It is primarily the guide values for the mechanical linear unit that are used when calculating nominal service life. The ball screw must also be taken into consideration for the drive with ball screw spindle. With the multitude of parameters crucial for the service life of the entire mechanical linear drive (forces and moments, taking into consideration directions and possible combinations, lead to a moderate load (F_m); ambient conditions, duty cycle...), the following simplified formulae only serve as an initial estimate.

1. Dynamically equivalent load of the guide or ball screw

$$\mathbf{F_m} = (F_1^3 \cdot q1 / 100 + F_2^3 \cdot q2 /100 + F_n^3 \cdot q_n /100)^{1/3}$$

2. Nominal service life of the roller guide

$$\mathbf{L} = (C / F)^3 \cdot 10^5 \cdot R$$

$$\mathbf{F} = F_m + F_V$$

3. Nominal service life of the sliding guide

$$\mathbf{L} = (C / F)^3 \cdot 10^5$$

$$\mathbf{F} = F_m + F_V$$

4. Nominal service life of the ball screw

$$\mathbf{L_{KGT}} = (C_{KGT} / F)^3 \cdot 10^6$$

$$\mathbf{F} = F_m + F_V \text{ (F_V only with double nut (MM); approx. 10 %)}$$

Definitions

F_m : Dynamically equivalent load [N] of guide or ball screw
F_1, F_2, F_n : Stepped single load **[N]**
q_1, q_2, q_n : Stroke rate for **F_1, F_2, F_n [%]**
L : Nominal service life of guide **[m]**
C : Dynamic load rating of guide (**C_{dyn}**) **[N]** (see Table on pages TL11 and TL12)
R : Factor for roller guide size
Beta 50 ... Beta 80 + Sigma 70: R = 0,625; Beta 80-C + Sigma 90: R = 0,75;
Beta 100 + 110 + Sigma 120: R = 0,87;
Beta 120 + 140 + Sigma 160: R = 1,1;
Delta 90: R = 0,595 (Y) und R = 0,625 (Z)
F : Total load **[N]** for guide or ball screw
F_v : Pretensioning **[N]** (3 % of **C_{dyn}**, 5 % for roller guide (see Table on pages TL11 and TL12)
L_{KGT} : Nominal service life of the ball screw [revolutions]
C_{KGT} : Dynamic load rating of the ball screw (**C_{dyn}**) **[N]** (see Table on page TL13)