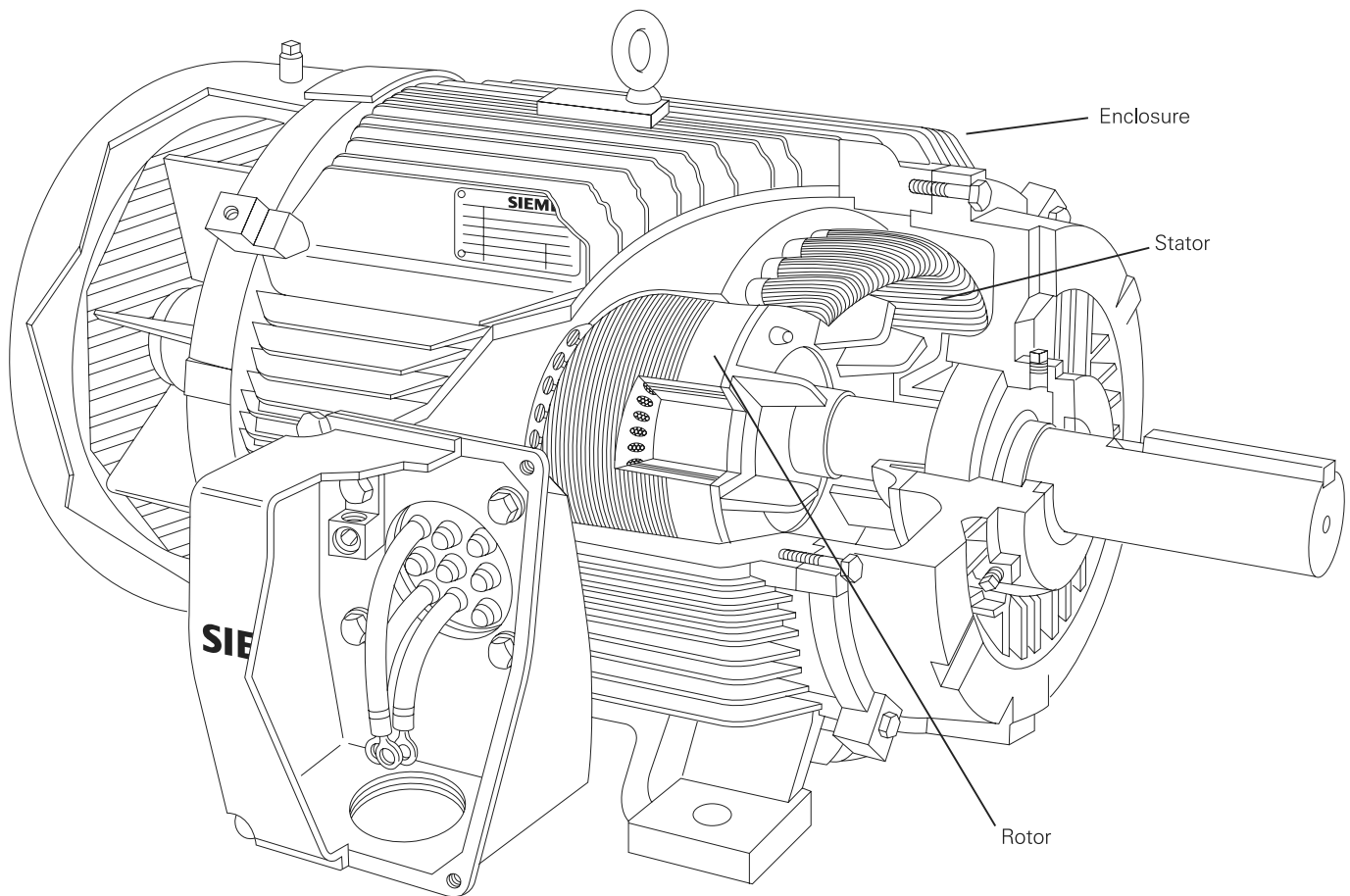


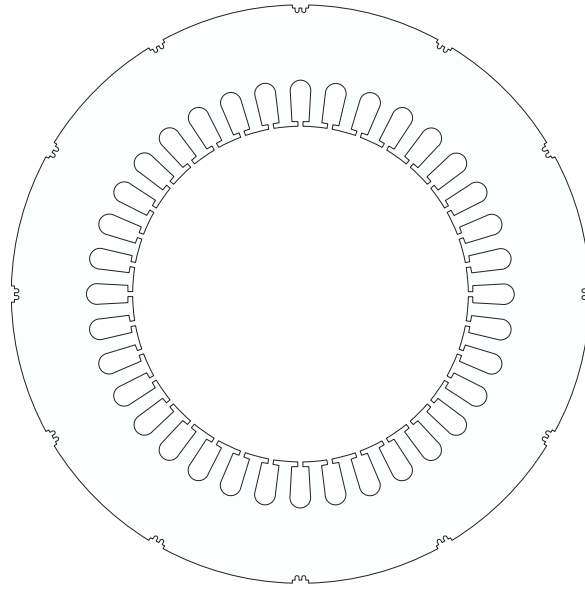
# AC Motor Construction

AC induction motors are commonly used in industrial applications. The following motor discussion will center around three-phase, 460 VAC, asynchronous, induction motors. An asynchronous motor is a type of motor where the speed of the rotor is other than the speed of the rotating magnetic field. This type of motor is illustrated below. The three basic parts of an AC motor are the rotor, stator, and enclosure.



