

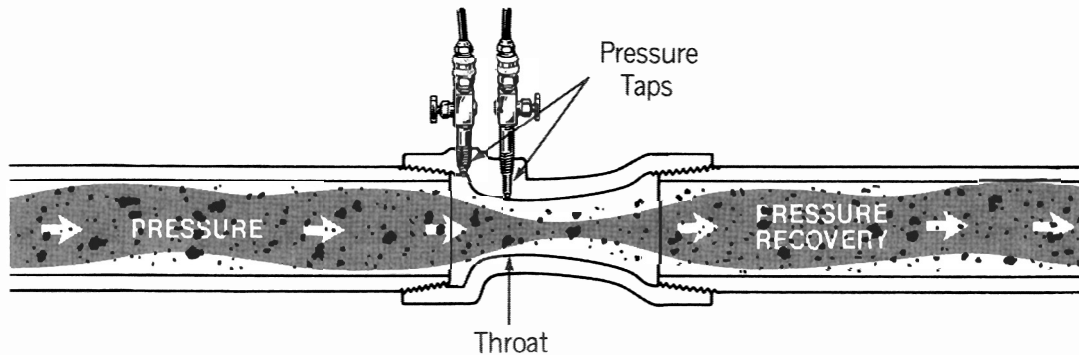
Venturi Principal

If a fluid system is to achieve the designed objectives, an accurate and reliable method of measurability and balancing flow must be specified. A Venturi Flow Measurement System utilizes the basic engineering principle of the venturi installed in a fluid line. Fluid passing through the reduced area of the venturi throat increases in velocity creating a pres-

sure differential between the inlet and throat areas. After passing through the throat, the flow area is gradually increased which decreases the velocity and allows pressure recovery. The differential pressure across the throat of the venturi (see Figure 1) can be read directly or easily translated into actual flow in gals./min. by use of various types of

differential pressure meters and capacity curves.

In order to evaluate the merits of a Venturi Flow Measurement System, all of the advantages must be examined. These advantages are presented here for consideration by the system design engineer.



Accuracy

Venturi accuracy and reliability are based on a well-known engineering principle (Bernoulli's Theorem). This principle covers the relationship between pressure differentials and velocity changes in various fluid flow conditions.

No flow measurement device can achieve greater long term accuracy than a properly calibrated venturi. A properly calibrated venturi can provide accurate measurements within $\pm 1/2\%$ in all sizes.

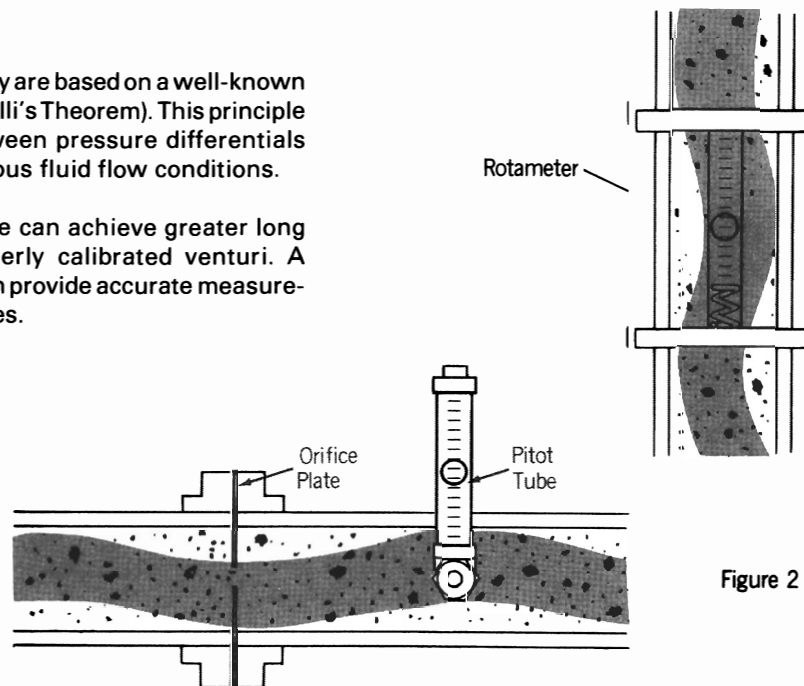


Figure 2

Reliability and Long Life

A venturi will maintain its accuracy over an extremely long period of time. The venturi is really a "self-cleaning" device. Its internal configuration, which permits smooth flow and efficient pressure recovery, eliminates erosion and resists clogging by foreign matter. Hydronic system water is usually "dirty", with particles of foreign matter. Other

devices using small orifices, spring loading, or glass read-outs in bypass arrangements are not self-cleaning and can be adversely affected by clogging or corrosive action (see Figure 2). Such loss of accuracy over years of continuous operation can seriously affect system redesign, system additions, or maintenance efforts when required later.

Maintenance Free

Maintenance of venturis is virtually unnecessary. Venturis have no moving parts, no springs to fatigue, or glass to break or stain. They will remain in the system throughout its life, always available for quick meter attachment and ready measurement.

Versatile

The venturi system is also versatile, because it can provide permanent stations with fixed meters, or portable meters which can be carried to a number of stations. A variety of meter types can be supplied, depending upon the application. Also, the wide range of sizes and beta ratios permits the designer to select the venturi that will exactly suit his needs.

Economy

HYPAN: Venturi Flow Measurement Systems have proven to be economical in the long run. They simplify maintenance, provide more system versatility and maintain their accuracy for many years, providing long range economy for the user.

Low Pressure Loss—Energy Savings

A significant advantage of the venturi is its low pressure loss, particularly when compared to other devices (see Figure 3—graph). For example, a venturi with a 0.6 beta ratio has a pressure loss of only 15% of actual pressure differential compared to 50% with a flow nozzle and 63% with an orifice plate. In addition, pressure recovery is smooth and gradual within a minimum length of pipe after the fluid had passed through the throat area.

Experience

Thousands of venturis have been installed in a variety of fluid systems. This experience contributes to the reliability of this product, and assures users that technical assistance or problem solving know-how is available at any time.

Saves Space

Requires fewer pipe diameters upstream and downstream for pressure recovery.

