



Bearing Fatigue (L10 Life)

Fatigue life or L10 Life is the number of revolutions that 90% of a sample batch of identical bearings would be able to achieve before failure. It should be noted that fatigue life is only an estimate. It should also be noted that since only 90% of the sample batch is expected to survive to the fatigue life, this must mean that 10% would be expected to fail before they reach the fatigue life.

All bearings will fail at some stage. In critical applications, it's best to err on the side of caution when designing bearings into the application. We also recommend testing prior to a final design.

Theoretical fatigue life of ball bearings can be expressed as $(C/P)^3$ where C is the basic dynamic load rating for the bearing from the catalogue, and P is the actual applied radial load or radial equivalent load (see below).

The radial equivalent load is used in situations where the inner ring is stationary and the outer ring is rotating, or where there is a thrust load involved.

If the inner ring is stationary, then $P = (\text{Radial Load} \times 1.2)$.

If there is a thrust load that is greater than 0.17 of the radial load, then $P = (\text{Radial Load} \times 0.56) \text{ plus } (\text{Thrust Load} \times 2.1)$.

If the inner ring is stationary and there is a thrust load that is greater than 0.17 of the radial load, then $P = (\text{Radial Load} \times 0.67) \text{ plus } (\text{Thrust Load} \times 2.1)$.

You should keep in mind that bearing life can also be greatly affected by temperature, cleanliness, fitting practices, lubrication choice and/or breakdown, vibration and other factors.

