Bearing Life and Load

Practical Engineering Guide

Basic Rating Life (L_{10})

$$L_{10} = \left(\frac{C}{P}\right)^3$$

Life in Hours:

$$L_{10h} = \frac{10^6}{60 \cdot n} \times L_{10}$$

Dynamic Equivalent Load:

$$P = X \cdot F_r + Y \cdot F_a$$

Life Modification Factor (aISO)

$$L_{na} = a_{ISO} \cdot L_{10}$$

Static Load Rating and Safety Factor

$$s_0 = \frac{C_0}{P_0}$$

Minimum Load

$$P_{\min} = 0.02 \cdot C$$

Key Takeaways for Design Engineers

- Choose a C/P ratio that supports your target life at the intended speed.
- Apply correction factors for temperature, contamination, and lubrication.
- Maintain at least the minimum load to prevent skidding.
- Control preload, fit, and alignment to avoid excess heat or uneven loading.

Tips for Maximizing Bearing Life

- Keep lubrication clean and replenished.
- Use proper fits: too tight raises heat, too loose risks skidding.
- Apply axial preload to reduce skidding; avoid high radial preload.
- Protect against dirt, heat, and shock loads.

For more detailed formulas and design support, refer to the CW Bearing catalog or connect directly with our engineering team.

We are ready to assist with your next project and help you select the optimal bearing for your application.