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LIQUID LINE

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Introducing ICON PROCESS CONTROLS, Ltd.

ICON PROCESS CONTROLS, Ltd. is a global company with over 30 years of experience in the fluid handling industry. Specializing in corrosion-resistant industrial fluid handling process control equipment, ICON provides Industry with the most complete line of all-plastic instrumentation products, supported by the largest inventory in North America.



ICON Process Controls specializes in **FLOW • PRESSURE • TEMPERATURE** by way of the following product line:

Truflo – Thermoplastic Corrosion-Resistant Flow Meters, Flow Switches, Pressure Gauges & Transmitters

Whether a project demands Best-in-Class performance or equipment that will adequately suit the application, ICON ensures the right product for the job. The company offers only top-tier products that are built tough and designed to operate seamlessly in the fluid industry's toughest applications. Its markets include Municipal and Industrial Water & Waste-Water Treatment, Bulk Chemicals, Steel Processing, Metal Finishing, Chemical Dosing Skids, and Food & Beverage.

With the addition of ICON Process Controls to our supplier pool, we not only expand Liquid Handling Equipment's product offering for flowmeters, but we also open the door to a valuable source of other equipment that heretofore hasn't been available to us.



**Truflo
Flow Meter &
Transmitter**

Please contact your local Liquid Handling Equipment representative to learn more about ICON Process Controls' smarter chemical storage solutions.

Liquid Handling Equipment Welcomes Craig Rogers



Craig Rogers
*Shipping
Manager*

We are very pleased to announce that in May of this year, **Craig Rogers** assumed the role of Shipping Manager. Before joining Liquid Handling Equipment, Craig served in the military as a Marine for five years. After the Marines, he worked as branch security for Bank of America. In his spare time, Craig likes to run and spend time with family.

Please join us in welcoming Craig to the Liquid Handling Equipment family!



LIQUID LINE



Technical Spotlight How to Calculate Head Loss Due to Friction

By John Hickner



John Hickner
Mechanical
Engineer

Our last Technical Spotlight featured the different types of flow through pipes. It also demonstrated how to find the Reynolds Number to determine in which flow the liquid appears. The Reynolds Number will now aid in figuring out the friction factor, as well as the head loss due to friction.

One of the main considerations when analyzing pipe flow is determining the pressure drop in the pipe. The pressure drop in a system is used to help size pumps for particular applications. The pressure drop is also tied to the head loss of the system. Pressure drop due to the viscous effects of a liquid represents an irreversible pressure loss, otherwise known as pressure loss (ΔP_L). Irreversible pressure loss is due to the friction of the viscous fluid in the pipe. If the fluid flowing through a pipe had no friction, there would be no pressure drop, which can be seen in the following equation.

$$\Delta P_L = f \frac{L}{D} \frac{\rho V_{avg}^2}{2}$$

The variables in the equation are as follows:

- ΔP_L Pressure Loss
- f Darcy-Weisbach friction factor
- L Length of the pipe
- D Diameter of the pipe
- V_{avg} Average Velocity

It is important to note that when using this equation, it is meant for fully-developed internal flows in pipes. When analyzing piping systems, pressure loss is usually expressed as head loss, (h_L). If using what is known from fluid statics, ΔP equals ρgh ($\Delta P = \rho gh$), then fluid head (h) is expressed as $\Delta P/\rho g$. The equation for head loss follows.

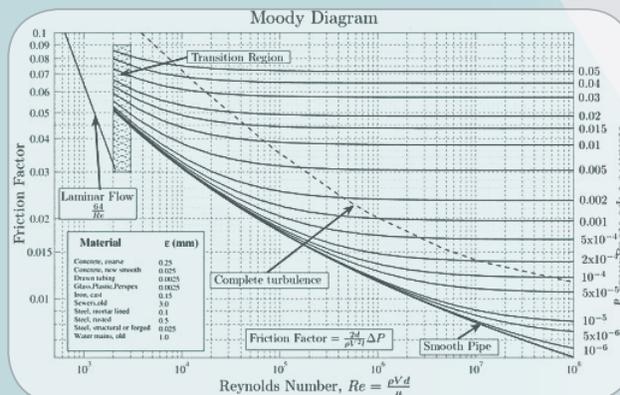
$$h_L = \frac{\Delta P_L}{\rho g} = f \frac{L}{D} \frac{V_{avg}^2}{2g}$$

The only new variable in the head loss equation is “g”, which is the gravitational constant. The needed variable to discover is the friction factor, which will require use of the Reynolds Number that was demonstrated in the last technical article.

To find the friction factor for laminar flow, take 64 and divide it by the Reynolds Number. When determining the friction factor for turbulent flow, a good reference is the Moody Diagram. It will help to ascertain the friction factor of the system.

