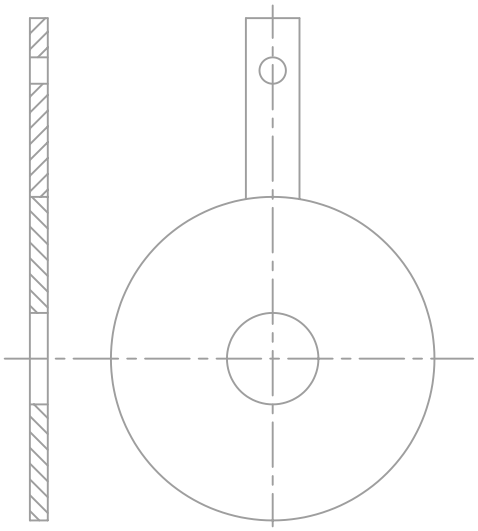
Single / Multistage Restriction Orifice Assemblies

General's Restriction orifice plate and its assemblies

The restriction orifices are used for reducing fluid pressure and are designed somewhat different from the orifice plates that are used for measuring flow rates. They are designed to slip between the piping flanges.



Single Stage Restriction Orifice

Multiple Restriction Orifice Assembly

While single restriction orifices are often sufficient to meet the requirements, there are situations where limitations arise due to process conditions making the single restriction orifices unacceptable. In such situations, use of multiple restriction in series is a better solution.

The foremost consideration for the case of multiple restriction is the pressure drop. This applies whether or not the fluid is liquid or vapor/gas. Higher pressure drop implies higher velocities resulting in vibration and noise problems.

The other consideration is not just about maximum permitted pressure drop and this is particularly for gas flow. If the process condition indicates that critical flow will occur with the use of single restriction plate, care should be exercised to avoid operating well beyond the critical pressure drop. Critical implies a pressure drop across the device exceeding 50 percent of the absolute upstream pressure at which point sonic velocity is reached.

Construction of Multistage Orifice Assembly comprises of multiple restriction orifice plates separated by a distance of one pipe diameter and welded with the pipes in between them. End connection is either suitable for butt welding or with end flanges. IBR Form IIIC certificate can be provided as per requirement.

Single / Multistage Restriction Orifice Assemblies

Standard as per R.W. Miller / ISO5167, AGA-3.

General Instruments manufactured multistage orifice assemblies are another type of measuring flow with high differential pressure meters effectively removing cavitation and flashing conditions. It also helps in killing pressure and thus effectively acting as a pressure reducing element. These are basically used to detect flow of fluids, gasses, steam, steam water, acids, alkalies, crudes, high viscous fluids, fluids with solid particles, condensation liquids. General make of multistage assemblies lead to a precise measure of differential pressure leading to the most precise flow rate taking care of all factors of fluid cavitation related to its vapour pressure. The design is applicable from ½" to 64" of flow measurement. For higher sizes of impact and pressure reducing kindly do contact the design and engineering team of General. It is measured at right angles to the flow direction, In a averaging General make Multistage assemblies the kinetic energy of the flowing fluid is transformed into potential energy for measurement of fluid flow velocity by effectively abrupting to 40% recovery in between two stages and thus, effectively removing the choking content of the fluid in gas and steam and removing cavitation in especially liquid state thus essentially reducing industrial noise and restricting to below 80 decibels.

Applications

- Gas and Liquid Flows
- High Pressure Drops

Prevents

- Cavitation and Flashing in Liquid flows
- Choked flow in gases.
- Excessive Noise / Vibration

Restriction orifice plates have traditionally been used to reduce pressures in GAS AND LIQUID FLOWS by forcing the flow through a restricted bore. The precise pressure drop is produced by accurately calculating the orifice bore, having taken into account all the relevant process and flow conditions.

Where very HIGH PRESSURE DROPS in liquid flows are required MULTISTAGE RESTRICTION ORIFICE ASSEMBLIES may be required to achieve the desired pressure drop whilst preventing problems such as CAVITATION, FLASHING and high NOISE and VIBRATION levels.

CAVITATION is a potentially damaging, erosive condition which occurs when the internal pressure of the liquid passing through the orifice falls below its vapour pressure and vapour bubbles form. Further downstream from the orifice the pressure recovers sufficiently to collapse the bubbles with extreme violence. Cavitation calculations are performed during the design stage of a Multistage RO to calculate cavitation factors at each stage in the orifice assembly.

