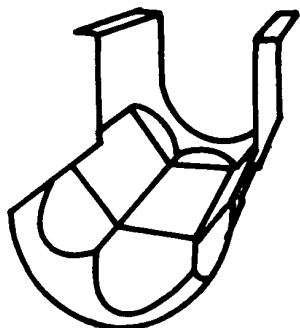


Through customer request, Plasti-Fab, Inc. has developed a variety of versions of the Palmer-Bowlus flume and in doing so we have created some confusion. We attempt here to explain the most common and suggested use of each.

"D" is the flume size. Available sizes are 4", 6", 8", 10", 12", 15", 18", 21", 24", 27", 30", 36", 42", 60", 72" and larger.

CUTBACK OR EXIT TYPE



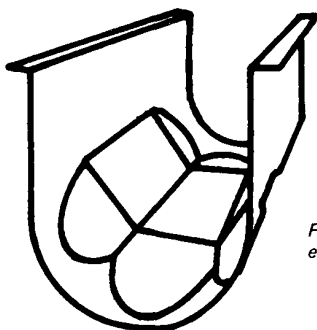
USE: Temporary installation in the outlet pipe of manholes. Infiltration and inflow (I & I) Studies.

DIMENSIONS: Outside width or diameter = D
 Length = $2D + 2''$
 Length of cutback CB = D
 Height at inlet $H' \approx D + 2''$
 Height at outlet $H' = < \frac{1}{2} D$ so that flume will fit into a pipe having an I.D. of size D, the same size as the flume.

INSTALLATION

Frequently this flume is installed with a flexible urethane foam pad wrapped around it to form a gasket between the flume and the pipe. (Urethane foam such as used in upholstery.) Solids in the water tend to plug the porous cells of the foam, stopping or greatly reducing the leakage around the flume. The flume may be held in place with a crossbar and/or sandbags, for I and I studies it is often held by hand.

PALMER-BOWLUS INSERT



Flow may be in either direction.

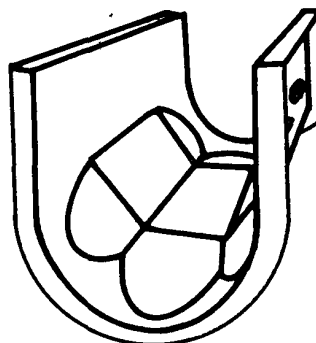
USE: Temporary or permanent installation in a straight channel having smooth surfaces with well defined dimensions, such as when made of pipe with the top half of the pipe removed.

DIMENSIONS: Outside width or diameter = D
 Length = $2D + 2''$
 Height $\approx D + 2''$

INSTALLATION

Placed into channel with or without gasketing material. If gasketing material is used such things as okum, modeling clay, plumbers putty or RTV silicone may be helpful. The flume is held level by bolting in place or with crossbar and/or sandbags.

PALMER-BOWLUS WITHOUT APPROACH



USE: Permanent installation *embedded in poured concrete* in straight well defined channel having a "D" dimension the same as the flume.

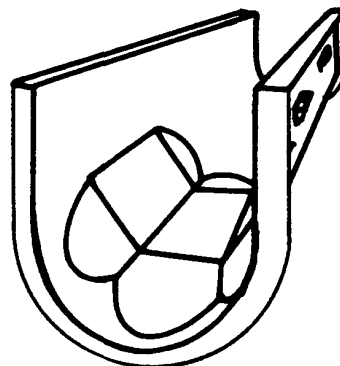
DIMENSIONS: Inside width or diameter = D
 Length = $2D + 2''$
 Height $\approx D + 2''$

INSTALLATION

Poured in place in concrete at time channel is being constructed. Ears on side key to concrete and may be used to help level flume before concrete is poured.

PALMER-BOWLUS WITH INTEGRAL APPROACH SECTION

Sometimes called "permanent type".



USE: Permanent installation in a poorly defined channel requiring the approach section to "smooth out" the flowing water.

