

## 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 in relation to  $C_0$  (see table 2)

$C_0$  : Basic static load rating (kN)

$P_0$  : Radial load (kN)

The permissible load ( $F_0$ ) indicates the permissible value of the applied load determined by the strength of the stud section of the Cam Follower. Therefore, it is necessary to consider the static safety factor  $f_M$  against  $F_0$  as well as  $f_s$ .

$$\frac{F_0}{P_0} = f_M$$

where

$f_M$  : Static safety factor in relation to  $F_0$  (see table 2)

$F_0$  : Permissible load (kN)

$P_0$  : Radial load (kN)

Table 2 Static Safety Factor ( $f_s$ ,  $f_M$ )

Load conditions	Lower limit of $f_s$ and $f_M$
Normal load	1 to 2
Impact load	2 to 3

## Rated Life

The service life of the Cam 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 Cam Follower units independently operating under the same conditions can achieve without showing flaking from rolling fatigue)

$C$  : Basic dynamic load rating\* (kN)

$P_c$  : Radial load (kN)

$f_r$  : Temperature factor (see Fig. 2)

$f_w$  : Load factor (see table 3)

\* Note: The basic dynamic load rating ( $C$ ) of the Cam Follower shows the load with constant direction and magnitude, under which the rated life ( $L$ ) is 1 million revolutions when a group of identical Cam 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)

$\ell_s$  : Stroke length (mm)

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

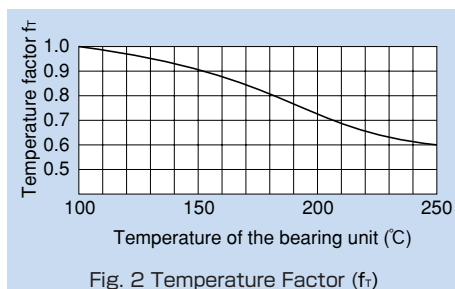
### ● For Rotary Motion

$$L_h = \frac{D \cdot L \times 10^6}{D_1 \cdot n \times 60}$$

where

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

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



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