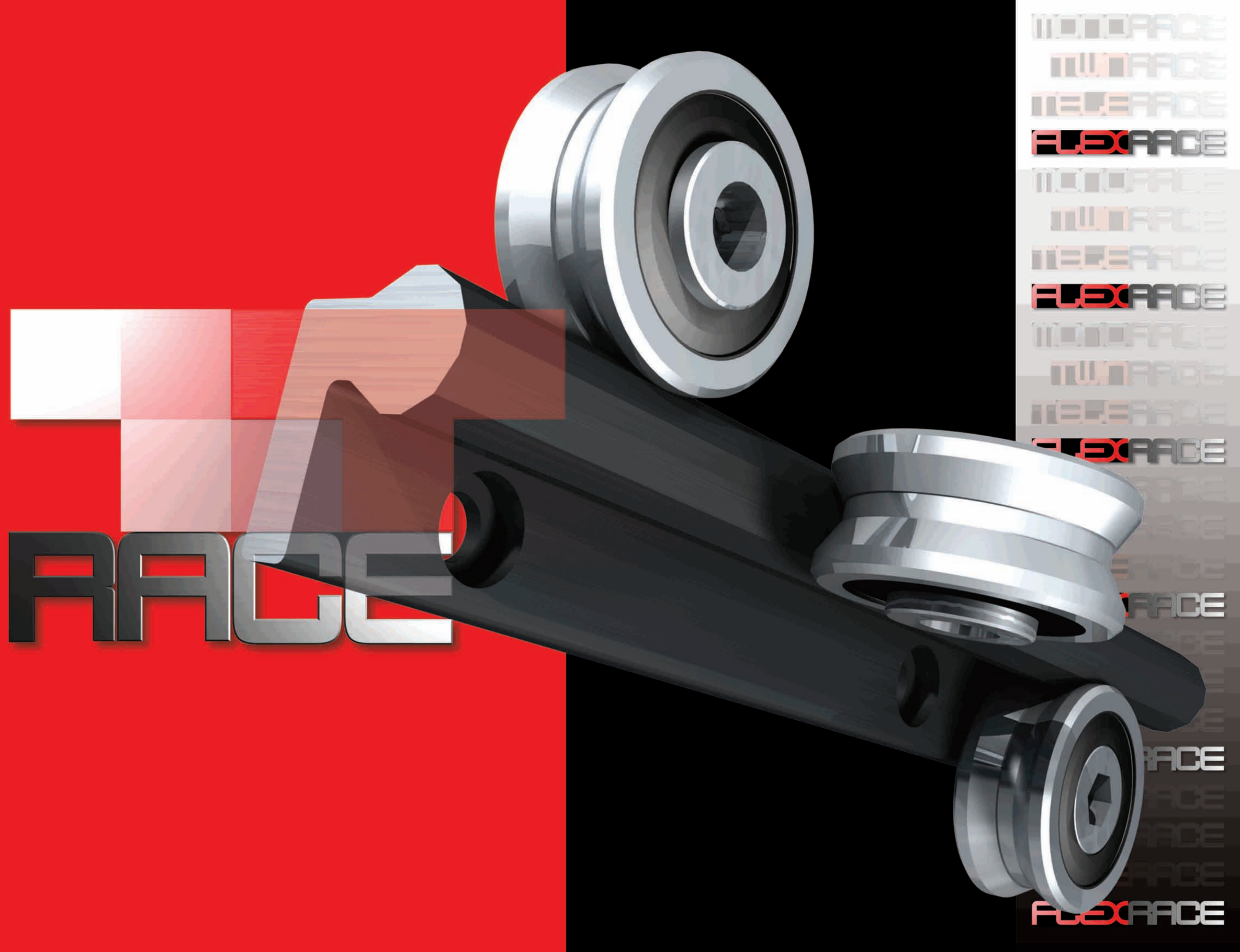
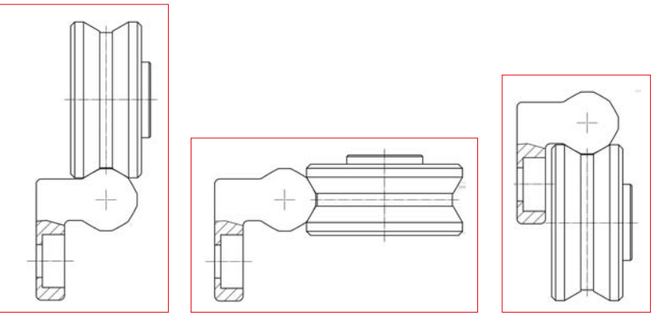
RACE



