2. Bearing selection

Rolling element bearings are available in a wide variety of type, configurations and sizes. The most important factor to consider in bearing selection is a bearing that will enable the machine or part in which it is installed to satisfactorily perform as expected.

When selecting a bearing, having an accurate and comprehensive knowledge of which part of the machine or equipment it is to be installed in and the operating requirements and environment in which it will function, is the basis for selecting just the right bearing for the job. In the selection process, the following data is needed.

(1) The equipement's function and construction.
(2) Bearing mounting location(point).
(3) Bearing load(direction and magnitude).
(4) Bearing speed.
(5) Vibration and shock load.
(6) Bearing temperature(ambient and friction generated).
(7) Environment(corrosion, lubrication, cleanliness of the environment, etc.).

When selecting the correct bearing for your application, it is important to consider several factors, shch as the calculation of various angle and clearances, which ensure proper fit. In the selection process, the following data is needed.

(1) Bearing dimensions selection is generally based on the operating load and the bearing's life expectancy requirements, as well as the bearing's rated load capacity.
(2) The dimensional accuracy and operating tolerances of bearings are regulated by ISO Standard. For equipment requiring high tolerance shaft runout or high speed operation.
(3) Select appropriate bearing clearance according to effect of interference fitting, thermal expansion and elastic deformation when uner load on inner/outer rings, and shaft/housing form accuracy.
(4) Select the cage type and its material according to bearing speed, noise level, vibration and shock load, and lubrication method.
(5) Select lubricant, lubrication method and sealing method according to operating temperature, rotational speed, lubrication and sealing methods, its maintenance and inspection.
(6) Select special bearing specifications for its operating environment such as high/low temperature, vacuum, pharmaceutical, etc. or requirement for high reliability.
(7) Confirm bearing handling procedures such as installation-related dimensions and installation and disassembly procedures according to specific design purposes such as bearings with separable inner/outer rings.

When selecting a bearing, frequently all the data required for the selection of the bearing is not necessarily clearly specified. Thus, some elements governing selection must be factored in on an estimated basis.

Over the years, CLI has gained considerable expertise in bearing selection. Please consult CLI for advice and assistance with any bearing selection problem.

Procedure	Confirmation items	Pages	Confirmation items	Pages
Confirm operating conditions and operating enviironment	● Function and construction of components to house bearings ● Bearing mounting location ● Bearing load (direction and magnitude) ● Rotational speed	2 - 25 38	● Vibration and shock load ● Bearing temperature (ambient and friction-generated) ● Operating environment (potential for corrosion, degree of contamination, extent of lubrication)	- 38 -
Select bearing type and configuration	● Dimensional limitations ● Bearing load (magnitude, direction, vibration; presence of shock load) ● Rotational speed ● Bearing tolerances ● Rigidity	- 25 38 15 37	● Allowable misalignment of inner/outer rings ● Friction torque ● Bearing arrangement (fixed side, floating side) ● Installation and disassembly requirements ● Bearing availability and cost	54 - 7 55 -
Select bearing dimensions	● Design life of components to house bearings ● Dynamic/static equivalent load conditions	21 29	● Safety factor ● Allowable speed ● Allowable axial load ● Allowable space	22 38 21~30 -
Select bearing tolerances	● Shaft runout tolerances ● Rotational speed ● Torque fluctuation	15 15 15		
Select bearing's internal clearance	● Material and shape of shaft and housing ● Fit ● Temperature differential between inner/outer rings	52 31 36	● Allowable misalignment of inner/outer rings ● Load (magnitude, nature) ● Amount of preload ● Rotational speed	54 25 37 38
Select cage type and material	● Rotational speed ● Noise level ● Vibration and shock load	38 - -	● Momentary load ● Lubrication type and method	- 39
Select lubricant, lubrication method, sealing method	● Operating temperature ● Rotational speed ● Lubrication type and method	39 38 39	● Sealing method ● Maintenance and inspection	46 -
Select any special bearing specifications	● Operating environment (high/low temperature, vacuum, pharmaceutical, etc.) ● Requirement for high reliability	4 22		
Confirm handling procedures	● Installation-related dimensions ● Installation and disassembly procedures	53 55		