LIQUID LINE

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In This Issue

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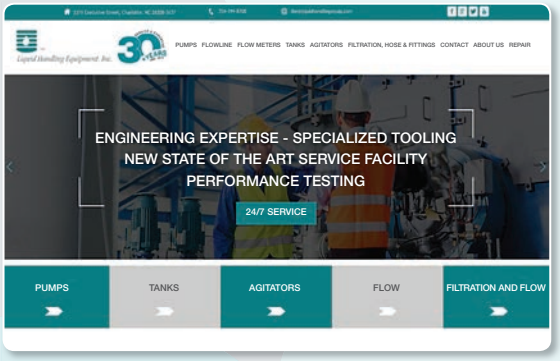
Liquid Handling Equipment Celebrates Its 30th Anniversary!

As of July 15, 2018, Liquid Handling Equipment, Inc. will officially celebrate 30 years in business! We couldn't have reached this significant benchmark without all of our customers and suppliers. We are very grateful to you for making the past 30 years possible.

SERVICE & EXPERTISE 30 YEARS 1988 - 2018
Liquid Handling Equipment, Inc.

Liquid Handling Equipment has some exciting plans in recognition of our 30th Anniversary. We are planning a mid-summer Open House to celebrate our anniversary and to show off our new warehouse / shop expansion. We are excited to have customers, suppliers, and friends join us at the Open House to both party and tour our expanded facilities. No firm date has yet been set, but if you are interested in being included on our invitation list, please shoot an email to Eric Sant at **esant@liquidhandlingequip.com** to reserve an invitation. *We want to see you there!*

The second exciting announcement is the launch of a new Liquid Handling Equipment Website, which is already in place. As we continue to evolve and expand our online presence, we realize that finding accurate, detailed information about a product is paramount for our existing and potential new customers and general visitors as they consider fluid handling equipment.



The updated Liquid Handling Equipment website includes a redesign of some navigational elements with additional dropdown menus. Products are now easier to find with more options available to read elevated descriptions or review detailed engineering specs when needed. Also, all the website functions are mobile friendly for those constantly on the go. Please visit our new Website at **www.liquidhandlingequip.com**. Let us know what you think; we look forward to your input.

As we look ahead to the next 30 years, Liquid Handling Equipment will continue to search for new ways to provide superior service to our customers and maintain and enhance our strong product offering. Our promise is that we will continue to strive to meet and exceed your expectations and always go the extra mile to retain or gain your business as our valued customers and business partners.

Thank you to all who have supported Liquid Handling Equipment, Inc. over the last 30 years. We truly appreciate your business!

See you this summer at our Anniversary / Grand Tour Open House!

Technical Spotlight

How Do Fluids Act When Passing Through Piping Systems?

By John Hickner

John Hickner
Mechanical Engineer

Our last *Technical Spotlight* featured NPSH and how to calculate it. A component of NPSH is friction loss. Accounting for friction loss is integral in determining the correct piping for pump systems.

The losses with respect to friction are vital for not only the suction piping, but also for the discharge piping. Let's take a look at two different friction losses when liquid passes through a piping system. Everything referenced in this article will be about fully-developed incompressible liquids.

Piping systems usually consist of long runs of pipes with multiple, individual valves, bends, elbows, and other fittings. Long runs of piping usually cause the most friction loss, which is commonly known as the major losses in a piping system. The valves, bends, elbows, and other fittings are what make up the minor losses. It is important to know that there are exceptions to these. For example, a half to fully-closed valve will introduce greater head losses than straight pipe runs. Analyzing minor losses through fittings and valves is usually determined through experimentation by the parts manufacturer, simply because the flow through fittings and valves is very complex in nature.

Major losses, in general terms, are the losses that occur from straight runs of piping. There are two different types of flow that can occur through straight pipes: Laminar Flow and Turbulent Flow. The difference between the two flows can be seen in Figure 1.

Figure 1: Rough sketch of Laminar vs. Turbulent Flow

Figure 1 shows a rough sketch of what Laminar Flow and Turbulent Flow look like. Fully developed Laminar Flow is shown as a smooth, constant velocity flow path; whereas, Turbulent Flow is shown as chaotic and erratic. As demonstrated, Laminar Flow has a straight flow path without any radial movement in the fluid. The flow for all elbows, tees, valves, and fittings should be considered Turbulent. The key deciding factor as to whether or not the fluid is Laminar or Turbulent is based on the Reynolds Number.

The Reynolds Number is a unit-less number that is the ratio between inertial forces and viscous forces. The Reynolds Number for a cylindrical pipe is found within Equation 1.

$$Re = \frac{\textit{Inertial forces}}{\textit{Viscous forces}} = \frac{V_{avg}\,D}{v} = \frac{pV_{avg}\,D}{\mu}$$

Equation 1: Reynolds Number

The variables in the equation are as follows:
- ***V_{avg} is the average velocity of the fluid in the pipe***
- ***D is the geometry of the pipe the fluid is flowing through (diameter for a cylindrical pipe)***
- ***p is density***
- ***μ is the absolute/dynamic viscosity***
- ***v is the kinematic viscosity of the fluid***

Once you have all the variables, you can calculate the Reynolds Number, which will define the flow as either Laminar or Turbulent. If the flow is Laminar, the Reynolds Number will be less than / or equal to 2300. If the Reynolds Number is greater than 4000, the flow is Turbulent.

