Calculating the Static Safety Factor

To calculate a load applied to the LM Guide, the average load required for calculating the service life and the maximum load needed for calculating the static safety factor must be obtained first. In particular, if the system starts and stops frequently, if a cutting load acts on the system, or if a large moment caused by an overhanging load is applied, it may experience an unexpectedly large load. When selecting a model number, make sure that the desired model is capable of receiving the required maximum load (whether stationary or in motion). Table 9 shows reference values for the static safety factor.

Table 9: Reference Values for the Static Safety Factor (f_s)

Machine using the LM Guide	Load conditions	Lower limit of f_s
General industrial machinery	Without vibrations or impacts	1.0 to 3.5
	With vibrations or impacts	2.0 to 5.0
Machine tool	Without vibrations or impacts	1.0 to 4.0
	With vibrations or impacts	2.5 to 7.0

When the radial load is large	$\frac{f_H \cdot f_T \cdot f_C \cdot C_0}{P_R} \geqq f_S$
When the reverse-radial load is large	$\frac{f_H \cdot f_T \cdot f_C \cdot C_{0L}}{P_L} \geqq f_S$
When the lateral loads are large	$\frac{f_H \cdot f_T \cdot f_C \cdot C_{0T}}{P_T} \geqq f_S$

f_S : Static safety factor
C_0 : Basic static load rating (radial direction) (N)
C_{0L} : Basic static load rating (reverse-radial direction) (N)
C_{0T} : Basic static load rating (lateral direction) (N)
P_R : Calculated load (radial direction) (N)
P_L : Calculated load (reverse-radial direction) (N)
P_T : Calculated load (lateral direction) (N)
f_H : Hardness factor (see Fig. 8 on A1-69)
f_T : Temperature factor (see Fig. 9 on A1-69)
f_C : Contact factor (see Table 10 on A1-69)