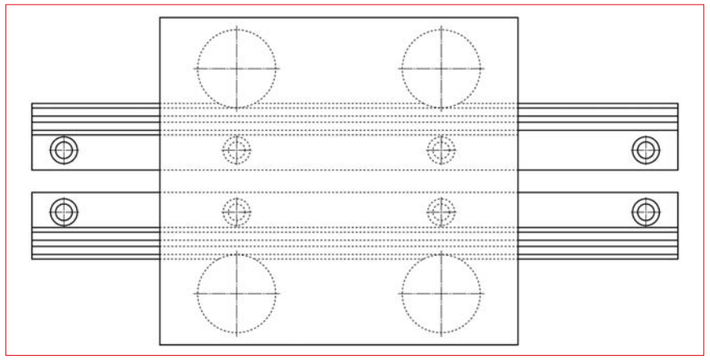
VERSATILE LINEAR SYSTEM



The FLEXRACE system provides an extremely versatile linear system, with great variety of rail configurations for a wide range of applications.
FLEXRACE is designed to be a strong and simple multitask linear system for larger handling and automation applications. It is a Low -cost, easy to assemble system, that offers smooth motion even on inaccurate surfaces.

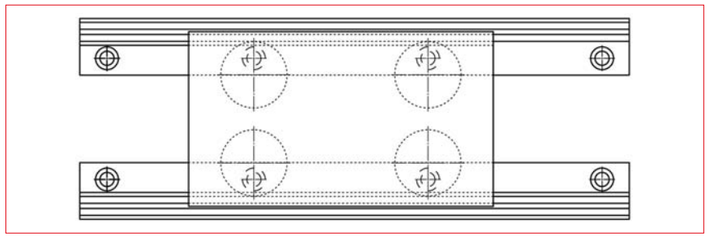
Order codes
PROFILED RAILS
FXR-0560
Profiled rail size 43mm of length 560mm.