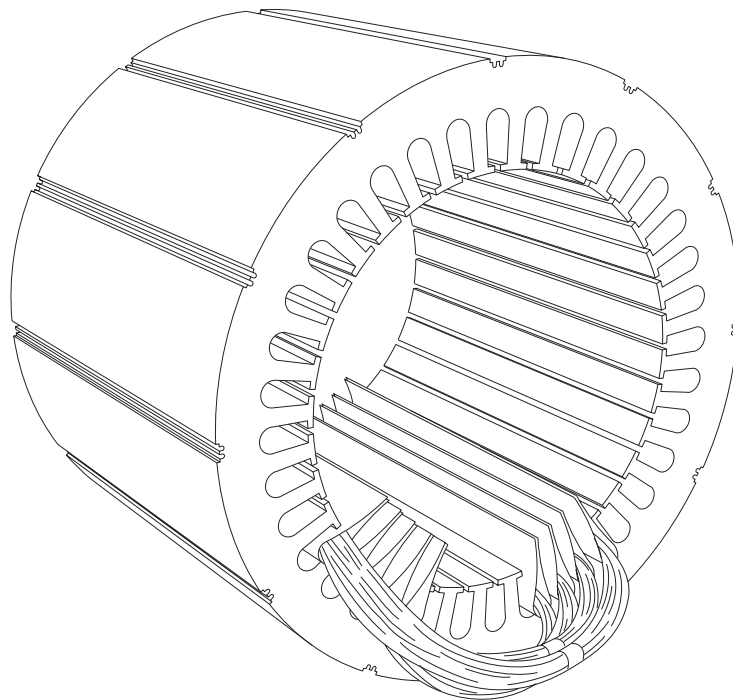
## Stator Construction

The stator and the rotor are electrical circuits that perform as electromagnets. The stator is the stationary electrical part of the motor. The stator core of a NEMA motor is made up of several hundred thin laminations.

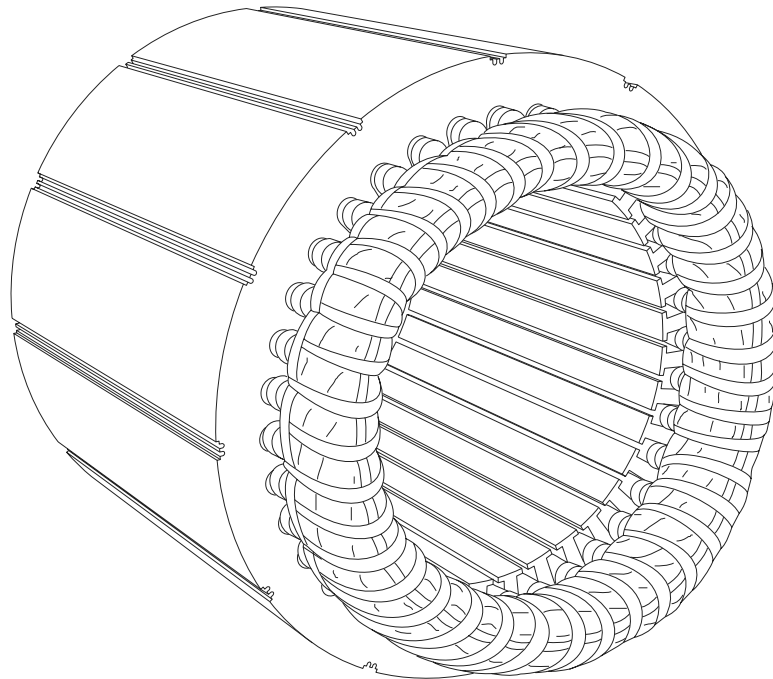


## Stator Windings

Stator laminations are stacked together forming a hollow cylinder. Coils of insulated wire are inserted into slots of the stator core.

