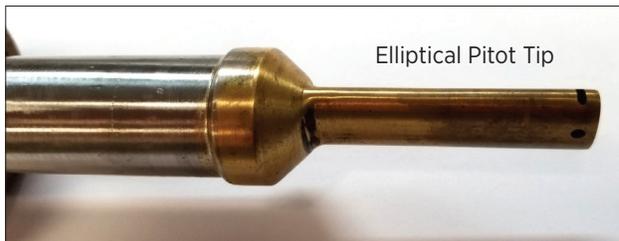


New Elliptical Pitot Tube for Water Flow Measurement

A Better Alternative to the Simplex Type Pitot Tube

Water flow rate is often a critical measurement for important power plant components including cooling towers, pumps, heat exchangers, and condensers. Since its inception in 1959, the Cooling Technology Institute (CTI) has used Simplex type pitot tubes for measurement of water flow rate. The Simplex tube is no longer commercially available and in recent years the results from the Simplex were suspect in challenging flow situations.

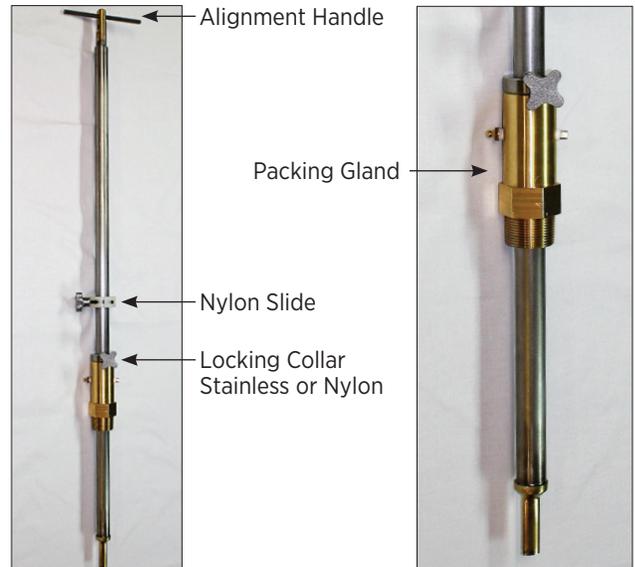
In 2017, CleanAir presented the results of a research study investigating alternative pitot designs. The elliptical pitot design as illustrated in the picture below, was recommended by CleanAir and adopted by CTI. The new design will provide the industry with a significant improvement over the Simplex design.



Advantages

- Flow measurements made with the elliptical pitot tube are much less sensitive to flow disturbances than the Simplex pitot tube resulting in more accurate flow measurements in less than ideal piping configurations.
- The study demonstrated that the coefficient for the elliptical tube pitot has a very low dependence on Reynolds number. This is a very desirable characteristic because it reduces the number of calibration points required to accurately determine the pitot coefficient and means that calibration data translates well to field settings.

A number of different pitot lengths are available and can be built to customer specification. Customer specifications for pitot length are often a function of targeted pipe size, portability and clearance at the measurement location. Each CleanAir pitot is dimensioned from the sensing tip to the alignment handles.



Each tube is equipped with co-joined static ports which are connected in the elliptical tip. One 1/4 inch stainless steel tube transmits the co-joined static pressure while a second parallel tube transmits the impact pressure down the length of the tube. Both the static pressure and impact pressure lines terminate in a threaded fitting near the alignment handles. Quick connects in the threaded fitting permit rapid connection to a wide variety of differential pressure measuring devices and may be removed or replaced by the user.

The pitot is equipped with a nylon slide that is designed so that when the pitot tip is resting at the far end of the pipe, the slide can be moved against the locking collar and secured to the pitot. During flow measurement, pitot placement within the pipe is measured from the inside of the packing gland ring to the nylon ring.

The 1/8 inch locking collar offset is equivalent to the distance from the end of the pitot to the midpoint of the impact orifice, meaning that this measurement does not need to be offset in order to calculate sampling stations

Each assembled tube includes a packing gland which permits installation of the pitot through a valve while water is flowing through the pipe. CleanAir can also provide calibration services at a variety of flow and velocity settings depending upon client need.