DIMENSIONS: Inside width or diameter = D
 Length = $4D + 1''$
 Height $\approx D + 2''$

INSTALLATION

Poured in place in concrete or grouted in place. Ears or lugs on sides key to grout and may be used for leveling by embedding threaded rod in concrete and supporting flume with rod and leveling nuts when grouting around flume.

AVAILABLE ACCESSORIES

Bubble pipes, float wells, capacitance probe slots, ultra sonic transducer brackets, end flanges.

PALMER-BOWLUS WITH INTEGRAL APPROACH AND WITH END BULKHEADS

USE: Permanent or temporary installation in a channel having dimensions larger than the flume size D. For example, installation of a 10" Palmer-Bowlus flume in a 24" pipe or a 12" Palmer-Bowlus flume in an 18" rectangular channel.

DIMENSIONS: Same as Palmer-Bowlus with integral approach section.

INSTALLATION

Varies considerably. Sometimes sand is placed around the flume with 2" of grout placed on the top of the sand. Bulkheads may be sealed with RTV silicone or other suitable caulking material.

AVAILABLE ACCESSORIES

Same as Palmer-Bowlus with integral approach above.

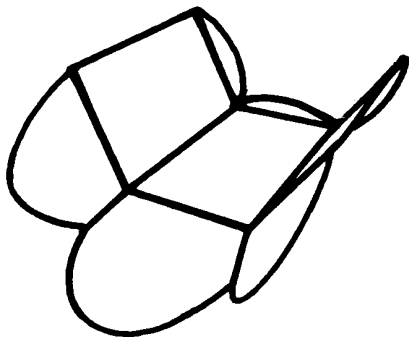
SPECIAL PALMER-BOWLUS FLUMES

BOLT TOGETHER FLUMES: This usually consists of a Palmer-Bowlus flume made in pieces and bolted together with T-304 stainless steel capscrews. By taking the flume apart it may be passed through a manhole and reassembled for installation.

DOUBLE FLUMES

These are units where a small Palmer-Bowlus flume is bolted inside of a larger Palmer-Bowlus flume, the purpose being to provide a small flume to measure present low flows and the small flume can be removed in the future when flows increase. This type of installation is more often done using Parshall flumes.

PALMER-BOWLUS STAINLESS STEEL SHAPED THROAT



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BUL PB-2 KP 5M 9/96

USE: Permanent installation where the engineer prefers to use stainless steel instead of a fiberglass Palmer-Bowlus flume.

DIMENSIONS: Length = 2D
Pipe I.D. = D

INSTALLATION

Varies considerably depending on type of pipe. May be welded into steel pipe, epoxy grouted and anchored to clean surfaces of concrete or tile pipe.

* * * * *

GENERAL NOTES ON ALL P-B FLUMES

ACCURACY

Frequently people ask about the accuracy of Palmer-Bowlus flumes and one of the statements in Plasti-Fab bulletin PB-1 leads people to feel that perhaps the Palmer-Bowlus flume is not as accurate as other types of flumes.

The facts are these:

- The Palmer-Bowlus flume is a venturi device and accuracy of all of the open channel venturi flumes is comparable.
- Laboratory tests have been run on Palmer-Bowlus flumes having trapezoidal throats and rectangular throats and under laboratory conditions these flumes indicate an accuracy of two percent of the theoretical, but please do not be misled into thinking that you should expect this kind of accuracy under field conditions. What can you expect? Plan on approximately 5% when operating under good conditions and don't be disappointed if the entire system, that is flume, transmitter, recorder, totalizer ends up at 10% of theoretical. This isn't just for the Palmer-Bowlus flume, but any open channel monitoring device.

RESOLUTION

Since we discussed accuracy above, we must touch on resolution as the two are considered at the same time. Due to the fact that there is a greater change of head (ΔH) for a given change in flow (ΔQ) in the Parshall flume, we say that the resolution of the Parshall is better than in a Palmer-Bowlus. Resolution in this sense may mean more swing of a pen arm, more travel of a float or more differential time in an ultra sonic system, and all of this may help reduce the effects of "slop" in mechanical linkages, electronic drift, temperature variations, and a host of other small things that happen in instruments.