

Prefabricated Palmer-Bowlus and Parshall Flumes

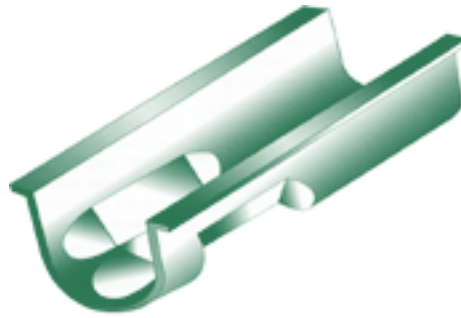
3.8

Maintenance free, accurate and economical.





General

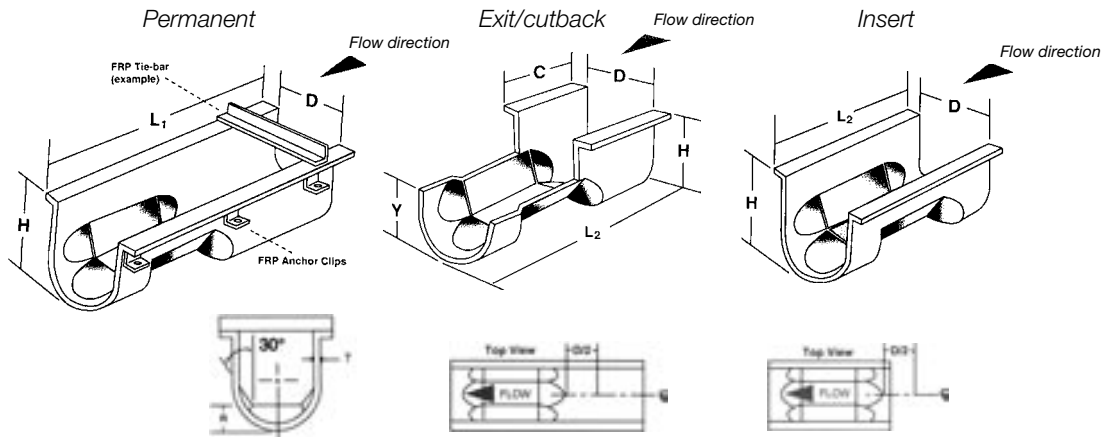


The Palmer-Bowlus trapezoidal throat design ensures a high velocity at critical flow levels, translating into minimal flow restriction, low energy loss and better measurement accuracies at both low flow and peak capacity. The smooth gel coated surfaces minimize friction and prevent solids build-up. A one-piece molded construction makes installation quick, easy and cost effective. All components are made with corrosion resistant materials for wide ranges of application types. Manufactured to conform to ASTM and US Department of the Interior standards.

Specifications

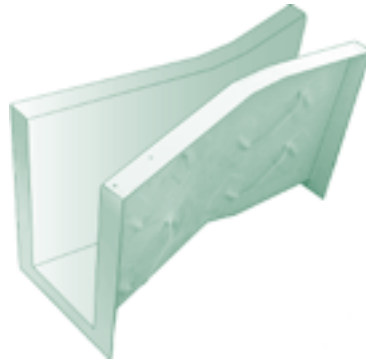
Size: Throat Size	CFS:	MGD:	GPM:	Max. head: @ approx. max. discharge	Shipping weight:		
	Approximately maximum discharge				Permanent	Insert	Exit/cutback
4"	0.12	0.07	54	3.0"	10 lbs	7 lbs	5 lbs
6"	0.30	0.19	132	4.2"	15 lbs	10 lbs	8 lbs
8"	0.69	0.45	310	6.0"	20 lbs	15 lbs	12 lbs
10"	1.12	0.72	502	7.2"	25 lbs	20 lbs	17 lbs
12"	1.67	1.08	752	8.4"	33 lbs	25 lbs	20 lbs
15"	3.09	1.99	1,385	10.8"	50 lbs	33 lbs	30 lbs
18"	4.61	2.98	2,071	12.6"	75 lbs	50 lbs	45 lbs
21"	7.04	4.55	3,161	15.0"	125 lbs	75 lbs	65 lbs
24"	9.47	6.10	4,248	16.8"	150 lbs	90 lbs	80 lbs
27"	13.09	8.44	5,873	19.2"	-	110 lbs	100 lbs
30"	16.52	10.66	7,413	21.0"	-	130 lbs	115 lbs
36"	29.97	19.37	13,451	27.0"	-	175 lbs	160 lbs
42"	43.77	28.29	19,645	31.4"	-	200 lbs	185 lbs

