

1.2. Rated Load and Rated Life

Rated Loads in All Directions

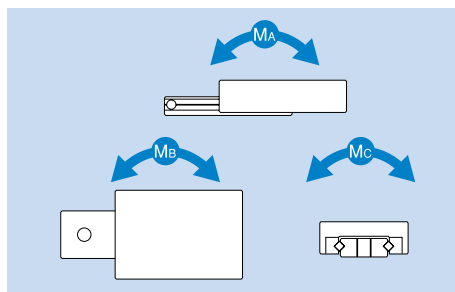
The rated loads of models VRT, VRT-A and VRU are equal in four directions (radial, reverse-radial and lateral directions), and their values are expressed as C and C_o in the corresponding dimensional tables in the "THK General Catalog - Product Specifications," provided separately.

Static Safety Factor f_s

The Cross Roller Table may receive an unexpected external force while it is stationary or operative due to the generation of an inertia caused by vibrations and impact or start-up and stop. It is necessary to consider a static safety factor against such a working load.

$$f_s = \frac{C_o}{P_c} \text{ or } f_s = \frac{M_o}{M}$$

- f_s : Static safety factor
 C_o : Basic static load rating (kN)
 M_o : Permissible static moment (M_a , M_b and M_c)
 P_c : Calculated load (kN)
 M : Calculated moment (kN)



Reference value of static safety factor

The static safety factors indicated in table 1 are the lower limits of reference values in the respective service conditions.

Table 1 Reference Values of Static Safety Factors (f_s)

Machine using the LM system	Service conditions	Lower limit of f_s
General industrial machinery	Without vibrations or impact	1 to 1.3
	With vibrations or impact	2 to 3

Rated Life

The rated life of the Cross Roller Table is obtained using the following equation.

$$L = \left(\frac{f_r}{f_w} \cdot \frac{C}{P_c} \right)^{\frac{10}{3}} \times 100$$

L : Rated life (km)

(The total number of revolutions that 90% of a group of identical VRT, VRT-A or VRU units independently operating under the same conditions can achieve without showing flaking)

C : Basic dynamic load rating (kN)

P_c : Calculated load (kN)

f_r : Contact factor (see Fig. 3 on page G-7)

f_w : Load factor (see table 2 on page G-7)

Calculating the Service Life Time

When the rated life (L) has been obtained, if the stroke length and the number of reciprocations per minute are constant, the service life time is obtained using the following equation.

$$L_h = \frac{L \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

L_h : Service life time (h)

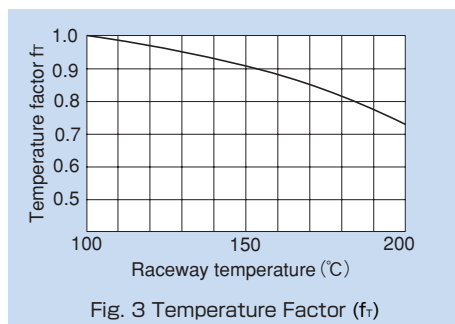
ℓ_s : Stroke length (mm)

n_1 : Number of reciprocations per minute (min^{-1})

■ f_T : Temperature factor

If the temperature of the atmosphere surrounding the operating model VRT, VRT-A or VRU exceeds 100°C, take into account the adverse effect of the high temperature and multiply the basic load ratings by the temperature factor indicated in Fig. 3.

Note: If the ambient temperature exceeds 100°C, contact **THK**.



■ f_w : Load factor

In general, reciprocating machines tend to involve vibrations or impact during operation. It is extremely difficult to accurately determine vibrations generated during high-speed operation and impact during frequent start-up and stop. Therefore, when the actual load applied on model VRT, VRT-A or VRU cannot be obtained, or when speed and vibrations have a significant influence, divide the basic load rating (C or C_0), by the corresponding load factor in table 2 of empirically obtained data.

Table 2 Load Factor (f_w)

Vibrations/impact	Speed (V)	f_w
Faint	Very low $V \leq 0.25\text{m/s}$	1 to 1.2
Weak	Slow $0.25 < V \leq 1\text{m/s}$	1.2 to 1.5