The only required information is the Reynolds Number, diameter of the pipe, and the material of the pipe. Once the relative pipe roughness (ϵ/D) is determined, find where it intersects with the Reynolds Number to arrive at the friction factor. With the friction factor found, the head loss of the system can be calculated.

One major point when solving for the head loss of a system is to make sure all variables have proper units. The friction factor and the Reynolds Number are unit-less, so the four variables need to be checked for their units.



Moody Diagram

Spotlight on: Poly Processing Smarter Chemical Storage Solutions

Known as a leader in cross-linked polyethylene chemical tanks, Poly Processing is a company dedicated to storage safety, as well as operational and cost-effectiveness. A nationally recognized company, Poly Processing has been committed to raising industry standards. It has continually developed new and better storage concepts based on customers' needs and demands via their continual feedback and input.



4400 SAFE Tank



6150 IMFO Tank

Formerly known as the Abell Company, Poly Processing was founded in 1955 as an agricultural distribution service. In 1970, the Abell family recognized the need for better storage solutions for corrosive chemicals. They developed a process for roto-molded, cross-linked plastic storage as an alternative to Fiberglass, stainless steel, and lined steel vessels.

What makes cross-linked polyethylene storage tanks so special?

When compared to linear polyethylene, cross-linked polyethylene has 20 times the stress crack resistance, 10 times the molecular weight, and five times the impact and tensile strength.

Poly Processing strives to provide innovative tank solutions to customers. Some of the innovative options it offers include:

- **SAFE-Tank** - Double-wall tank to provide 110% secondary containment for the primary tank
- **IMFO Tank** - Integrally-molded flanged outlet that is a molded-in drain flange, providing full drainage since it is below the knuckle... No leak paths!
- **OR-1000** - Interior surface specifically designed to address the aggressive oxidation effects of sodium hypochlorite, sulfuric acid, and hydrochloric acid by adding a chemical barrier
- **B.O.S.S. Fitting** - One-piece fitting for better leak protection
- **SAFE-Surge Manway Cover** - Emergency air surge protection for pneumatic-filled tanks

Poly Processing offers a wide range of tank sizes. Flat bottom tanks range from 55 to 13,650 gallons. It also offers cone-bottom and horizontal tanks.

Check with your local Liquid Handling Equipment representative for more information about Poly Processing's tanks, as well as its other offerings and capabilities.



A Liquid Handling Equipment Success Story

by Matt Price



Matt Price
Outside Sales

A specialty chemical plant was in need of several mag-drive positive displacement pumps for PEG 1000 applications, which were part of a facility expansion project. The customer specializes in water-based rheology additives that include concrete additives and polyurethane thickeners. After discussing the advantages of Rotan's ED (Environmental Duty) Series Mag-Drive internal gear pumps, Liquid Handling Equipment was given the opportunity to bid on the project.

A competitor's brand of internal gear pumps had been in long-term use at the plant. The customer, however, was familiar with Rotan, having experienced success with Rotan internal gear pumps at his overseas facilities.

For this project, Liquid Handling Equipment recommended four ED101EF-3U33 internal gear mag-drive pump assemblies with 15 hp motors in a close-coupled configuration. Some of the benefits of the Rotan ED pump design over competitors' pumps include standard 180-degree-through-port connections with top-mounted relief valve, close-coupled pump and motor assemblies, and oversized ports for increased priming capabilities.



Rotan ED Internal Gear Mag-Drive Pump

The relief valve location and through-port connections allow for full draining of the relief valve, along with bi-directional flow capabilities without modifications required, other than changing the relief valve orientation if reverse flow is needed. This was an important consideration since the customer required two of the pumps to run in reverse-flow direction.

The close-coupled design, along with custom base plate, eliminated the need for flexible couplings, preventing any potential alignment issues. One of the major advantages was that with the standard Rotan oversized port, Liquid Handling Equipment was able to offer competitive pricing for pumps with 4" flanged ports compared to the competitor's 2-1/2" ports. The larger ports enabled the pumps to run at a lower speed than the competitor's (approximately 60% of maximum capacity compared to 90%), leading to less wear over time, while giving the customer the option for increased flow rates.

Upon meeting with the customer, Liquid Handling Equipment and the Rotan representative, were able to highlight all the above-listed advantages and secure the order. Rotan's commitment to innovation and design, along with continued factory support and nearby inventory of spare magnets and wear items for ED pumps, allowed Liquid Handling Equipment to provide a cost-effective solution for a difficult application.

Let Liquid Handling Equipment's product knowledge, industry expertise, and our roster of quality suppliers like Rotan provide solutions to your difficult fluid handling 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

ICON Process Controls, Ltd.

Niagara Meters

Accessory Equipment

Blacoh Fluid Products

Dixon

Garlock Sealing Technologies

Novaflex

OPW / Civacon Corp.