DYNAMIC LOAD RATINGS AND LIFE CALCULATIONS

RATING LIFE

Life : For an individual rolling bearing, the number of revolutions which one of the bearing rings makes in relation to the other ring before the first evidence of fatigue develops in the material of one of the rings or rolling elements.

Basic rating life : For an individual rolling bearing, or a group of apparently identical rolling bearings, operating under the same conditions, the life associated with 90% reliability, with contemporary, commonly used material and conditions. Basic rating life L_{10} can be calculated with following formulas.

For radial ball bearing $L_{10}=(Cr/Pr)^3$ in million revolutions

For radial roller bearing $L_{10}=(Cr/Pr)^{103}$ in million revolutions

Here Cr is basic dynamic radial load rating, in newtons.

Pr is dynamic equivalent radial load, in newtons.

Adjusted rating life : The rating life obtained by adjustment of basic rating life for a desired reliability level, special bearing properties and specific operating conditions. Adjusted rating life can be calculated with following formula:

$L_{na}=a_1a_2a_3L_{10}$

Here a_1 is life adjustment factor for reliability. Its values are given in following table.

Reliability %	90	95	96	97	98	99
a_1	1	0.62	0.53	0.44	0.33	0.21

a2 is life adjustment factor for special bearing properties. a1=1 for the bearings commonly ordered from FSQ. When the bearing with $a_2>1$ is desired, please specially order from FSQ under guidance of the Sales Engineer.

a_3 is life adjustment factor for operating conditions. Operating conditions taken into account here include the adequacy of lubrication, presence of foreign matter, and conditions causing changes in material properties, for example, high temperature causing reduced hardness. Where the negative influence of above mentioned would not exist, a_3 could be equal to 1, otherwise values of a_3 less than 1 should be considered only where the lubrication conditions are so favourable that the probability of failure caused by surface distress is greatly reduced.