

# Bearings and Bushings

Bearings and bushings support rotating shafts and reduce friction between moving parts. They are essential components in nearly every FRC mechanism.

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## Bearings

Bearings use rolling elements, typically balls, to allow shafts to rotate with very low friction.

### Advantages:

- Very low friction
- Smooth rotation
- High efficiency
- Excellent for high-speed applications

### Common FRC uses:

- Drivetrains
  - Rollers and intakes
  - Arms and elevators
  - Gearboxes
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## Bushings

Bushings use a smooth surface that the shaft slides against rather than rolling elements.

### Advantages:

- Simple and inexpensive
- Lightweight
- Resistant to dirt and debris
- Compact design

### Common FRC uses:

- Low-speed pivots

- Lightly loaded mechanisms
  - Simple rotating joints
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## Common Bearing Sizes

Typical FRC bearings include:

- 1/2" hex bearings
- 1/2" round bearings
- Flanged bearings

Bearings are often press-fit into plates, tubes, or bearing blocks.

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## Bearing vs. Bushing

- **Bearing:** lower friction, higher performance, higher cost
  - **Bushing:** simpler, cheaper, and better for low-speed applications
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## Key Idea

Bearings provide smooth, efficient rotation for most FRC mechanisms, while bushings offer a simple solution for lower-speed or lower-load applications. Choosing the correct support method improves reliability and reduces wear.

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