FLASHING is a similar phenomenon to cavitation except that the process pressure never recovers sufficiently to collapse the gas bubbles resulting in two phase flow - liquid and gas - downstream of the orifice. Erosion of pipe work and valves and other instrumentation can occur due to the impact of liquid droplets carried at high speed in the vapour flow.

CHOKED FLOW IN GASES - also know as critical flow - occurs when too large a pressure drop is attempted across a single orifice plate, or when too large flows are forced thru a lesser inlet pipe size. In such cases the flow through the orifice will become sonic, at which point no further increase in flow can be achieved by either increasing the upstream pressure or lowering the downstream pressure. General make multistage RO will enable staged reductions in pressure to prevent choked flow occurring.

General make Multistage ROs are manufactured from a wide range of materials and are engineered to meet specific project process conditions and requirements. Plates are usually welded into pipe with a separation of one pipe diameter, the number of plates and orifice bores being determined by calculation. Process connections to existing pipe work can be either standard process flanges or machined ends suitable for butt welding.

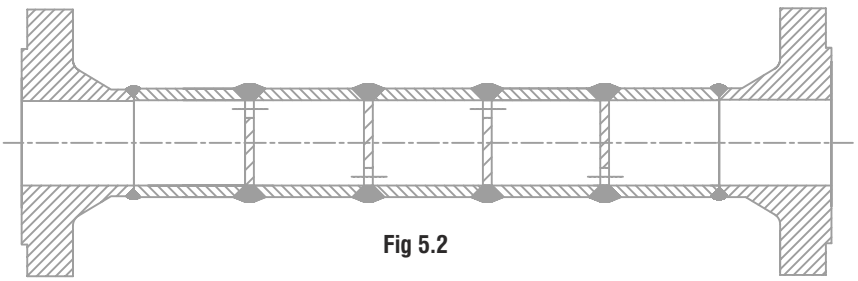


Fig 5.2

Multiple Restriction Orifice Assembly

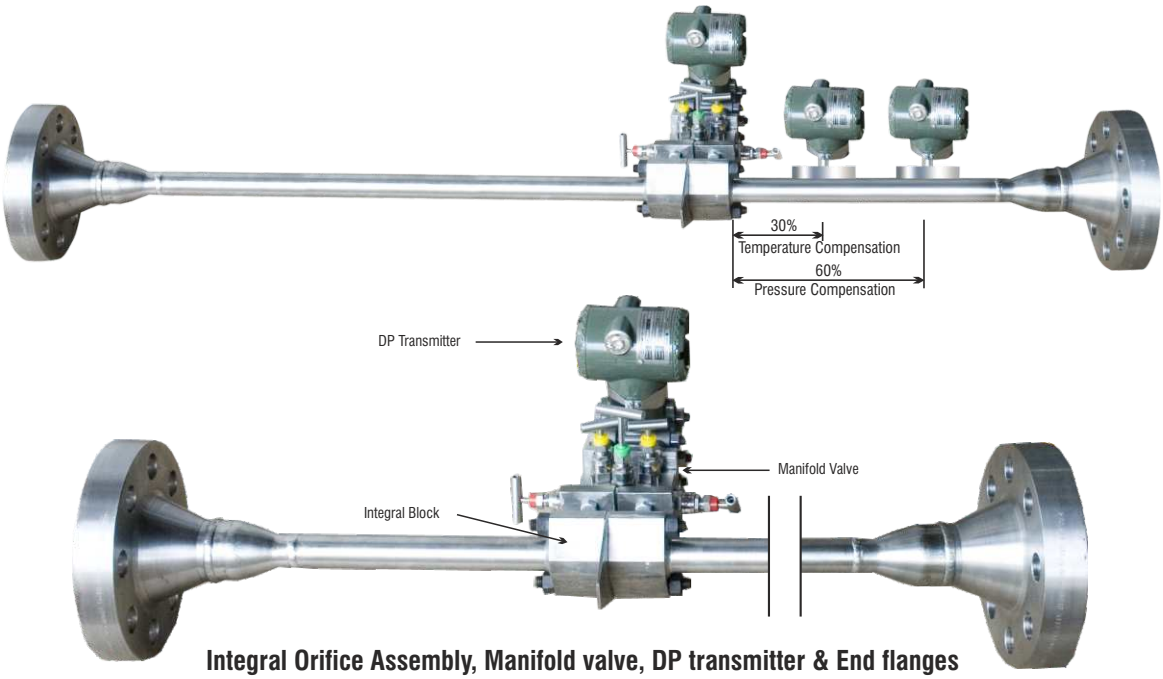
Integral Orifice Assembly

Integral assembly Std as per B16.5, B16.36, B16.47 Series B, ISO5167, AGA-3, ASME, MFC 14M 2003

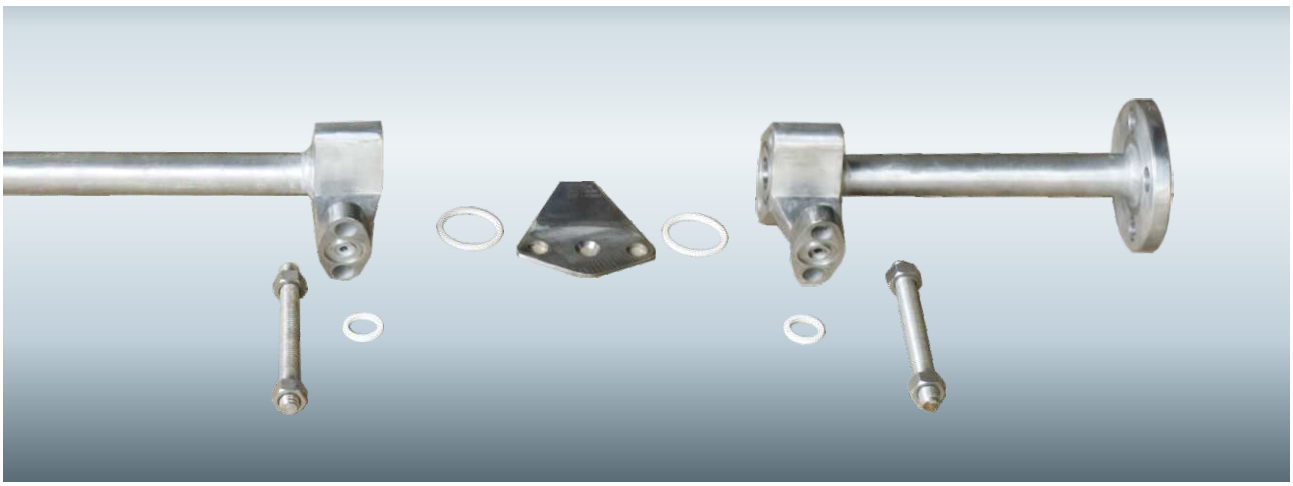
