

Life Expectancy and Static Load Safety Factor

Life Expectancy of one Cam Roller

The nominal service life expectancy L in meters or L_h in hours is attained or

exceeded by at least 90% of a large number of identical rollers.

when subject to force loads

If the Cam Roller Guide is subject to a centrally-acting force F_y or F_z , calculate the nominal travel life using formulas (1) and (2):

The force F must not exceed the maximum permissible force given in the "Maximum Permissible Loads" tables.

$$(1) \quad L = \left(\frac{C_{y,z}}{F} \right)^3 \cdot 10^5$$

$$(2) \quad L_h = \frac{L}{2 \cdot s \cdot n \cdot 60}$$

- L = nominal life expectancy (m)
- L_h = nominal life expectancy (h)
- $C_{y,z}$ = dynamic load capacity (N)
- F = equivalent dynamic load (N)
- s = length of stroke (m)
- n = stroke repetition rate (min⁻¹) (complete cycles)

when subject to moment loads

If the Cam Roller Guide is subject to a moment M acting about the x, y or z axis only, calculate the nominal travel life using formulas (3) and (4):

The moment M must not exceed the maximum permissible moment load given in the "Maximum Permissible Loads" tables.

$$(3) \quad L = \left(\frac{M_{x,y,z}}{M} \right)^3 \cdot 10^5$$

$$(4) \quad L_h = \frac{L}{2 \cdot s \cdot n \cdot 60}$$

- L = nominal life expectancy (m)
- L_h = nominal life expectancy (h)
- $M_{x,y,z}$ = dynamic moment (Nm)
- M = equivalent dynamic moment load (Nm)
- s = length of stroke (m)
- n = stroke repetition rate (min⁻¹) (complete cycles)

Note

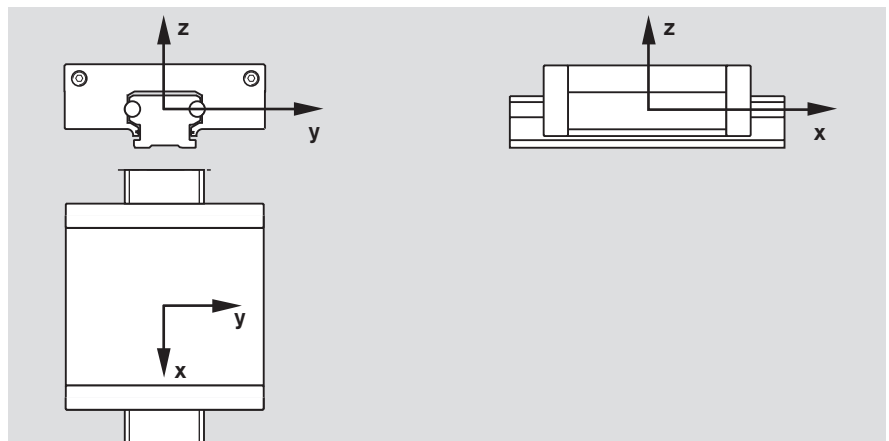
The above formulas for calculation of life expectancy apply only in applications subject to a single force acting centrally in the y or z axis, or a single moment acting about the x, y or z axis.

For applications subject to a combination of forces from different directions or moments about different axes, or any combination of forces and moments, please consult us.

Coordinate system

The following coordinate system is used to define the direction of action of forces

and moments:



Life Expectancy and Static Load Safety Factor

Static Load Safety Factor

when subject to force loads

If the Cam Roller Guide is subject to a centrally-acting force F_{y0} or F_{z0} , calculate the static load safety factor using formula (5):

$$(5) \quad S_0 = \frac{C_{y0, z0}}{F_0}$$

The force F_0 must not exceed the maximum permissible force given in the "Maximum Permissible Loads" tables.

S_0 = static load safety factor (-)
 $C_{y0, z0}$ = static load capacity (N)
 F_0 = equivalent static load (N)

when subject to moment loads

If the Cam Roller Guide is subject to a moment M_0 acting about the x, y or z axis only, calculate the static load safety factor using formula (6):

$$(6) \quad S_0 = \frac{M_{x0, y0, z0}}{M_0}$$

The moment M_0 must not exceed the maximum permissible moment load given in the "Maximum Permissible Loads" tables.

S_0 = static load safety factor (-)
 $M_{x0, y0, z0}$ = static moment (Nm)
 M_0 = equivalent static moment load (Nm)

Note

The above formulas for calculation of the static load safety factor apply only in applications subject to a single force acting centrally in the y or z axis, or a single moment acting about the x, y or z axis.

For applications subject to a combination of forces from different directions or moments about different axes, or any combination of forces and moments, please consult us.