

1.4. Rated Life

Static Safety Factor

The basic static load rating C_0 refers to the static load with constant direction and magnitude, under which the sum of the permanent deformation of the roller and the permanent deformation of the raceway accounts for 0.0001 times of the roller's diameter in the contact area where the maximum stress is applied (if the deformation exceeds this level, it will affect the rotation). This value is indicated as " C_0 " in the dimensional tables in the "THK General Catalog - Product Specifications," provided separately. When a load is statically or dynamically applied, it is necessary to consider the static safety factor as shown below.

$$\frac{C_0}{P_0} = f_s$$

where

f_s : Static safety factor (see table 2)

C_0 : Basic static load rating (kN)

P_0 : Radial load (kN)

Table 2 Static Safety Factor (f_s)

Load conditions	Lower limit of f_s
Normal load	1 to 3
Impact load	3 to 5

Rated Life

The service life of the Roller Follower is obtained from the following equation.

$$L = \left(\frac{f_r \cdot C}{f_w \cdot P_c} \right)^{\frac{10}{3}} \times 10^6$$

where

L : Rated life

(The total number of revolutions that 90% of a group of identical Roller Follower units independently operating under the same conditions can achieve without showing flaking from rolling fatigue)

C : Basic dynamic load rating* (kN)

P_c : Dynamic equivalent radial load (kN)

f_r : Temperature factor (see Fig. 2 on page Q-8)

f_w : Load factor (see table 3 on page Q-8)

* Note: The basic dynamic load rating (C) of the Roller Follower shows the load with constant direction and magnitude, under which the rated life (L) is 1 million revolutions when a group of identical Roller Follower units independently operate. The basic dynamic load rating (C) is indicated in the corresponding dimensional table in the "THK General Catalog - Product Specifications," provided separately.

Calculating the Service Life Time

When the rated life (L) has been obtained, the service life time (L_h) is obtained from the following equation.

●For Linear Motion

$$L_h = \frac{D \cdot \pi \cdot L}{2 \times \ell_s \cdot n_1 \times 60}$$

where

L_h : Service life time (h)

L : Rated life

D : Bearing outer diameter (mm)

ℓ_s : Stroke length (mm)

n_1 : Reciprocations per minute (min^{-1})

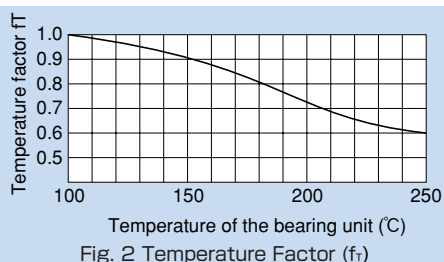
●For Rotary Motion

$$L_h = \frac{D \cdot L}{D_1 \cdot n \times 60}$$

where

D_1 : Outer ring contact average diameter of the cam (mm)

n : Rotation speed per minute of the cam (min^{-1})



Note: The normal service temperature is 80°C or below. If the product is to be used at a higher temperature, contact **THK**.

Table 3 Load Factor (f_w)

Service condition	f_w
Smooth motion without impact	1 to 1.2
Normal motion	1.2 to 1.5
Motion with severe impact	1.5 to 3