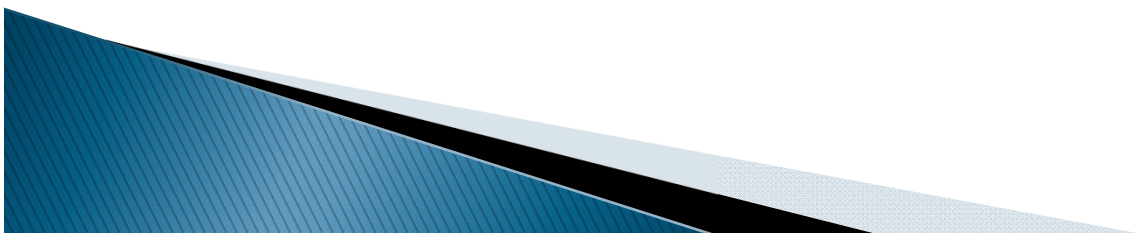
Incorporating the Online Encyclopedia of Chemical Engineering Equipment Into Your Course Activities

Dr. Susan Montgomery,
G. Brymer Williams Collegiate Lecturer

CHEMICAL ENGINEERING
UNIVERSITY of MICHIGAN ■ COLLEGE of ENGINEERING

Agenda

- History of the Encyclopedia
- Demonstration
- Implementation
- Do's and Don'ts
- Current and Future Work
- Acknowledgments
- Questions and discussion



History of the Encyclopedia

- 1993 – NSF DUE grant 9555125
  - Multimedia Materials for Intro ChE course
  - CDs distributed by CACHE Corporation
- 1997 – CD version 1.0
- 2000 – CD version 2.0
  - Fogler's *Elements of Chemical Reaction Engineering, Prentice Hall*
  - Felder and Rousseau's *Elementary Principles of Chemical Processes, John Wiley and Sons*
- 2007 – CD version 3.0
- 2014 – Online version
  - All-new images

Demonstration

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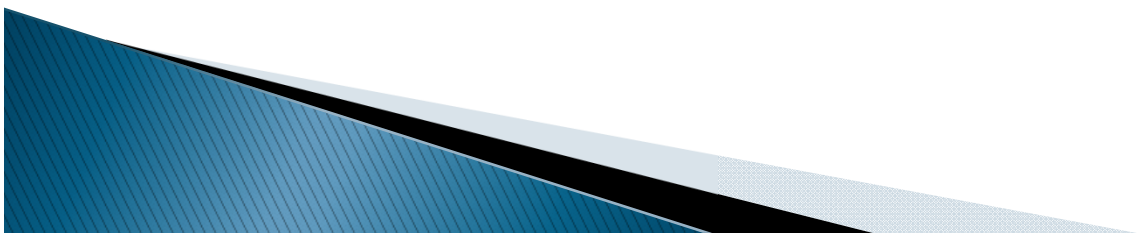


Description

Description

GENERAL INFORMATION

Water is the most naturally abundant and widely used extinguishing substance. It extinguishes fire by cooling.

There are three main types of water deluge systems, components of which are shown below. From left to right, they are: fine water spray systems, sprinkler systems, and water spray systems.

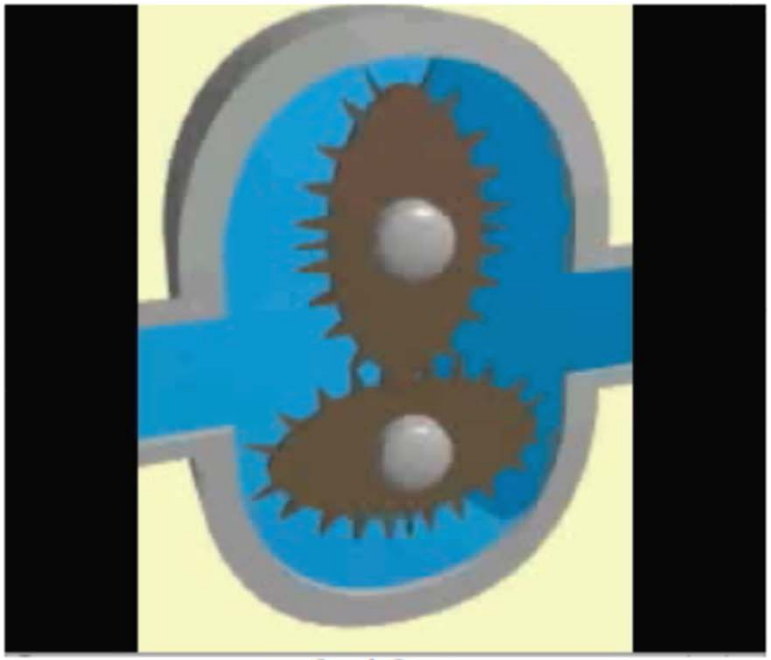
(Courtesy of Minimax GmbH & Co. KG, Bad Oldesloe, Germany)

