

## **INSTALLATION REQUIREMENTS FOR THE HP SERIES PROFILE/INSERTION FLOWMETERS**

The HP Series Profile/Insertion Flowmeters have been designed to measure flow in medium to low diameter pipes. In general, a velocity measurement taken at one point is used to infer the average flow through the pipe. A knowledge of the properties of the media and the cross sectional area of the piping make this possible under the assumption that a fully developed velocity profile is provided at the metering section.

In choosing the installation for the insertion flowmeter, the following guidelines should be observed to achieve the highest accuracy in flow measurement.

In considering the installation site, it should be remembered that when a flowing stream leaves a section of piping which may contain elbows, reducers or valves and enters a straight section of pipe, a non-uniform velocity profile and swirl occurs. The effects of the upstream disturbance diminish with distance down the straight pipe run.

The effects of each of the potential causes vary in magnitude and therefore, the length of straight pipe runs, which are required, vary with the source of flow disturbance.

Independent sources have examined the effects of various upstream sources of turbulence on turbine rotors. Table 1 lists a summary of the recommended upstream straight pipe runs. A minimum of 5 pipe diameters should also be provided downstream of the measuring section.

Flow straighteners are composed of a cluster of thin wall tubes which may be used to reduce swirl on the flowing fluid but do not reduce the effects of the non-uniform flow velocity since they do no function as flow diffusers but rather as flow straighteners.

In many real piping configurations, it may be impractical, if not impossible, to provide the desired long upstream pipe length recommended. A noticeable decrease in performance may occur for upstream straight pipe runs which are less than 10 pipe diameters.

For information on Flow Straighteners, consult with manufacturer for recommendations.

<b>TABLE 1</b>		
	<b>UPSTREAM STRAIGHT PIPE LENGTHS</b>	<b>DOWNSTREAM STRAIGHT PIPE LENGTHS</b>
Concentric Reducer	15 D	5 D
Sweeping Elbow or Tee	20 D	5 D
Two Sweeping Elbows	25 D	5 D
Partially Opened Valve or Two Sweeping Elbows At 90°	50 D	5 D
Ball, Gate Or Butterfly Valve (Wide Open)	14 D	5 D