

1.5 Static Safety Factor f_s

A linear motion system may possibly receive an unpredictable external force due to vibration and impact while it is at rest or is moving or due to inertia resulting from start and stop. It is therefore necessary to consider the static safety factor against operating loads like these.

Statistic Safety Factor f_s

The static safety factor (f_s) indicates the ratio of a linear motion system load carrying capacity (basic static load rating C_0) to the load exerted there on.

$$f_s = \frac{C_0}{P} \text{ or } f_s = \frac{M_0}{M} \dots\dots\dots(1)$$

- f_s : static safety factor
- C_0 : basic static load rating (N)
- M_0 : static permissible moment (N·mm)
- P: calculated load (N)
- M: calculated moment (N·mm)

1.6 Basic Dynamic Load Rating C

The basic dynamic load rating (C) refers to a load in a given direction with given magnitude such that when identical linear motion systems in a group are interlocked with one another under the same conditions, the nominal life (L) of the systems is 50 km ($L = 50$ km) if the systems use balls, and 100 km ($L = 100$ km) if they use rollers.

The basic dynamic load rating (C) is used to calculate the service life of a set of linear motion systems which are interlocked with one another in response to a load.

For rating values of individual linear motion systems, see the respective specification tables in this catalog.

1.7 Nominal Life

The service lives of linear motion systems more or less vary from system to system even if they are manufactured to the same specifications and remain in service under the same operating conditions. Hence a guideline for determining the service life of a linear motion system is given based on nominal life, which is defined as follows.

The nominal life refers to the total running distance that 90% of identical linear motion systems in a group, when interlocked with one another under the same conditions, can achieve without developing flaking.

The nominal life (L) of a linear motion system can be obtained from the basic dynamic load rating (C) and load imposed (P) using the following equations.

- For a linear motion system with balls

$$L = \left(\frac{C}{P}\right)^3 \times 50 \dots\dots\dots(2)$$

- For a linear motion system with rollers

$$L = \left(\frac{C}{P}\right)^{\frac{10}{3}} \times 100 \dots\dots\dots(3)$$

- L: nominal life (km)
- C: basic dynamic load rating (N)
- P: imposed load (N)