

A Short History of Positive Displacement Flowmeters

Positive displacement flowmeters are truly a member of the class of traditional technology flowmeters. Their history goes back to 1815, when Samuel Clegg invented the first PD gas flowmeter. This was a water sealed rotating drum meter. Clegg's son-in-law, John Malam, together with Samuel Crosley, invented an improved model in 1825. Problems remained with high cost, freezing, and large size.

Thomas Glover invented the first "dry" gas diaphragm meter in 1843. Glover's meter contained two diaphragms and a sliding valve. In 1844, the first actual "dry" gas meter was developed by engineers Croll & Richards. The diaphragm meters used today are similar to these early meters, although major improvements have been made in material of construction. Early meters had diaphragms made of sheepskin with steel metal enclosures. More recent meters have synthetic rubber-on-cloth diaphragms and are made of cast aluminum.

Nutating disc meters, used today as water meters, were invented in 1830 by James and Edward Dakwyne. The Dakwyne's were granted a patent for a hydraulic pump using this same principle. In the 1850s, the nutating disc principle was incorporated into a meter developed by Bryan. These meters were improved, and the disc began to be made of hard rubber in the early 1900s. By combining hard rubber on brass, the life of the meter was greatly extended. This rubber and brass design was widely used until the late 1950s, when the brass meter body and chamber were replaced by plastics and composites. Piston meters were first introduced in the early and mid 1800s. However, these meters were not very durable. The rotary piston meter was invented in the late 1800s, and it is still in use today.

Bopp & Reuther of Germany holds the earliest patent for the oval gear meter in 1932. This meter has since been popularized by Oval Corporation of Japan, which introduced the oval gear meter in the early 1950s. Emerson Brooks is another major supplier today of the oval gear type meter. Oval gear meters are used for liquid measurement.

The development of positive displacement flowmeters was driven by the increasing need to accurately measure the amount of water and gas consumed in homes and in commercial and manufacturing establishments. Positive displacement meters predate the earliest new-technology flowmeter by more than 100 years. Magnetic flowmeters were the earliest new-technology flowmeter introduced, and this occurred in 1952. Because PD meters have been around so long, there has been more time for suppliers to develop, and for an installed base to build up. The very longevity of the PD meter helps assure its continued use.