1. Wide-base configurations for high cantilever moments.

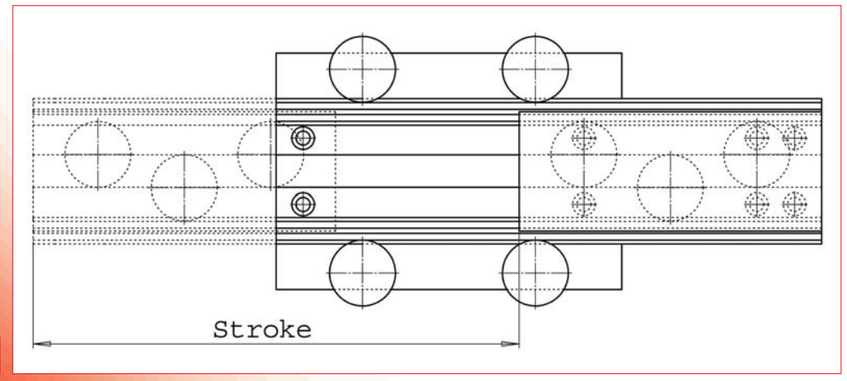


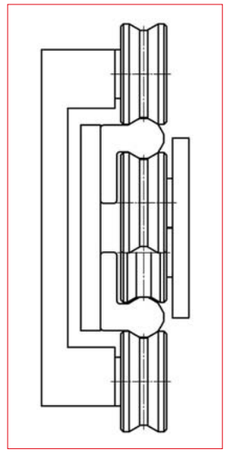
With external slider/structure

With internal slider/structure

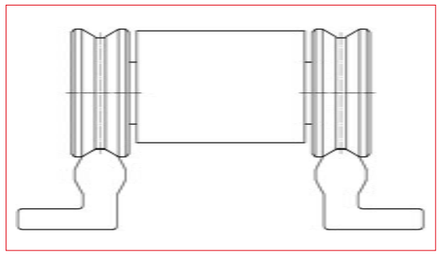


2. Combined solutions to obtain telescopic systems.

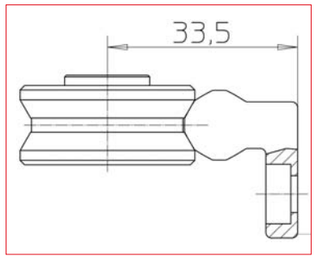


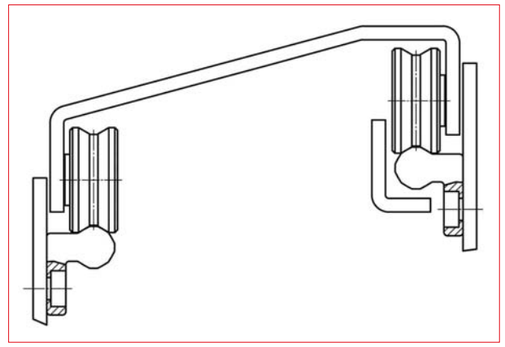


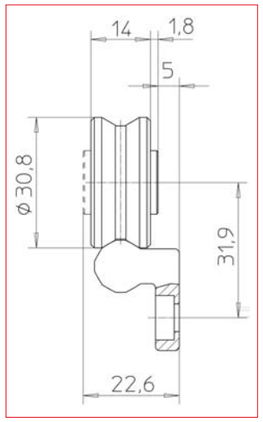
3. Solutions with flat mounted rails.

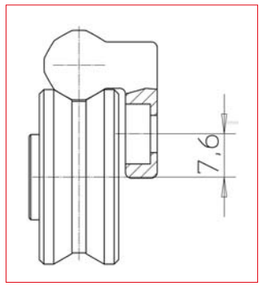


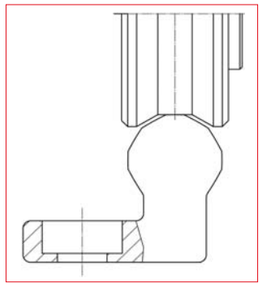
4. Applications for doors and shields.











It is also possible to assemble a combination of guiding (REV43-RCV43) rollers and loading rollers (REP43-RCP43), to obtain linear system which can compensate structural misalignments.

Roller assembling to mobile part

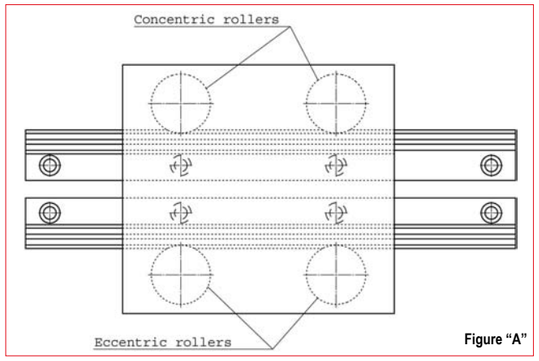


Figure “A”

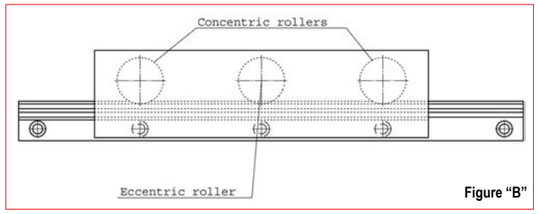


Figure “B”

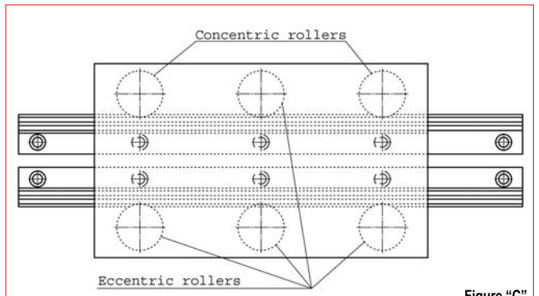
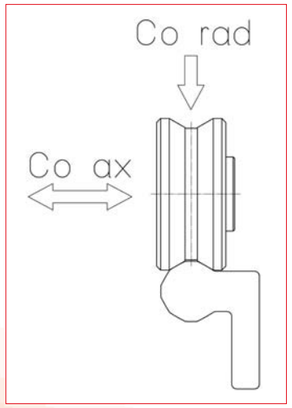


Figure “C”



The position and number of rollers depends on the size, weight and force applied on the moving element, see also pages 42-43 for further indications.

