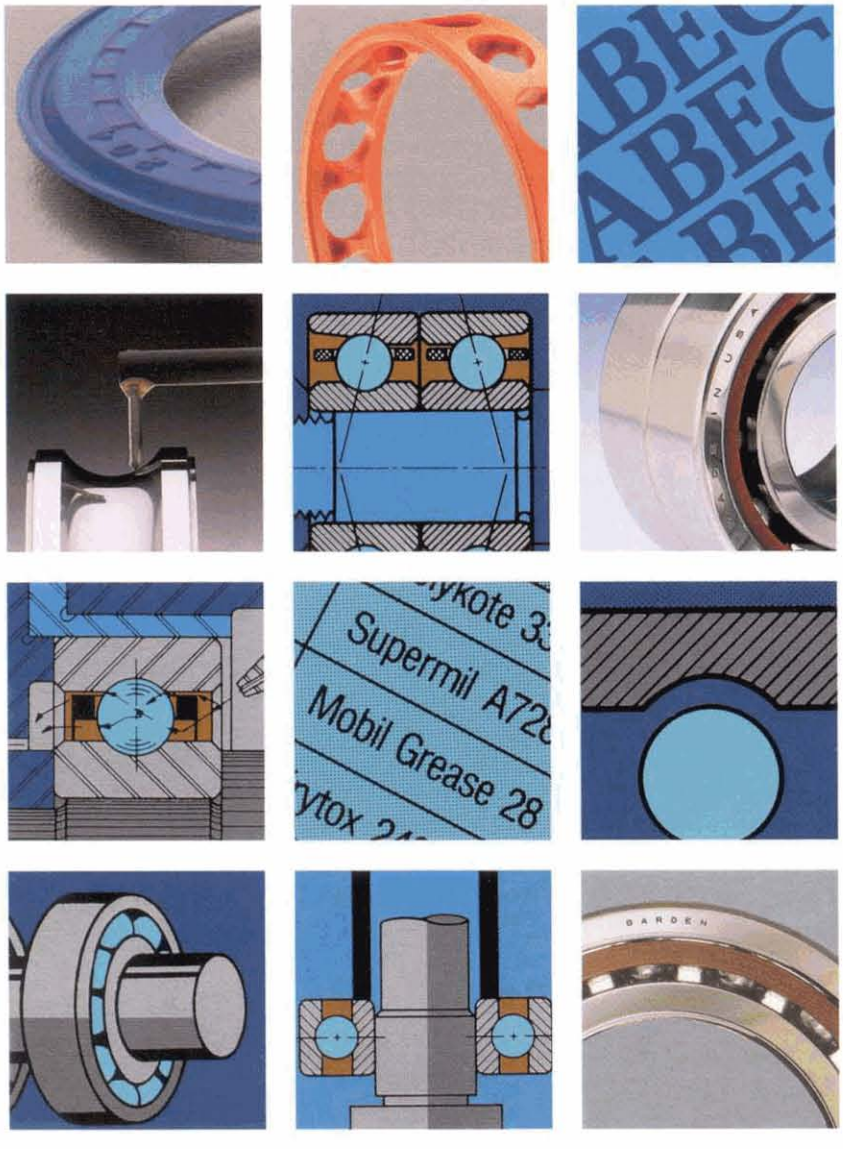
BEARING IN MIND: PRECISION BALL BEARING BASICS

BARDEN PRECISION BEARINGS

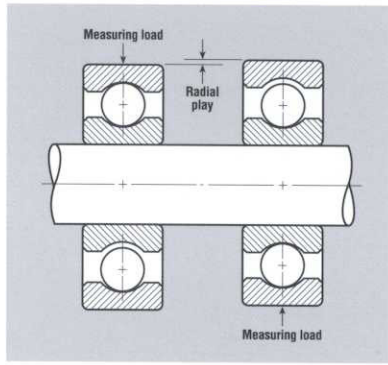


This booklet contains a series of informational articles on precision ball bearings published by The Barden Corporation. It is intended as a review of fundamental topics of importance to bearing specifiers and users. Additional detailed information is available from Barden; call (203) 744-2211, FAX (203) 744-3756, or write to The Barden Corporation, 200 Park Avenue, Danbury, CT 06813-2449.

BARDEN PRECISION BEARINGS

RADIAL INTERNAL CLEARANCE

Radial internal clearance in a ball bearing assembly is the total maximum possible movement, perpendicular to the bearing axis, of the inner ring in relation to the outer ring. It is commonly referred to as radial play.



Radial internal clearance is measured under a light reversing radial load and corrected to zero load, to establish radial play values.

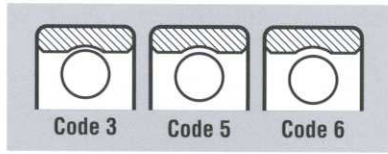
Although often overlooked by designers, radial play is one of the most important basic bearing specifications. The presence and magnitude of radial play are vital factors in bearing performance.

Without sufficient radial play, interference fits (press fits) and normal expansion of components cannot be accommodated, causing binding and early failure. High operating speeds create heat through friction and require greater than usual radial play.

Higher values of radial play are also beneficial where thrust loads predominate, to increase load capacity, life and axial rigidity. On the other hand, low values of radial play are better suited for predominantly radial support.

Deep groove bearings are available from Barden in a range of radial play groups. Each group is expressed as a Radial Play Code, representing limits to the range of radial internal clearance.

BARDEN RADIAL PLAY CODES



Radial play ranges vary with ball size and bearing size; the table below shows only one of several radial play groupings for Barden products. Such ranges have nothing to do with ABEC tolerances or precision classes, hence a high value of radial play does not imply lower quality or less precision.

Specifying a radial play code must take into account the installation practice. If a bearing is press-fit onto a shaft or into a housing, its radial internal clearance is reduced by approximately 80% of the interference fit. Thus, an interference fit of .00025" would cause a .0002" decrease in internal clearance.

Typical Barden Radial Play Grouping

Range	Barden Code Code	ABMA Designation	Radial Play
Tight	3	0	.0002" to .0004"
Normal	5	3	.0005" to .0008"
Loose	6	4	.0008" to .0011"

Angular contact bearings make use of radial play, combined with thrust loading, to develop their primary characteristic – an angular line of contact between the balls and both races.

Standard angular contact bearings are manufactured to nominal contact angles, rather than radial play codes. In Barden spindle size bearings, the nominal contact angle is either 15° or 25°. As with radial play codes, the smaller angle delivers better radial capacity and rigidity, the larger angle is better for axial rigidity.

For more information or a set of ***Bearing in Mind*** *articles, call (203) 744-2211, Ext. 468, or write to The Barden Corporation, 200 Park Ave., Danbury, CT 06810.*