Dimensions



D:	D/2:	L ₁ :	L ₂ :	H:	R:	Y:	C:	T:
4"	2"	17"	10"	6"	2/3"	1 13/16"	4 5/8"	3/16"
6"	3"	25"	14"	8"	1"	2 13/16"	6 5/8"	3/16"
8"	4"	33"	18"	10"	1 1/3"	3 13/16"	8 5/8"	3/16"
10"	5"	41"	22"	12"	1 2/3"	4 13/16"	10 5/8"	3/16"
12"	6"	49"	26"	14"	2"	5 13/16"	12 5/8"	3/16"
15"	7 1/2"	61"	32"	17"	2 1/2"	7 5/16"	15 5/8"	3/16"
18"	9"	73"	38"	20"	3"	8 13/16"	18 5/8"	3/16"
21"	10 1/2"	85"	44"	23"	3 1/2"	10 5/16"	21 5/8"	3/16"
24"	12"	97"	50"	26"	4"	11 13/16"	24 5/8"	3/16"
27"	13 1/2"	109"	56"	29"	4 1/2"	13 5/16"	27 5/8"	3/16"
30"	15"	121"	62"	32"	5"	14 13/16"	30 5/8"	3/16"
36"	18"	145"	74"	38"	6"	17 13/16"	36 5/8"	3/16"
42"	21"	169"	86"	44"	7"	20 13/16"	42 5/8"	3/16"

General

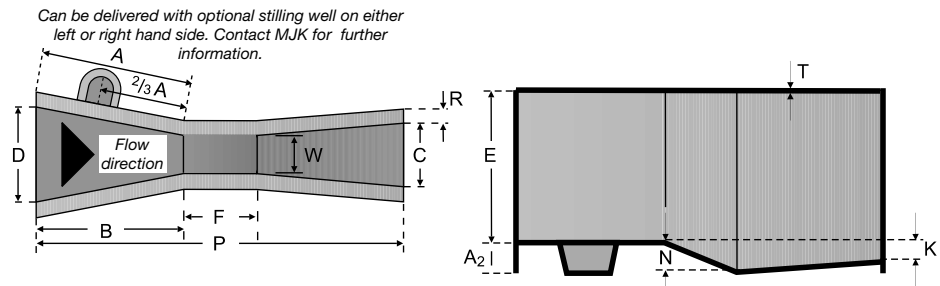


The Parshall flumes are made of fiberglass-reinforced polyester resins layed up over white isophthalic gel-coat. They have a rigid 1-piece construction and are especially well suited for measuring liquids containing solids. Manufactured to conform to ASTM and US Department of the Interior standards. The smooth surface and internal flow lines help reduce measuring errors that occur with the accumulation of debris. The integral reinforcing ribs and extruded FRP angles, bolted to the top flanges, aid in maintaining dimensional integrity during shipment and installation. Fiberglass anchor clips are provided to help secure the unit in concrete.

Specifications

Size: Dimension "D"	CFS: Approximately maximum discharge	MGD:	GPM:	Max. head: @ approx. max. discharge	Shipping weight:
2"	0.36	0.23	162	8"	35 lbs
3"	1.86	1.20	834	18"	45 lbs
6"	3.91	2.52	1,754	18"	65 lbs
9"	8.87	5.73	3,980	24"	85 lbs
12"	16.13	10.40	7,225	30"	175 lbs
18"	24.60	15.89	11,040	30"	185 lbs
24"	33.11	21.39	14,855	30"	240 lbs
36"	50.39	32.57	22,619	30"	310 lbs
48"	67.93	43.88	30,473	30"	420 lbs