In general, the rollers should be positioned, along the axis upon which the radial-load is applied. When the moving part is just resting on the rails, only concentric rollers are assembled. For applications where a guiding slider/support is constructed, a combination of concentric rollers and eccentric rollers must be used, see example figure A. Only the eccentric rollers allow for preload setting. For application with a guiding slider/support, similar to figure A, but with the rails positioned far apart, it is recommend to assemble loading rollers REP43 in lower rail, when only radial loaded.

In case more than 2 rollers are mounted on the same rail, it is recommended to use 2 concentric rollers at the two ends of the moving part and all remaining central rollers of the eccentric REP or REV type, in order to eliminate as much as possible of roller misalignment, by having a max 0,8mm displacement of the roller, ref. below figure B.

For applications with more than 2 rollers in a pair of rails, we recommend the configuration of concentric and eccentric rollers as indicated in figure C.

LOAD CAPACITY

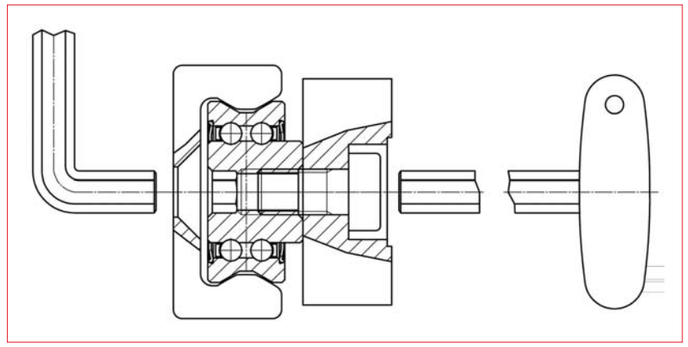
RR43		
Co rad (N)	Co ax (N)	C (N)
3600	2160	9.000

For more detailed information on ROLLERACE rollers, refer to page 6.

Roller preload setting

The ROLLERACE rollers coded with the middle letter E (REV or REP) have an eccentric integrated pivot, which allows for a clearance-preload adjustment of the linear system.
The assembled sliders are normally supplied with a standard preload setting, according to the MR-rail it is supplied with, ensuring maximum smoothness with no play.

The preload is set for the slider in the special raceway it comes with - To avoid the need of additional adjustments, keep the sliders and rail/raceway together.
However in case preload setting or adjustment is necessary, this is easily done by turning the rollers with the eccentric pivot by means of a pair of Allen wrenches, as shown below.

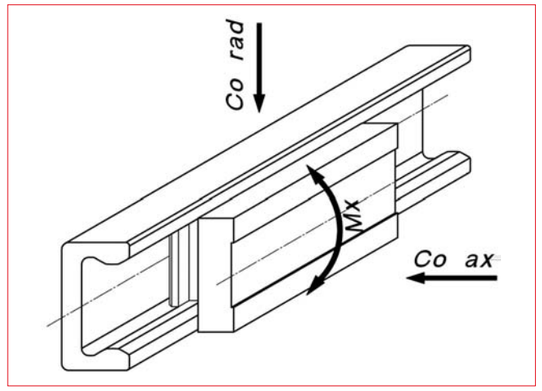


Manual adjustment of the slider inserted in the MR-rail:

Tightening torgue of rollers:
RR18 = 3 Nm
RR28 = 9 Nm
RR43 = 22 Nm

- Insert the Allen wrenche through the rail attachment hole, into the socket head of the roller to calibrate, only the rollers which are accessable.
- slightly loosen a bit the rollers fixing screw to enable some pivoting movement of the screw (not too much).
- Slightly rotate the roller by means of the socket head screw in one direction or, alternatively, in the other, to “feel” the increase of clearance or preload. Reach the position of a clearance. Then turn the roller against upper raceway to eliminate the clearance, achieving a small preload. Subsequently, tighten the screw again, maintaining firm the socket head screw behind the roller;
- Verify the slider's running smoothness along the rail.
- Caution: the slider should move very easily, but without any clearance. If the slider moves with difficulty, it means that the preload setting is too high and this may result in a reduced lifetime of the MR rail.
- In order to obtain precise preload setting, specific adjustment tools are available on request. These tools are special preload measurement devices, very much similar to those used during production. Our Technical Department is always available for any further explanation or advice.