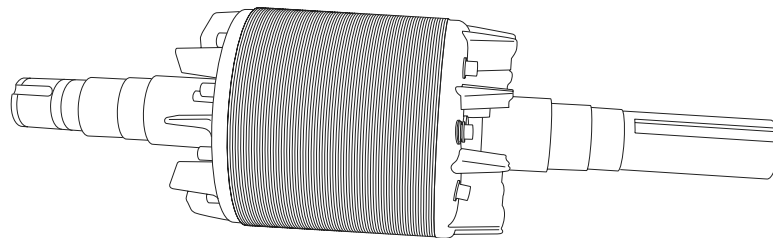


Each grouping of coils, together with the steel core it surrounds, form an electromagnet. Electromagnetism is the principle behind motor operation. The stator windings are connected directly to the power source.

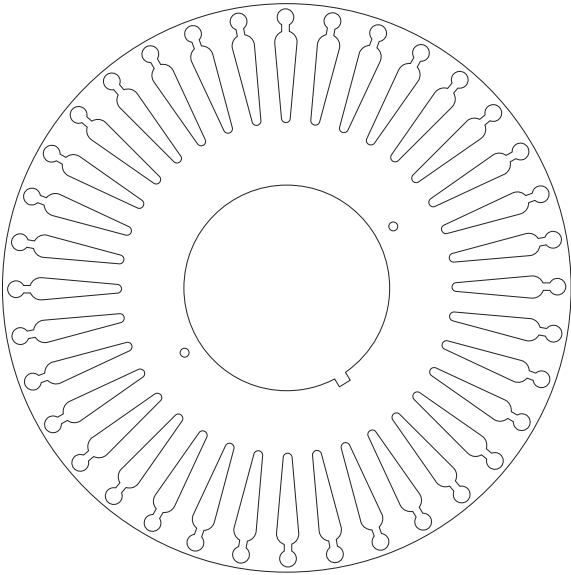


## **Rotor Construction**

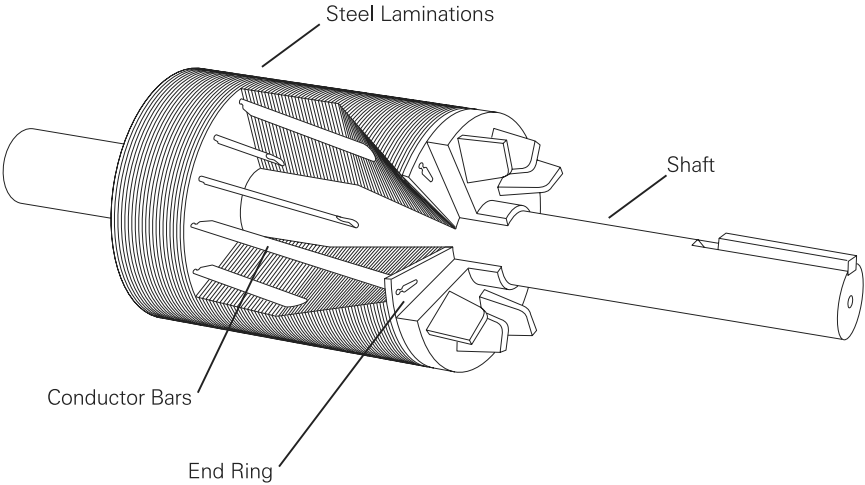
The rotor is the rotating part of the electromagnetic circuit. The most common type of rotor is the "squirrel cage" rotor. Other types of rotor construction will be mentioned later in the course. The construction of the squirrel cage rotor is reminiscent of rotating exercise wheels found in cages of pet rodents.



The rotor consists of a stack of steel laminations with evenly spaced conductor bars around the circumference.

