Badger Meter Europa

Parshall flumes

Description

The Parshall flume is one of a large class of open channel primary elements known as critical flow venturi flumes. A distinguishing characteristic of the Parshall flume is the downward sloping invert of the throat. This feature gives the Parshall flume its ability to operate at higher ratios of downstream to upstream head than any other such device.

The Parshall flume is a monolithic fiberglass reinforced polyester structure to assure maximum strength and accuracy of dimension while minimizing installation time. Its weight is light, the installation easy and there is no need for special tools. Its short length makes the installation possible in areas, where further cosntructions are limited.

Application

The Parshall is recommended for those applications in which moderate concentrations of sand, grit or other heavy solids exist and fluid velocities entering the flume are subcritical. The flume operates with a small energy loss or change in channel grade, about one-fourth that of weirs having the same crest length. The flume is ideally suited for fluid measurement in irrigation channels or sewers.

Calibration

The Parshall flume exhibits reproducible head rise/flow rate characteristics throughout its size range. In order to assure the accuracy of the device, adherence to all dimensions for construction as well as free flow hydraulic conditions are required.

Sizing

Selection of a Parshall flume should be made on expected flow rates or on the maximum flow rate and on the width of influent and effluent channel, which must at least have the dimensions mentioned in column B (see table on back side). For single point measurement to be valid, the design hydraulic gradient must insure that free flow conditions exist at all flow rates. Thus, the downstream fluid level must not exceed the values in figure 2 or single point measurement will not produce acceptable values.

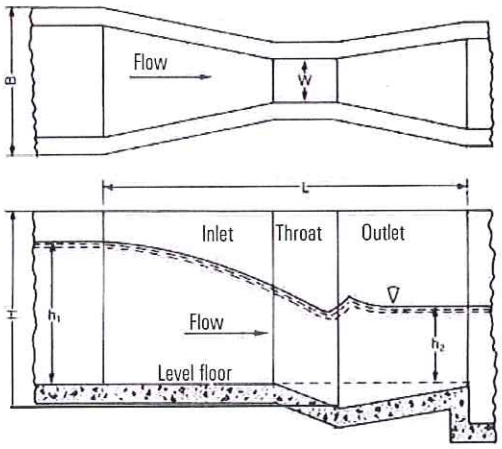

Figure 1

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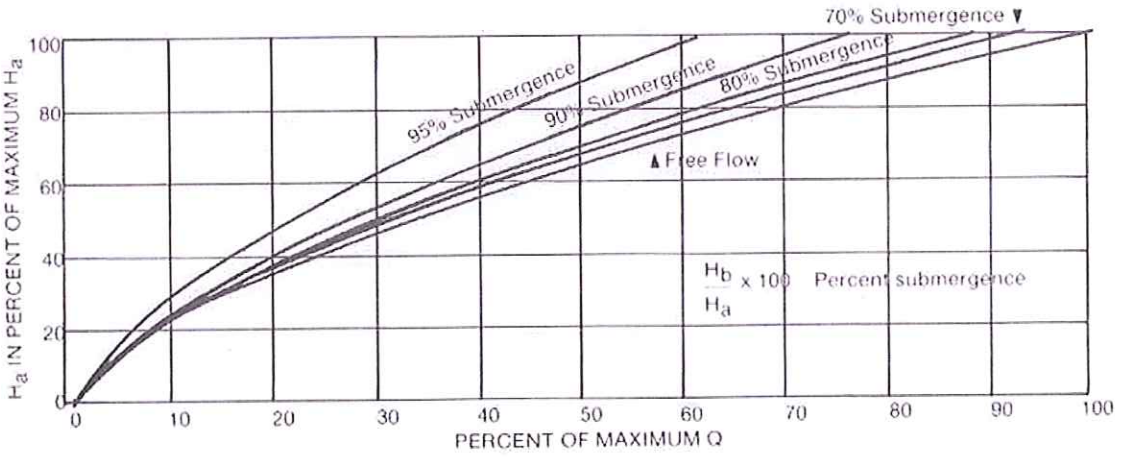
Performance data and dimensions of standard sizes

Throat		Measuring range		max. level	Dimensions			
W		L/s		h_1	Length	Width	Height	Weight
					L	B	H	G net
mm	inch	min.	max.	mm	mm	mm	mm	kg
75	3	0,77-5	0,77-54	462	915	323	667	20
150	6	1,50-11	1,50-114	465	1524	461	724	45
230	9	2,50-18	2,50-284	661	1626	639	876	60
305	12	3,32-24	3,32-473	780	2867	973	1143	160
455	18	4,80-35	4,80-757	805	2943	1154	1143	230
610	24	12,10-44	12,10-1009	799	3020	1335	1143	240
915	36	17,60-69	17,60-1577	812	3169	1700	1143	280

Minimum downgrade in the channel: 0,2 – 0,5 %

The Parshall flume is an empirically derived and rated measuring device. The discharge capacities are rated for "free flow" conditions. As the downstream depth increases, flow condition is no longer critical, thus two depth measurement readings (at Ha and Hb) are necessary to obtain the correct discharge under these conditions. The following graph presents these corrections necessary to ensure true discharge values.



Discharge curves for Parshall flumes with free flow and with submerged conditions.

Figure 2