highly predictable and extensive data is available for a large range of flows, pressure differentials and pipe sizes.

Eccentric and segmental orifice plates may be used when the measured fluid contains suspended material or has both liquid and gaseous phases. Use of concentric plates in this application may lead to accumulations behind the plates and cause false readings.

Figure 1 – Orifice Plate Types

Beta ratios should be between 0.15 and 0.70 for flange taps. Beta ratios should be between 0.20 and 0.67 for pipe taps. Orifice plates with small Beta ratios and high pressure drops often function as restriction orifices. These plates may have a thickness up to ½" to withstand the energy that is dissipated.

Permanent pressure drop loss can be from 75% to 90% of the up stream pressure depending on the Beta.

Pressure tap locations are discussed in Guideline EG-19-222 (Flow Meter Installation).

A. Flow Nozzle

Flow nozzles are widely used for flow measurements at high flow velocities. The flow nozzle is more rugged and erosion resistant than the orifice plate. For a given diameter and a given differential pressure, the flow nozzle will pass approximately 65% more flow than the orifice plate.

Permanent pressure drop of a flow nozzle is greater than the Venturi flow element and less than the orifice flow element.

The flow nozzle, because of its streamlined contour, tends to sweep solids through the throat. For non-homogeneous fluids, the flow nozzle is preferable to the orifice plate. The flow nozzle should not be used if large percentages of solids are present.

Typical pressure measurements are at the radius tap locations of 1 pipe diameter upstream and 0-.5 pipe diameters downstream of the flow nozzle. The downstream tap should never be located beyond the end of the nozzle.