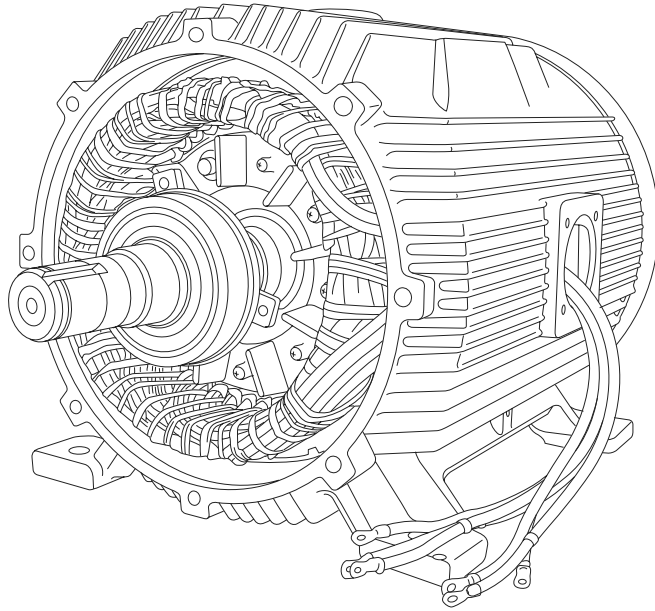


The laminations are stacked together to form a rotor core. Aluminum is die cast in the slots of the rotor core to form a series of conductors around the perimeter of the rotor. Current flow through the conductors form the electromagnet. The conductor bars are mechanically and electrically connected with end rings. The rotor core mounts on a steel shaft to form a rotor assembly.

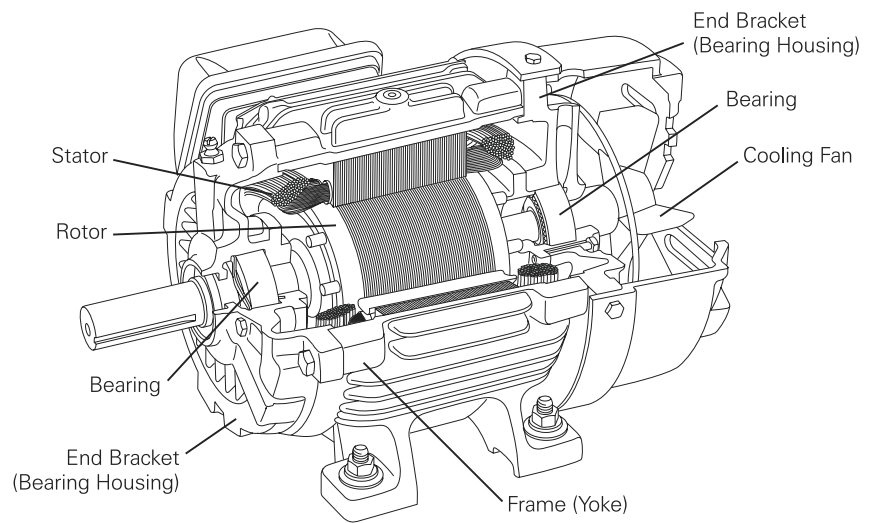


## Enclosure

The enclosure consists of a frame (or yoke) and two end brackets (or bearing housings). The stator is mounted inside the frame. The rotor fits inside the stator with a slight air gap separating it from the stator. There is no direct physical connection between the rotor and the stator.



The enclosure also protects the electrical and operating parts of the motor from harmful effects of the environment in which the motor operates. Bearings, mounted on the shaft, support the rotor and allow it to turn. A fan, also mounted on the shaft, is used on the motor shown below for cooling.



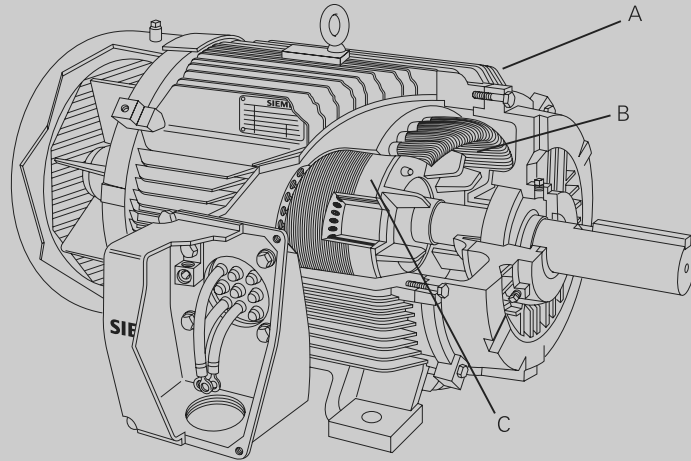
## Review 2

1. Identify the following components from the illustration:

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_



2. The \_\_\_\_\_ and the \_\_\_\_\_ are two parts of an electrical circuit that form an electromagnet.

3. The \_\_\_\_\_ is the stationary electrical part of an AC motor.

4. The \_\_\_\_\_ is the rotating electrical part of an AC motor.

5. The \_\_\_\_\_ \_\_\_\_\_ rotor is the most common type of rotor used in AC motors.