,3           | M3             | 20                     | LFR5201      | LFCL42   |
| AB.LFR5301                         | 0,03              | 50         | 38,7           | 26             | 2              | 10,4           | 76        | 46             | 25             | M3             | 20                     | LFR5301      | LFCL86   |
| AB.LFR5302 <sup>1)</sup>           | –                 | 57         | 46             | –              | 1,5            | 15,5           | 58        | 48             | 31             | M3             | –                      | LFR5302      | –        |

1) Observe the note on page 110.

# Side plate



ABAL

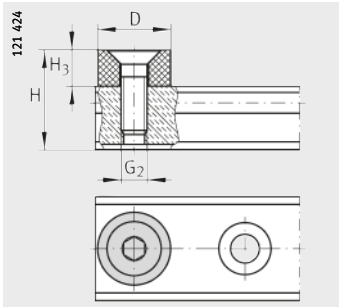


ABAL

| Dimension table · Dimensions in mm |                   |            |   |     |                |      |              |
|------------------------------------|-------------------|------------|---|-----|----------------|------|--------------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions |   |     |                |      | For carriage |
|                                    |                   | B          | S | L   | J <sub>L</sub> | H    |              |
| ABAL32                             | 0,03              | 86         | 3 | 112 | 100            | 32   | LFL32-SF     |
| ABAL52                             | 0,04              | 130        | 5 | 136 | 117            | 49,5 | LFL52-SF     |
| ABAL52-E                           | 0,05              | 145        | 5 | 186 | 167            | 55   | LFL52-E-SF   |



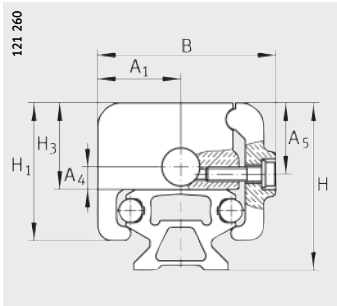
# Stops



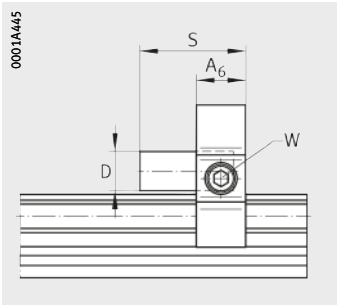
PASTP

| Dimension table - Dimensions in mm |                   |            |                |                |      |              |
|------------------------------------|-------------------|------------|----------------|----------------|------|--------------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions |                |                |      | For guideway |
|                                    |                   | D          | H <sub>3</sub> | G <sub>2</sub> | H    |              |
| PASTP20                            | 0,008             | 14         | 7              | M5             | 22,2 | LFS20        |
| PASTP25                            | 0,008             | 14         | 7              | M5             | 25   | LFS25        |
| PASTP32                            | 0,01              | 16         | 11             | M6             | 31   | LFS32        |
| PASTP42                            | 0,01              | 16         | 11             | M6             | 31   | LFS42-C      |
| PASTP52                            | 0,01              | 20         | 11             | M8             | 45   | LFS52        |
| PASTP86                            | 0,01              | 20         | 11             | M8             | 45   | LFS86-C      |

