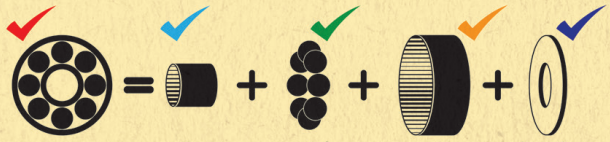
Bearings
ROLLING ELEMENT

a field guide

Bearings are **composed** of...



an inner **race**...

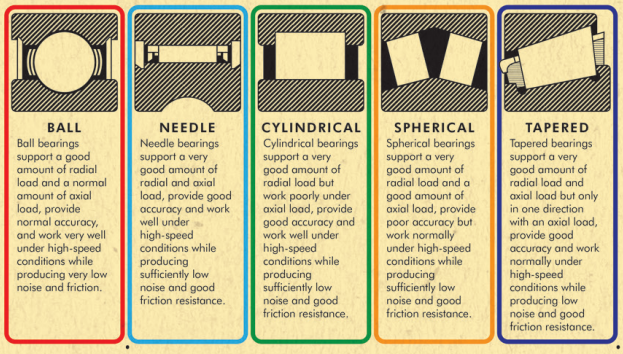
a set of **rollers** separated by a cage...

an outer **race**...

and sometimes a pair of **shields** or **seals**.

There are many different **types** of bearings

(ref. www.emersonbearing.com, www.skf.com)



BALL
Ball bearings support a good amount of radial load and a normal amount of axial load, provide normal accuracy, and work very well under high-speed conditions while producing very low noise and friction.

NEEDLE
Needle bearings support a very good amount of radial and axial load, provide good accuracy and work well under high-speed conditions while producing sufficiently low noise and good friction resistance.

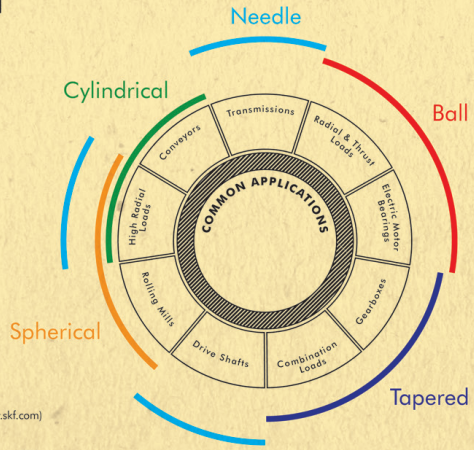
CYLINDRICAL
Cylindrical bearings support a very good amount of radial load but work poorly under axial load, provide good accuracy and work well under high-speed conditions while producing sufficiently low noise and good friction resistance.

SPHERICAL
Spherical bearings support a very good amount of radial load and a good amount of axial load, provide poor accuracy but work normally under high-speed conditions while producing sufficiently low noise and good friction resistance.

TAPERED
Tapered bearings support a very good amount of radial load and axial load but only in one direction with an axial load, provide good accuracy and work normally under high-speed conditions while producing low noise and good friction resistance.

BALL TYPE ROLLER TYPE

Some **common applications** for these different types of bearings



(ref. www.skf.com)

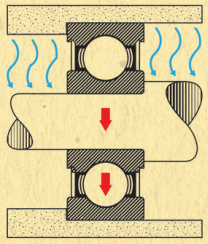
Remember, bearing type affects **grease life**.

Larger bearings and high-speed bearings translate to short grease life. High DN grease is required.

BEARING TYPE	RELATIVE TYPE OF GREASE
Deep-groove, single-row ball bearing	1
Angular contact, single-row ball bearing	0.625
Self-aligning ball bearing	0.77 - 0.625
Thrust ball bearing	0.2 - 0.17
Cylindrical, single-row roller bearing	0.625 - 0.43
Needle roller bearing	0.3
Tapered roller bearing	0.25
Spherical roller bearing	0.14 - 0.08

(ref. Booser, Bloch, ML)

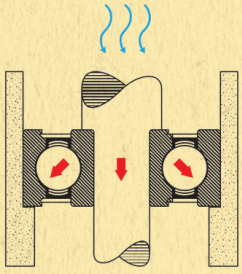
Bearings also work under different kinds of **loads**.



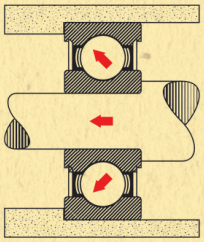
RADIAL LOAD
When the load is perpendicular to the shaft due to

GRAVITY

AXIAL OR THRUST LOAD
(When the load is parallel to the shaft)



Axial load in a vertical pump or electric motor due to gravity



Axial load in a horizontal pump

(ref. www.skf.com)

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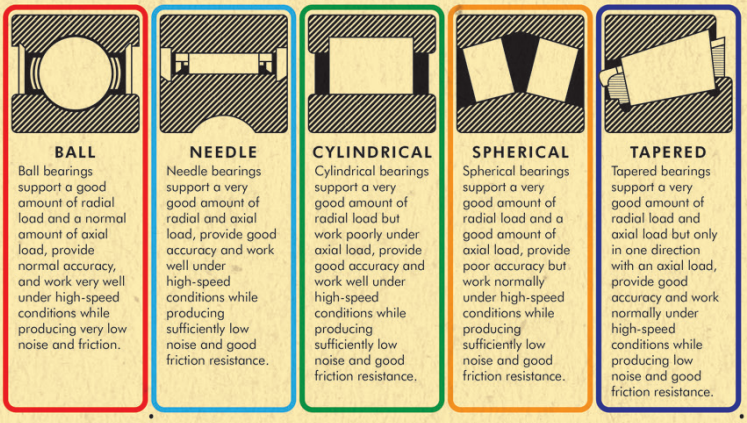

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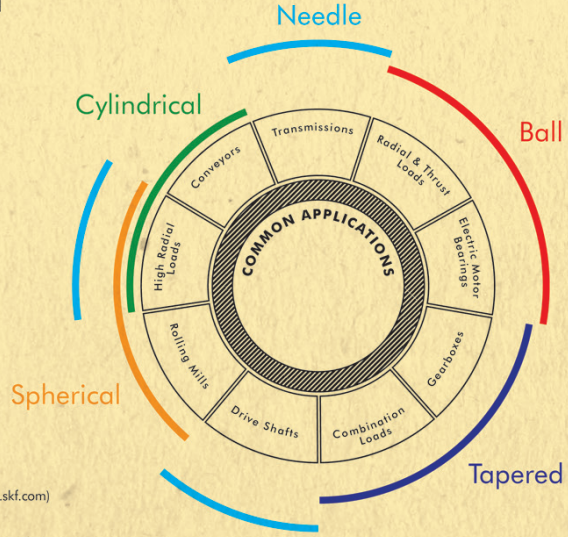

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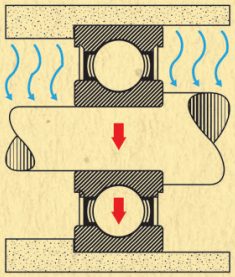

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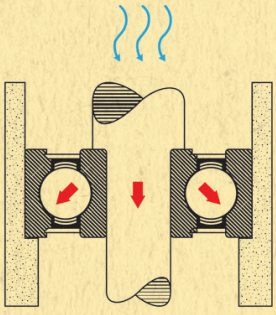

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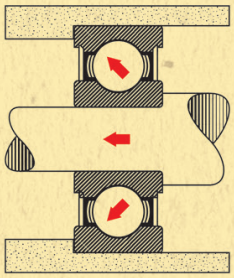

Axial load in a horizontal pump

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