Description

OVAL GEAR & IMPELLER

GENERAL INFORMATION/EQUIPMENT DESIGN

Oval gear meters and impeller meters, shown below, operate in the same manner, but differ in the shape of the gears. Fluid flowing through the measuring chamber causes the gears to turn, displacing an exact volume of fluid. A magnetic or mechanical device counts the number of turns, determining the volumetric flowrate.



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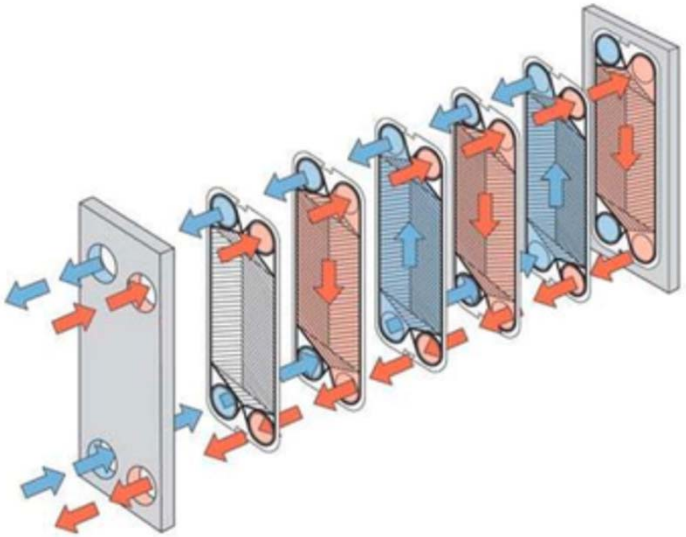


(Copyright Alfa Laval, Richmond, VA)

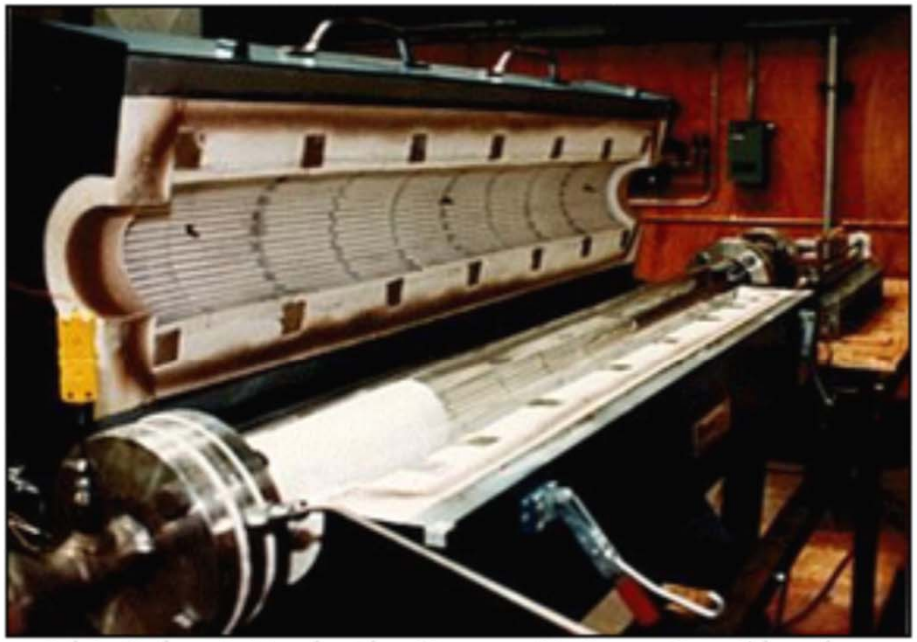
The pictures shown below are examples of double wall heat exchangers.

(Copyright Polaris Plate Heat Exchangers, Tinton Falls, NJ)

Description

USAGE EXAMPLES

Plug flow reactors have a wide variety of applications in either gas or liquid phase systems. Common industrial uses of tubular reactors are in gasoline production, oil cracking, synthesis of ammonia from its elements, and the oxidation of sulfur dioxide to sulfur trioxide. Pictured below is a tubular reactor used in research on the oxidation of nitrogen compounds. It reaches temperatures of 800 - 1100˚C.