Dimensions



W:	A:	2/3 A:	B:	C:	D:	E:	F:	P:	K:	N:	R:	T:
2"	1'-4 ⁵ / ₁₆ "	10 ⁷ / ₈ "	1'-4"	5 ⁵ / ₁₆ "	8 ¹³ / ₃₂ "	9"	4 ¹ / ₂ "	2'-6 ¹ / ₂ "	7 ⁷ / ₈ "	11 ¹¹ / ₁₆ "	1 ³ / ₄ "	3 ¹ / ₁₆ "
3"	1'-6 ³ / ₈ "	1'-1 ¹ / ₄ "	1'-6"	7"	10 ³ / ₁₆ "	2'-0"	6"	3'-0"	1"	2 ¹ / ₄ "	2"	3 ¹ / ₁₆ "
6"	2'-7 ¹ / ₁₆ "	1'-4 ⁵ / ₁₆ "	2'-0"	1'-3 ¹ / ₂ "	1'-3 ⁵ / ₈ "	2'-0"	1'-0"	5'-0"	3"	4 ¹ / ₂ "	2 ¹ / ₂ "	3 ¹ / ₁₆ "
9"	2'-10 ⁵ / ₈ "	1'-11 ¹ / ₈ "	2'-10"	1'-3"	1'-10 ⁵ / ₈ "	2'-6"	1'-0"	5'-4"	3"	4 ¹ / ₂ "	2 ¹ / ₂ "	3 ¹ / ₁₆ "
12"	4'-6"	3'-0"	4'-4 ⁷ / ₈ "	2'-0"	2'-9 ¹ / ₄ "	3'-0"	2'-0"	9'-4 ⁷ / ₈ "	3"	9"	2 ¹ / ₂ "	1 ¹ / ₄ "
18"	4'-9"	3'-2"	4'-7 ⁷ / ₈ "	2'-6"	3'-4 ³ / ₈ "	3'-0"	2'-0"	9'-7 ⁷ / ₈ "	3"	9"	2 ¹ / ₂ "	1 ¹ / ₄ "
24"	5'-0"	3'-4"	4'-10 ⁷ / ₈ "	3'-0"	3'-11 ¹ / ₂ "	3'-0"	2'-0"	9'-10 ⁷ / ₈ "	3"	9"	2 ¹ / ₂ "	1 ¹ / ₄ "
36"	5'-6"	3'-8"	5'-4 ³ / ₄ "	4'-0"	5'-17 ¹ / ₈ "	3'-0"	2'-0"	10'-4 ³ / ₄ "	3"	9"	2 ¹ / ₂ "	5 ¹ / ₁₆ "
48"	6'-0"	4'-0"	5'-10 ⁵ / ₈ "	5'-0"	6'-4 ¹ / ₄ "	3'-0"	2'-0"	10'-4 ⁵ / ₈ "	3"	9"	2 ¹ / ₂ "	3 ¹ / ₈ "



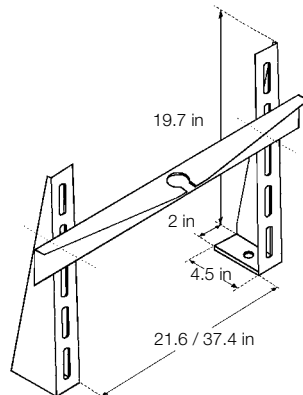
Order numbers

Dimension:	Palmer-Bowlus prefabricated flumes:			Parshall prefabricated flumes:
	Permanent:	Insert:	Exit/cutback:	Standard includes staff gauge:
2"	-	-	-	179000
3"	-	-	-	179001
4"	179100	179200	179300	-
6"	179101	179201	179301	179002
8"	179102	179202	179302	-
9"	-	-	-	179003
10"	179103	179203	179303	-
12"	179104	179204	179304	179004
15"	179105	179205	179305	-
18"	179106	179206	179306	179005
21"	179107	179207	179307	-
24"	179108	179208	179308	179006
27"	-	179209	179309	-
30"	-	179210	179310	-
36"	-	179211	179311	-
42"	-	179212	179312	-

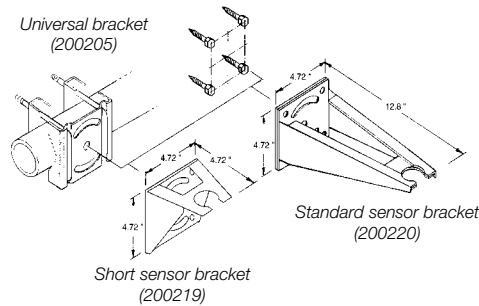
Options
(Consult MJK)

- Embedded staff gauge with calibration units in 0.1', 0.02' & 1/4" increments.
- Attached stilling wells in 12", 10", 8", and 6" I.D. can be supplied.
- Shuttle® Ultrasonic Level Meter with support bracket for Shuttle® Level Transmitter. See separate data sheet.
- 2 1/2" wide standard end flanges in fiber glass.
- Bulkheads and pipe stubs can be built on for many applications.
- Additional flume styles such as H and trapezoidal can be built to specifications.
- All flumes are built to order - please allow 3 weeks for delivery.