The region between the two is called Transitional Flow. With this number, you can start to analyze the head losses due to friction in the pipe. Again, these losses are categorized as major and minor losses. The next newsletter will address how to use the Reynolds Number to calculate the friction factor and the head loss due to friction.

Product Spotlight

Spotlight on:
Bendel Tank & Heat Exchanger

Bendel specializes in the design and shop fabrication of Pressure Vessels, Reactors, Shell & Tube Heat Exchangers, and Storage Tanks up to 186" in diameter and up to 75,000 gallons in capacity. Its custom fabricated products are built to nationally-recognized standards, which include UL, NFPA, API, ASME, and TEMA, and are available in Carbon Steel, Stainless Steel, and Nickel Alloy materials of construction.

All Bendel products are custom designed and fabricated in its Charlotte, NC facility. The company serves the Chemical, Petrochemical, Pulp & Paper, Textile, Paint, Water / Wastewater Treatment, and Pharmaceutical markets, to name a few.

Bendel is a member of the STI Steel Tank Institute. Bendel's modern fabrication facility encompasses more than 65,000 square feet of manufacturing area on a 12-acre site, located less than one mile from Interstate Highways I-85 & I-77.

The Bendel Engineering and Drafting department provides clients with exceptional design capabilities for pressure vessels, reactors, heat exchangers, and shop-built storage tank fabrications.

The Bendel team consists of highly-educated and experienced professionals in each of its departments. In addition to exceptional administrative and sales support services, the Bendel engineering and drafting team members intensely focus on delivering high-quality products. Our internal system emphasizes definition of design, testing, fabrication, and quality control at each stage of development.

Bendel Reactor

Originally organized in 1959 to manufacture storage tanks and mobile truck tanks for the petroleum industry, Bendel has continually updated, modernized, and expanded its capabilities and facilities to produce a wide range of custom-designed, engineered, and fabricated vessels.

The Bendel Tank & Heat Exchanger facility is one of the largest fabricators of pressure vessels, reactors, and shop-built storage tanks in the eastern United States.

CONSISTENT PERFORMANCE AND RELIABILITY FOR OVER 50 YEARS.

Website: www.bendelcorp.com

A Liquid Handling Equipment Success Story

by Ed Moser

Ed Moser
Outside Sales

In coordination with the development of a new company Website, Liquid Handling Equipment has recently committed time and resources to upgrading our Internet marketing. In doing so, the goal has been to make it easy for existing customers, as well as potential new customers, to find Liquid Handling Equipment when a fluid handling need arises. A good example of the value of our new Internet marketing presence happened in December of last year.

Liquid Handling Equipment received notification that someone inquired about our fiberglass tank line. Upon receipt of the email, the individual was contacted and an appointment was made to visit the company the very next day.

Immediately upon arrival, the company's existing 10,000 gallon vertical fiberglass tank was carefully examined. The manway cover on top of the tank was removed in order to gain a better view of the tank's interior. With the aid of a flashlight, the inside of the tank was carefully examined to assess any damage.

Near the top sidewall, a problem was apparent. In the cleaning process, a vacuum had occurred, which pulled in the tank's straight sides in several places. It was determined that the FRP tank was beyond repair and definitely needed to be replaced.

Fortunately, the company had an existing drawing of the tank. It was forwarded to Edwards FRP & Repair. Edwards quickly created a drawing of the "new" tank, which Liquid Handling Equipment submitted to the customer for any possible revisions. The customer did make some changes that were sent back to Edwards for confirmation of the necessary revisions.

On December 8, 2017, a formal quote was submitted. The customer placed an order in mid-January of this year and the custom tank was delivered to the customer the first week in February. The company is so pleased, it has promised that it will soon request a quote on a second tank.

By expanding our marketing reach, Liquid Handling Equipment now has a new customer that is not only pleased with its new tank, but also with the ease of the process in specifying and purchasing it.

Check out the new Liquid Handling Equipment Website for detailed information on Edwards FRP and Repair and other lines to let us know how we can partner to provide solutions for your tank and other applications.

Meeting Your Process Needs

Liquid Handling Equipment carries a full line of products to meet all of your process needs.

Tanks & Heat Exchangers
Bendel Tank & Heat Exchanger
Edwards F.R.P. Tanks & Repair
Modern Welding
Poly Processing Company
Sharpsville Container

Pumps
Boerger Pumps
Crane Pumps - Barnes / Burks / Crown / Deming / Weinman
DESMI / Rotan
Ebara
Flux Pumps
HMD Kontro / Sundyne
Iwaki-America
LC Thomsen
Price
Roper
Walchem
Watson-Marlow / MasoSine Pump
Watson-Marlow Sanitary Process Pumps
Yamada America
Zoeller Pump Company

Agitators
MixMor Corporation

Filtration
Eaton / Hayward MFG
Harmsco
Pentair
Strainrite

Flow & Liquid Level Management
FLOWLINE
Niagara Meters

Accessory Equipment
Blacoh Fluid Products
Dixon
Garlock Sealing Technologies
Icon Process Controls
Novaflex
OPW / Civacon Corp.