ATTACHMENT 3

SOP-5224-3

Use of Parshall Flume

Records Use Only

1. When using a Parshall flume to determine discharge flow values for a surface water stream or spring, select the proper size flume for the expected flow conditions.

   [NOTE: Refer to Table 3-1 for free flow capacities of the size ranges of Parshall flumes used at the laboratory.]

2. Install the flume in the flow channel, with the floor of the inlet converging channel set in a level position. This can be determined using a level bubble or carpenter's level. Soil or streambed material is then packed around the flume to prevent leakage under and around it.

3. The flume should be installed so as to minimize the submergence ratio, which is defined as the ratio between the downstream head to the upstream head, allowing for "free-flow' conditions. For Parshall flumes in the size ranges used at LANL, the submergence ratio shall not exceed 0.6.

   [NOTE: If this cannot be achieved refer to U.S. Geological Survey Water Supply Paper 2175, Measurement and Computation of Stream Flow: Volume 2, Chapter 10 Computation of Discharge, page 317 and Figures 158 and 159 for application of submergence correction factors.]

4. After the flume is installed, allow the water to pool upstream of the flume. No gage-height readings should be recorded until the pool has resin to a stable level.

5. After stabilization, gage-height readings should be taken at half-minute intervals for approximately three minutes. Calculate the mean value of the readings taken to determine the gage height.

6. Utilize the calibration data for the specific Parshall flume, if available, or use Table 3-2 to obtain the discharge flow rate.

7. After completion of the flow measurement, remove the flume.

Table 3-1
Capacities of Parshall Flumes

Size (Throat Width, inches)	Free Flow Capacity (ft^3/s)	
	Min	Max
6	0.05	3.9
9	0.09	8.9
12	0.11	16.1
24	0.42	33.1

Table 3-2
Discharge Rates for Parshall Flumes for Free-Flow Conditions

Gage Height (ft)	Flume Size (inches)			
	6	9	12	24
0.1	0.05	0.09	0.11	
0.2	0.16	0.26	0.35	0.66
0.3	0.31	0.49	0.64	1.24
0.4	0.48	0.76	0.99	1.93
0.5	0.69	1.06	1.39	2.73
0.6	0.92	1.40	1.84	3.62
0.7	1.17	1.78	2.33	4.60
0.8	1.45	2.18	2.85	5.66
0.9	1.74	2.61	3.41	6.80
1.0	2.06	3.07	4.00	8.00
1.1	2.40	3.55		
1.2	2.75	4.06	5.28	10.6
1.3	3.12	4.59		
1.4	3.51	5.14	6.68	13.5
1.5		5.71		
1.6		6.31	8.18	16.6
1.7		6.92		
1.8		7.54	9.79	19.9
1.9		8.20		
2.0			11.5	23.4
2.2			13.3	27.2
2.4			15.2	31.1

[NOTE: The values in the table above should be used as a guide or preliminary ratings for flumes built in the field. The field installations should be field calibrated to give the most accurate measurements due to structural differences that may be present between the actual flume and the model.]