



Pump Engineer is pleased to be able to bring you sample data from the HI's e-learning program. Here is module 3 in a selection of slides from each of the six course modules.

HI's e-Learning Program Centrifugal Pumps: Fundamentals, Design and Applications

Course I: Pump basics: applications, types & construction

- Module 1: Typical applications of centrifugal pumps
- Module 2: Types of pumps
- Module 3: Centrifugal pump construction

Course II: Pump fundamentals: fluid mechanics, performance and selection

- Module 4: Fundamentals of fluid mechanics
- Module 5: Centrifugal/vertical pump performance characteristics
- Module 6: Pump selection and application

Further details

For further details, please visit www.pumplearning.org to try a free demonstration course of "How To Learn" on-line.

Module 3: Centrifugal Pump Construction

OBJECTIVES

When you complete Module 3, Centrifugal Pump Construction you will be able to:

- Identify the major components of centrifugal pumps
- Identify the sub-types of each component
- Identify the mechanical similarity of different centrifugal pump types
- Explain the function of each component
- Select the most appropriate sub-type component for different applications.

IMPELLERS

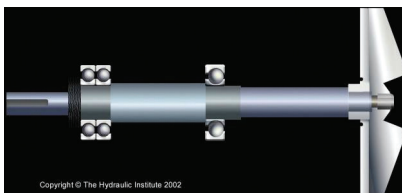
The impeller is mounted on a shaft with bearings so that it can be rotated inside the casing. Note that where the rotating shaft enters the casing, it must be sealed against leakage of liquid.



SHAFTS

Pump shafts are designed to support the impeller on one end, overhung from the bearings or between the bearings. The overhung design allows straight liquid flow into the impeller, but results in greater radial load on the bearings.

The overhung design eliminates one seal around the shaft and simplifies the construction of the casing. Some sealless pump designs use a stationary shaft or spindle on which the impeller and drive element rotate.

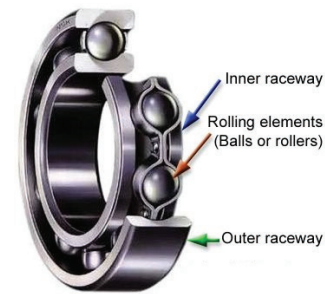


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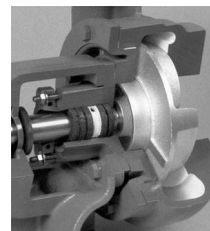
BEARINGS: ROLLING ELEMENT

BEARINGS

Rolling element bearings are most commonly used to support centrifugal pump shafts. Single row or double row ball bearings are good for carrying radial and axial loads. Roller bearings are good for carrying high radial loads but not axial loads.



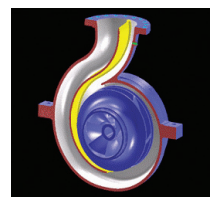
SEALS AND PACKING



In order to seal rotating shafts against leakage of the pumped liquid, soft packing is often used. Such packing is usually made of

braided fibers impregnated with graphite or other lubricating material. The packing is retained by a gland which can be tightened to squeeze the packing close to the shaft. During operation, some leakage of liquid is necessary to keep packing from overheating.

CASINGS



Pump casings collect the liquid from the pump impeller, convert the velocity energy to pressure energy, and guide the liquid to the pump discharge nozzle.

This casing shows a dual (double) volute which helps balance the hydraulic forces. ●