(Copyright Robert Hesketh, Rowan University, Glassboro, NJ)

Description

ADVANTAGES

- Able to achieve high vacuum levels and handle large flow rates
- Relatively low noise level
- Available in small sizes suitable for laboratory applications
- High compression ratios per stage
- Reliable

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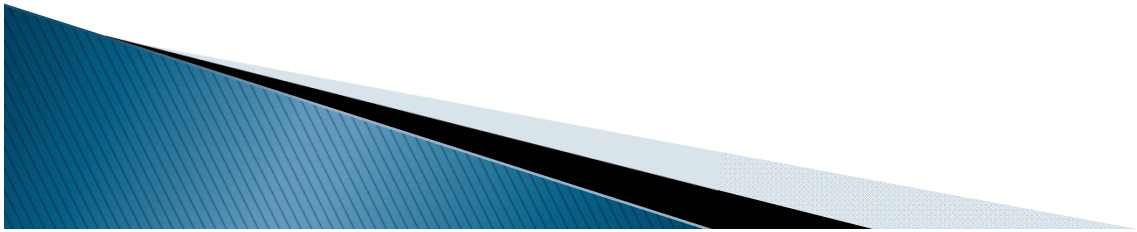
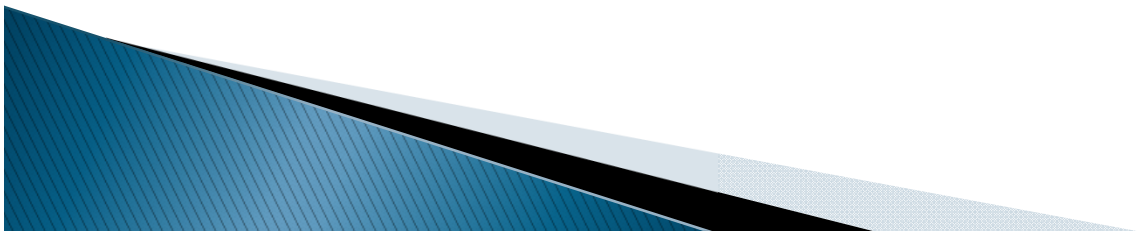
DISADVANTAGES

- Sensitive to contamination
- High service requirement
- Intolerance for liquid slugs
- Need to select a compatible lubricant
- Low tolerance for fouling
- Limited materials of construction



Implementation

- Preparing and delivering lectures
- Addendum to homework
- Extra-credit problem on exam
- Required reference for projects
- Background in laboratory courses
- Reference in design projects
- Resource in industrial internships



Do's

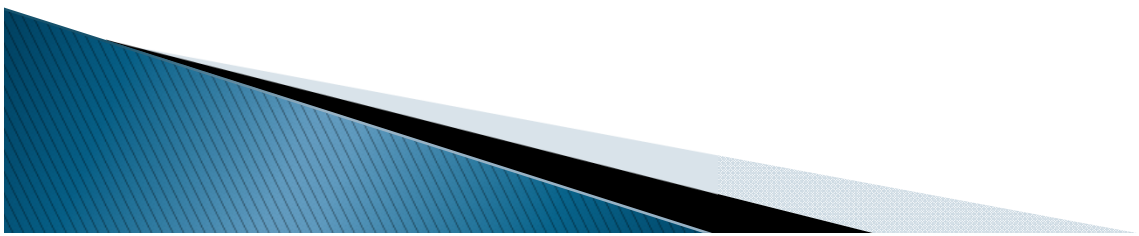
- Demonstrate the Encyclopedia in class
- Include a citation to the Encyclopedia when including visuals in your slides
- Include a link to the Encyclopedia in your course website
- Encourage students to use the Encyclopedia
- Teach students how to reference websites

  e.g. (harvardgenerator.com)

  Pumps. Encyclopedia of Chemical Engineering Equipment [ONLINE] Available at: encyclopedia.che.engin.umich.edu/Pages/TransportStorage/Pumps/Pumps.html [Accessed 17 June 14]

Don’ts

- Assign reading the Encyclopedia as a volunteer activity and expect students to do it.
- Make questions on homework too broad such that students are not sure how much depth to go into.
- Make extra-credit questions on exams too difficult/obscure.



Current and Future Work

- Continual updates
  - New graphics
  - Updated references
- New sections for specific applications
  - Safety
  - Food industry
  - …
- Videos on You-tube
- Publicity
  - AIChE student chapters
  - AIChE student newsletters
  - Letters to department chairs?
  - Newsletters – AIChE education division, ASEE ChE division

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Questions / suggestions?

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