Sizing control

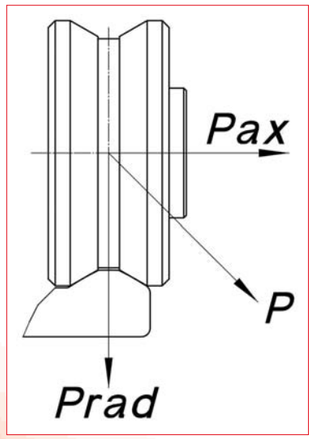


Where:

- Pax = axial load component;
- Prad = radial load component;
- Mx,My, Mz = applied moments;
- Co ax = axial load capacity
- Co rad = radial load capacity;
- Mox,Moy, Moz = resistance capacity to moments;
- Z = safety coefficient >= 1

It is recommended to apply the following values to safety coefficient Z:

Z	Application conditions
1 - 1,5	Accurate determination of static and dynamic loads. Precise assembly, tight structure.
1,5 - 2	Average conditions
2 - 3,5	Insufficient determination of applied loads. Vibrations, loose structure. Imprecise assembly. Unfavourable environmental conditions.



When the positioning and configuration of rails and sliders or rollers is determined, it is necessary to verify the correct sizing of system components, for both static and dynamic function.
With regard to the static verification, it is necessary to determine the load applied onto each single slider. When the heaviest loaded slider is identified, the safety coefficient must be calculated on that slider and the result must be compared with the maximum static load capacity.
When the load applied is the result of a sum of radial and axial loads as well as moments, it is necessary to calculate the value of each component and verify the following:

$$\frac{Pax}{Co\ ax} + \frac{Prad}{Co\ rad} + \frac{Mx}{Mox} + \frac{My}{Moy} + \frac{Mz}{Moz} <= \frac{1}{Z}$$

For system sizing of FLEXRACE, only the axial (Pax) and radial (Prad) load components must be taken into consideration. As a result, it is sufficient to calculate the following:

$$\frac{Pax}{Co\ ax} + \frac{Prad}{Co\ rad} <= \frac{1}{Z}$$

System lifetime

The actual lifetime of the system (rails, sliders, and rollers) depends on the applied load, but is also influenced by factors such as: correct lubrification, environmental conditions, assembly precision to avoid uncalculated component stress/wear, total cycle length.
In order to estimate the expected system lifetime in km of operation, the following equation must be solved:

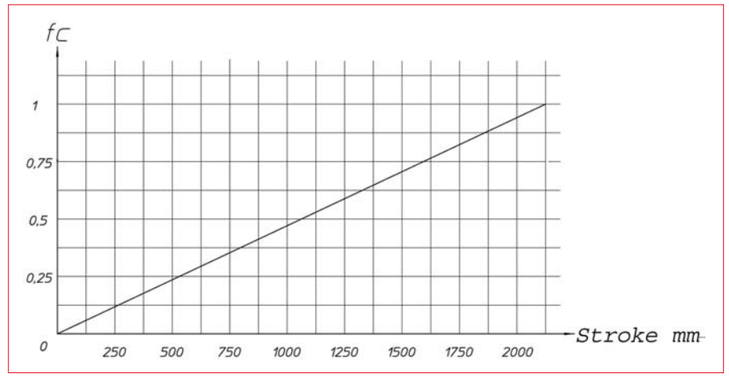
$$L(Km) = 100 \times (C/P)^3 \times f_c/n \times f_a$$

Where:
Co= dynamic load coefficient of roller or slider
P = is the equivalent load applied on the heaviest loaded roller or slider.

For each single roller: P = P rad + (Pax / Co ax) x Co rad

For the slider: P = P rad + (Pax / Coax + Mx / Mox + My / Moy + Mz / Moz) x Co rad

Fc = coefficient depending on the actual length of the stroke. This is an important factor in the case of applications with short stroke and high frequency. In these cases total lifetime in km is much shorter, than if application with long strokes. The factor is equal to 1 for stroke longer than 2 meter, while for shorter than 2 meter, the value is derived from the graph shown below:



n = number of rollers or sliders running on the same rail.

fa = coefficient depending on lubrication and environmental conditions; recommended values are shown in the table below:

fa	Application conditions
0,7 - 1	Good lubrication; availability of self-lubricating rail wiper system; no dust accumulation and no pollutants; precise assembly.
0,2 - 0,5	Random lubrication; environmental dust; thermal fluctuations; vibrations.
0,05 - 0,1	Low lubrication; high environmental pollution; strong thermal fluctuations; high vibrations.