



Pump Engineer is pleased to be able to bring you sample data from the HI's e-learning program. Starting this issue, we will publish 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

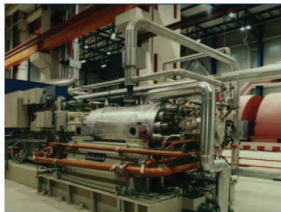
- Module 4: Fundamentals of fluid mechanics
- Module 5: Centrifugal/vertical pump performance characteristics
- Module 6: Pump selection and application

#### Further details

For further details, please visit [www.pumplearning.org](http://www.pumplearning.org) to try a free demonstration course of "How To Learn" on-line.

# Module 1: Typical applications of centrifugal pumps

## Electric Power Industry



Courtesy of Sulzer Pumps

Electricity which we use to light our homes and drive electric motors is produced in large electric power generating plants. Electricity is generated by large turbines using steam from high pressure boilers. Many pumps are needed in this process and make up a third large market for pumps. These powerful high pressure pumps are used to feed water at high pressure to steam boilers.

## Electric Power Industry



Other pumps in power plants are necessary to remove the condensed steam from the bottom of massive steam condensers and send it to heaters which increase the water temperature. Heater drain pumps then move the water to the boiler feed pump.

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## Electric Power Industry



Courtesy of ITT Fluid Handling - Bell and Gossett

Cold water is needed to cool the spent steam and turn it back to water. These pumps circulate water from the cooling tower through the condenser and back to the cooling tower where it is cooled as it splashes down through the tower.

## Electric Power Industry



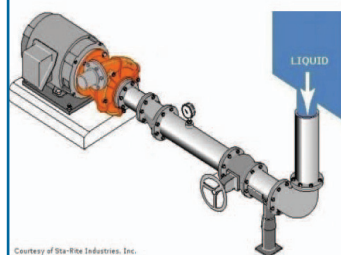
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Exhaust gas from the furnace in electric generating stations is scrubbed by water from pumps in order to remove solid particles.

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## Typical Installations

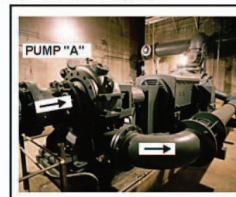


Courtesy of Sta-Rite Industries, Inc.

Many process pump applications have pumps connected to a tank above ground, called flooded suction, and discharge into another tank at higher level or pressure.

## Typical Installations: Pumps in Series

Pumps can also be connected in series, with one pump feeding directly into another. This installation shows two pumps driven by the same motor. The discharge flow from Pump A is piped directly to Pump B. Pump B, in turn, adds energy to the liquid to satisfy the head requirements of the system.



Courtesy of Yeomans Chicago Corporation  
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