1.5. Selecting a Nut

Dynamic Permissible Torque T and Dynamic Permissible Thrust F

The dynamic permissible torque (T) and the dynamic permissible thrust are the torque and the thrust at which the contact surface pressure on the tooth surface of the bearing is 9.8 N/mm^2. These values are used as a measuring stick for the strength of the nut.

pV Value

With a sliding bearing, a pV value, which is the product of the contact surface pressure (p) and the sliding speed (V), is used as a measuring stick to judge whether the assumed model can be used. Use the corresponding pV value indicated in Fig. 2 as a guide for selecting a slide series model. The pV value varies also according to the lubrication conditions.

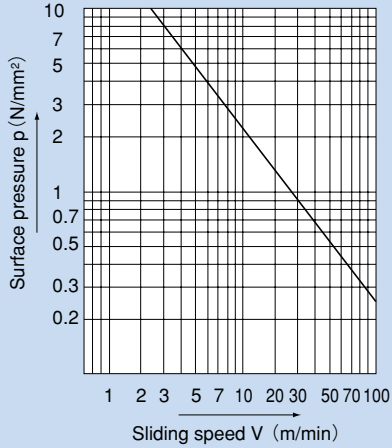

Fig. 2 pV Value

■f_s : Safety Factor

To calculate a load applied to the nut, it is necessary to accurately obtain the effect of the inertia that changes with the weight and dynamic speed of an object. In general, with reciprocating or rotating machines, it is not easy to accurately obtain all the factors such as the effect of the start and stop, which are always repeated. Therefore, if the actual load cannot be obtained, it is necessary to select a bearing while taking into account the empirically obtained safety factors shown in table 2.

Table 2 Safety Factor (f_s)

Type of load	Lower limit of f_s
For a static load less frequently used	1 to 2
For an ordinary single-directional load	2 to 3
For a load accompanied by vibrations/impact	4 or greater

■f_T : Temperature Factor

If the temperature of the nut exceeds the normal temperature range, the seizure resistance of the nut and the strength of the material will decrease. Therefore, it is necessary to multiply the dynamic permissible torque (T) and the dynamic permissible thrust (F) by the corresponding temperature factor indicated in Fig. 3.

Note: In the case of a miniature Change Nut, be sure to use it at 60℃ or below.

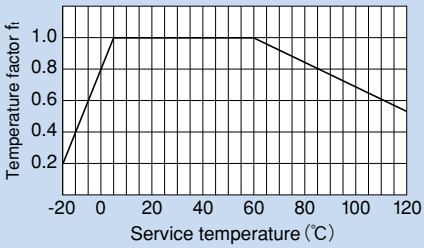

Fig. 3 Temperature Factor

Accordingly, when selecting a nut, the following equations need to be met in terms of its strength.

Dynamic permissible torque (T)

$$f_S \leqq \frac{f_T \cdot T}{P_T}$$

Static permissible thrust (F)

$$f_S \leqq \frac{f_T \cdot F}{P_F}$$

where

f_S	: Safety factor	(see table 2)
f_T	: Temperature factor	(see Fig. 3)
T	: Dynamic permissible torque	(N-m)
P_T	: Applied torque	(N-m)
F	: Dynamic permissible thrust	(N)
P_F	: Axial load	(N)

■Hardness of the Surface and Wear Resistance

The hardness of the shaft significantly affects the wear resistance of the nut. If the hardness is equal to or less than 250 HV, the abrasion loss increases as indicated in Fig. 4. The roughness of the surface should preferably be 0.80 a or less.

A dedicated rolled shaft achieves surface hardness of 250 HV or greater, through hardening as a result of rolling, and surface roughness of 0.20 a or less. Thus, the dedicated rolled shaft is highly wear resistant.

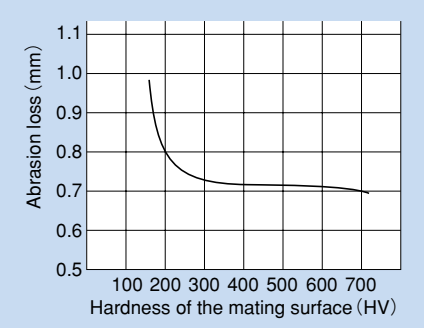

Fig. 4 Surface Roughness and Wear Resistance