Mounting Brackets



Sensor bracket for channel or flume
(21.6 in: 200230 / 37.4 in: 200235)



How the MJK 713 Open Channel Flowmeter works

The MJK 713 works by measuring flow in flumes or weirs. The MJK 713 measures the depth of flow in the flume or weir and calculates the flow rate based on the standard curve for the flume or weir used. This is typically based on the equation:

$$FLOW Q = level^X \cdot constant$$

The exponent (X) and constant depend on the type of primary device used. A pre-programmed list of standard weirs

and flumes allows easy selection of the equation required for the flume or weir, however a custom curve can be configured for non-standard flumes or weirs.

The MJK 713 is easily operated with 4 function keys: Flow Key, Totalizer Key, Alarm Key, and the Sampler Key. The function keys allows access to the various parameters shown below:



Flow key:

- actual flow rate
- average flow rate
 - over last hour
 - today
 - previous day



Totalizer key:

- total flow
 - since startup
 - over last hour
 - today
 - previous day
 - any previous day up to 99 days back



Alarm key:

- displays last 9 alarms with date and time stamp
 - sensor errors
 - high and low flow alarms
 - high and low hourly flows
 - high and low flow for day
 - power failure



Sampler key:

- total samples
- total samples today
- total samples previous day



Selecting a flume

For measurement accuracy use flume sizes to match actual flows.

Sizing to nominal pipe size is not always correct. Optimum flow readings are obtained by selecting a flume size that has flow rates between maximum and minimum discharge rates.

Typically oversized flumes reduce the accuracy of the flow measurement. When the pipeline size is larger than the flume, the approach section, constructed on site by the installer, on the permanent flume must smooth the flow before it reaches the point of measurement.

Installation requirements**General**

Flumes should not be placed at right angles to flowing streams such as in turnouts unless the flow is effectively straightened and uniformly redistributed before it enters the flume. Surges and waves of any appreciable size should be eliminated and the flow lines should be essentially parallel to the flume's centerline. Also, the flow at the flume's entrance should be free of turbulence (visible surface boils).

All flumes have extruded FRP angles that are bolted onto the top flanges to maintain dimensional integrity during shipment and installation.

Although these angles can be removed AFTER the installation process is complete, MJK recommends leaving the angles in place to maintain the flume's dimensional integrity should the grout sink.

Palmer-Bowlus flumes grouted in place

Permanent type Palmer-Bowlus flumes are typically grouted into place between two sections of pipe having the same diameter as the flume. In existing pipelines, a section of pipe equal to the length of the flume is removed and replaced with the flume.

When installing the flume, the invert (inside bottom most point) should be used as a reference. The invert of the flume must be level in both front to back and side to side directions. The parallel sidewalls must be plumb. The flume should be set on a solid foundation to prevent settling or heaving. FRP anchor clips are provided for attaching wire to the flume to prevent the flume from floating or shifting during staged pouring of flowable grout.

Internal bracing must be provided on the perpendicular sidewalls of the flume by the installer to prevent any undue stress or deformation during backfilling with flowable grout or other materials. Flowable grout backfill should be stage filled poured in 2 to 6" deep increments (lifts) with minimal use of a vibrator. The first lift should be SLOWLY poured on one side so that the grout will flow under the flume to the other side, thereby helping to eliminate any void areas under the raised trapezoidal floor section. Each lift must be allowed to set up before next stage is poured.

Parshall flumes grouted in place

When installing Parshall flumes, the crest (floor of the converging section) should be used as a reference.

The crest of the flume must be level in both front to back and side to side directions.

Flumes should be set on a solid foundation to prevent settling or heaving. FRP anchor clips are provided for attaching wires to the flume. This aids in preventing the flume from floating or shifting during stage pouring of flowable grout.

When installing flumes, internal bracing should be provided by the installer.

This helps to prevent any undue stress or deformation during backfilling with flowable grout or other materials. Flowable grout backfill should be "stage-poured" in approximately 6" deep increments ("lifts"). The first 6" "lift" should be poured SLOWLY on one side, This allows the grout to flow under the flume to the opposite side, by that helping to eliminate any void areas under the floor section.

Each "lift" must be allowed to set up before the next "lift" is poured.

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