Stops



PAH

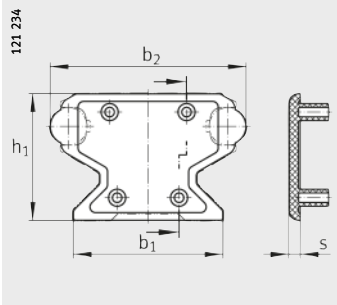


PAH  
View rotated 90°

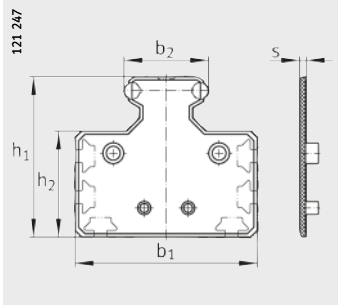
| Dimension table · Dimensions in mm |      |            |                |    |                |    |      |                |                |                |                |                          |                |
|------------------------------------|------|------------|----------------|----|----------------|----|------|----------------|----------------|----------------|----------------|--------------------------|----------------|
| Designation                        | Mass | Dimensions |                |    |                |    |      |                |                |                |                |                          | For guideway   |
|                                    | m    | B          | A <sub>1</sub> | S  | A <sub>6</sub> | D  | H    | H <sub>1</sub> | H <sub>3</sub> | A <sub>4</sub> | A <sub>5</sub> | Width<br>across<br>flats |                |
|                                    | ≈ kg |            |                |    |                |    |      |                |                |                |                | W                        |                |
| PAH32                              | 0,05 | 46         | 21             | 30 | 15             | 10 | 39   | 32             | 19             | 7              | 14             | 5                        | LFS32-C        |
| PAH52                              | 0,17 | 75         | 35             | 43 | 20             | 16 | 70,5 | 58             | 36,5           | 9,5            | 30             | 6                        | LFS52-C (-NZZ) |



End cover



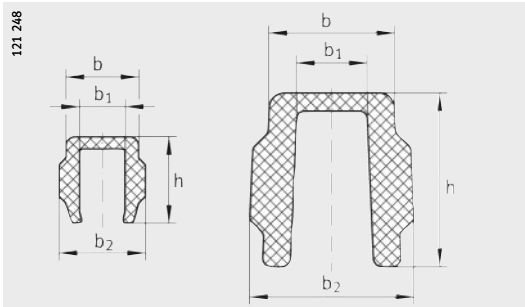
KA.LFS...-C



KA.LFS...-M

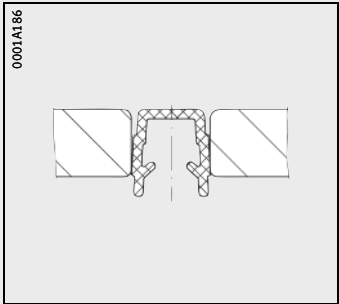
| Dimension table - Dimensions in mm |                   |                |                |   |                |                |              |
|------------------------------------|-------------------|----------------|----------------|---|----------------|----------------|--------------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions     |                |   |                |                | For guideway |
|                                    |                   | b <sub>2</sub> | b <sub>1</sub> | S | h <sub>1</sub> | h <sub>2</sub> |              |
| KA.LFS25-M                         | 0,01              | 24,4           | 55,4           | 3 | 45,4           | 30,9           | LFS25-M      |
| KA.LFS32-C                         | 0,01              | 31,4           | 23,4           | 3 | 19,4           | —              | LFS32-C      |
| KA.LFS32-M                         | 0,012             | 31,4           | 75,4           | 3 | 59,9           | 46,4           | LFS32-M      |
| KA.LFS42-C                         | 0,012             | 41,4           | 27,4           | 3 | 19,4           | —              | LFS42-C      |
| KA.LFS52-C                         | 0,013             | 51,6           | 39,5           | 3 | 33,4           | —              | LFS52-C      |
| KA.LFS52-M                         | 0,015             | 51,6           | 111,4          | 4 | 98             | 64,8           | LFS52-M      |
| KA.LFS86-C                         | 0,015             | 85,6           | 70,4           | 3 | 33,4           | —              | LFS86-C      |

# Slot closing strip



NAD

| Dimension table · Dimensions in mm |                   |            |                |                |      |                  |
|------------------------------------|-------------------|------------|----------------|----------------|------|------------------|
| Designation                        | Mass<br>m<br>≈ kg | Dimensions |                |                |      | For guideway     |
|                                    |                   | b          | b <sub>1</sub> | b <sub>2</sub> | h    |                  |
| NAD5×5,7                           | 0,012             | 4,8        | 3              | 5,7            | 5,7  | LFS25-M          |
| NAD8×11,5                          | 0,027             | 8,2        | 5,5            | 9,2            | 11,5 | LFS32-M, LFS52-M |



NAD5×5,7



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