

DYNAMIC LOAD RATINGS AND LIFE CALCULATIONS

BASIC DYNAMIC LOAD RATING

Basic dynamic radial load rating C_r : The constant stationary radial load which a rolling bearing could theoretically endure for a basic rating life of one million revolutions. In the case of a single row angular contact bearing, the radial load rating refers to the radial component of that load which causes a purely radial displacement of the bearing ring in relation to each other.

The basic dynamic radial load ratings of various bearings can be obtained from the catalog.

Basic dynamic radial load rating for bearing combinations for two similar row radial ball or roller bearings mounted side by side on the same shaft such that they operate as a unit (paired mounting), the basic radial load rating of the pair is the basic radial load rating of the single bearing multiplied by 1.6 for ball bearing or by 1.7 for roller bearing.

DYNAMIC EQUIVALENT LOAD

Dynamic equivalent radial load P_r : That constant stationary radial load under the influence of which a rolling bearing would have the same life as it will attain under the actual load conditions. The dynamic equivalent radial load P_r , for radial ball bearing and spherical roller bearing, under constant radial and axial loads, is given by

$$P_r = X F_r + Y F_a$$

Here F_r is radial component of actual bearing load, in newtons. F_a is axial component of actual bearing load, in newtons.

X is dynamic radial load factor.

Y is dynamic axial load factor.

Values of X and Y for radial ball bearings are listed in Table 3. For spherical roller bearing X and Y are variable on two different conditions:

$$\begin{aligned} X &= 1, \quad Y = Y_1. \text{ when } F_a/F_r \leq e \\ X &= 0.67, \quad Y = Y_2. \text{ when } F_a/F_r > e \end{aligned}$$

Values of e , Y_1 , Y_2 are given in the catalogue. For cylindrical roller bearing, under radial load only

$$P_r = F_r$$

Note – The ability of cylindrical roller bearing to support axial loads varies considerably with bearing design execution. The bearing user should therefore consult Technology Section of FSQ for recommendations regarding the evaluation of equivalent load and life in case where cylindrical roller bearing is subjected to axial load.