

**GMN**  
BEARING USA

*Presents*

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## The Difference Between

Radial Ball Bearings **VS** Angular Contact Bearings



an eBook

# BEARING DEFINITIONS

## **RADIAL “DEEP GROOVE” BALL BEARING**

A ball bearing that can accept radial and axial loads in both directions.

## **ANGULAR CONTACT BALL BEARING**

A ball bearing that can accept radial loads in both directions but axial loads in only one direction.

A contact angle is created where the balls touch the inner and outer ring. Angular contact bearings usually have standard angles of 15° and 25°; Radial usually 8°.

High-precision bearings are important in machinery that requires reliability, fast rotational speed and heavy use.

But radial ball bearings & angular contact ball bearings are not interchangeable.

Choosing the right high precision bearing is critical to machine success. The first step is knowing the differences between each precision bearing.

That’s what this eBook is designed to help you do!

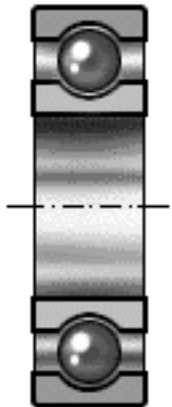


# RADIAL BALL BEARINGS

These bearings are also referred to as “deep groove” ball bearings, and are the most popular and widely used in industrial machinery applications because of their versatility.

Radial ball bearings produce very little friction as they carry loads from rotating parts to the shaft and/or housing.

Radial ball bearings have a small initial contact angle of  $\sim 8^\circ$  that helps reduce the stress caused by the weight of the load they are supporting.



*A distinct advantage that radial bearings have over angular contact ball bearings is that they can accept axial loads in both directions and don't need to be purchased in sets.*



# ANGULAR CONTACT BALL BEARINGS

Sometimes referred to as “spindle bearings,” these bearings are used in machinery that requires high accuracy, rigidity and durability.

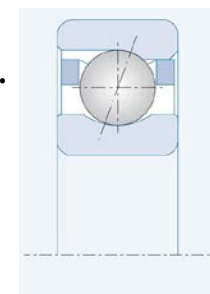
Angular contact ball bearings can carry both radial and axial loads. The weight of the load is transferred from one ring to the other, through the balls, along a specific contact angle.

The inner and outer rings of an angular contact bearing are asymmetrical. Because of this, the ball is nestled in between these rings producing a contact angle where the balls touch the inner and outer raceways.

The contact angle is measured by two intersecting lines, one that’s formed at the point of contact between the ball and the rings and the other that’s formed from the axis of rotation to the bearing *(see diagram below)*.

15° and 25° contact angles are the most common but other angles can be customized as needed.

*Angular contact bearings have a much higher speed rating than radial ball bearings because of the nonstop contact of the balls to both rings.*



# BALL BEARING COMPARISON CHART

## RADIAL BALL BEARING

## ANGULAR CONTACT BALL BEARING

### ADVANTAGES

- Can accept axial load in both directions
- Initial contact angle of  $\sim 8^\circ$

- Supports high operating speeds
- Low maintenance and operation costs

### USE WHEN

- Machine space isn't available for matched angular contact bearing sets
- High operational speed is NOT required

- High operational speed IS required
- Guidance for rotational parts IS required
- High rigidity and precision IS required

### APPLICATIONS

- Medical Industry
- Vacuum Technology
- Electric Motors
- Conveyors

- Woodworking Spindles
- Machine Tool Spindles
- Vacuum Pumps
- Semiconductor Industry
- Centrifuges



# GMN BEARING USA

We stock a large inventory of German-manufactured high-precision, radial “deep-groove” ball bearings and single-row angular contact ball bearings for machine applications that require high precision.

We offer other options for high-precision ball bearings, see below:

## RADIAL BALL BEARING

- Cage material
- Ball material
- Internal clearance
- Shield(s)
- Lubrication
- Internal clearance & installation tolerance strategies

## ANGULAR CONTACT BALL BEARING

- Cage material
- Ball material
- Contact angle
- Preload
- Seal(s)
- Lubrication
- Specific installation tolerance strategies

Have a project you are working on and need help finding the right bearing for your rotating part? Our onsite mechanical engineers and technical support staff are available to help, [contact us](#) with any questions!



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