General Instruments manufactured integral orifice assemblies are another type of measuring flow device, which caters to the principle of maintaining constant reynolds number through out the process of media entering and processed and finally out of the assembly.

This is possible with the precision manufactured device wherein the input flange, with pipe chamber, the orifice assembly and the outlet pipe chamber and the subsequent flange for the flange end connection, all shall be attributed to constant reynolds number.

We manufacture Integral meter run assembly upto 2".



Integral Orifice Assembly, Manifold valve, DP transmitter & End flanges



Advantages of using Integral Meter run assembly:

Use of an integral orifice flow meter will eliminate the three measurement inaccuracies recorded in small orifice line installations.

- The Integral Orifice honed body reduces ID uncertainty
- By inserting precision bored upstream and downstream sections of pipe, the velocity profile distortion due to pipe roughness is reduced.
- The self-centering design of the Integral Orifice Plate eliminates plate misalignment.

Improves reliability and maintenance costs

The integral orifice flow meter eliminates impulse lines, reducing leak points by over 50% and decrease start-up time due to the flexibility of numerous process connection options. The direct mount design minimizes line plugging by eliminating long lines, small-bore ports, and crevices while providing consistently reliable installations.

- Accuracy up to ±0. 5% of volumetric flow rate.
- Integral manifold head allows direct mounting of DP transmitters.
- Ideal fluid types: liquid, gas, and steam.