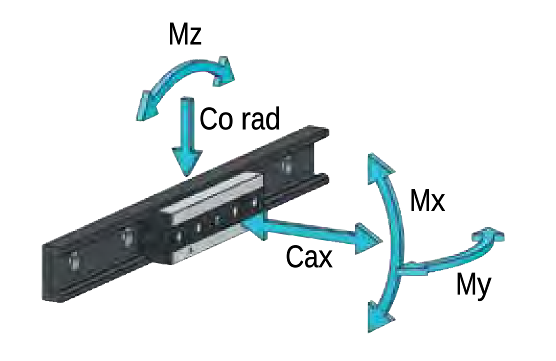
After identifying the most appropriate positioning of rails and sliders, or eventually the single rollers, it is necessary to verify the proper sizing of the linear components.
This both from a static point of view and in accordance to the expected life-time.
For the static verification it is necessary to determine the load on each slider or roller, and then identify the most stressed one. Then verify the values of the safety coefficients, while comparing with the max. nominal load capacities. When the applied load is a combination of loads; radial and/or axial loads and moments, it is necessary to determine the value of each factor and verify that:

$$\frac{Pax}{Co\,ax} + \frac{Prad}{Co\,rad} + \frac{Mex}{Mx} + \frac{Mey}{My} + \frac{Mez}{Mz} <= \frac{1}{Z}$$

- Pax = axial load component
- Prad = radial load component
- Mex, Mey, Mez = applied moments
- Co ax = axial load capacity
- Co rad = radial load capacity
- Mx, My, Mz = resistance capacity to moments
- Z = safety coefficient > = 1

The radial load capacity for all sliders is the side with 2 engraved marks, ref. page 31.

Load direction



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	Avarage conditions
2 - 3,5	Insufficient determination of applied loads. Vibrations, loose structure. Imprecise assembly. Unfavourable einvironmental conditions.

Theoretical lifetime calculation

The theoretical life of the rollers and raceways of rail should be determined by the conventional formula as indicated below in km of running, however, should keep in mind that the value thus calculated must be taken with caution just for orientation, in fact, the real service life achieved can be very different from that calculated value, because the phenomena of wear and fatigue are caused by factors not easy to predetermine, for example:

- Inaccuracy in the estimation of the real loading condition
- Overloading for inaccuracies assembly
- Vibration, shock and dynamic pulse stress
- Raceways status of lubrication
- Thermal excursions
- Environmental pollution and dust
- Damage mounting
- Stroke length and frequency of movement

$$L\,(Km) = 100 \cdot \left(\frac{C}{P}\right)^3 \cdot \frac{fc}{n} \cdot fa$$

Where:
- C = Dynamic load coefficient of slider
- P = The equivalent load applied on the most stressed slider

Verified for each single slider

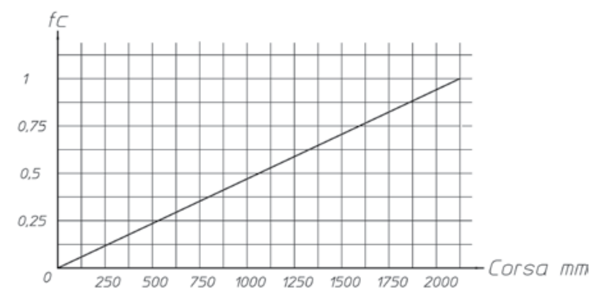
$$- P = P\,rad + \left(\frac{Pax}{Co\,ax} + \frac{Mex}{Mx} + \frac{Mey}{My} + \frac{Mez}{Mz}\right) \cdot Co\,rad$$

- fc = Coefficient depending on the actual stroke length. This factor takes into account applications with short stroke. With value 1 the stroke is superior to 2m, with shorter stroke the value is less, ref "Graph Coefficient Fc"

- n = Number of sliders in same rail passing same raceway point

- fa = Coefficient taking into account operational ambient and level of correct lubrication of raceways

Coefficient fc



fa	Application conditions
0,7 - 1	Good lubrication and wipers mounted – No impurities on raceways – Correct installation
0,2 - 0,5	Normal dusty factory ambient, some vibrations, temperature changes, no wipers
0,05 - 0,1	Poor Lubrication, dusty ambient, vibrations, high temperature changes, no wipers

The correction factors fc and fa applied to the theoretical calculation formula have the sole purpose of guiding the designer qualitatively on the influence in the lifetime estimation of the real application conditions without any pretense of precision. For more details please contact the Technical Service T RACE.