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# FLUME OPERATION & MAINTENANCE

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## OPERATION & CALIBRATION

Flumes should be properly selected, sized, and installed. Under the assumption that the channels and flow conditions have altered, there should generally be no need for calibration of a flume. Flumes have no moving parts that would wear out or replace, as the converging sidewalls and raising floor already develop the relationship needed with open flows. Periodic calibration of the flow meter (secondary device) will be necessary and should be conducted as often as the conditions and device require.

To properly operate, a flume relies on:

1. Being the correct selection for style and size in an environment.
2. Proper installation.
3. Strict adherence to flume dimensions.
4. Proper upstream flow conditions.
5. A downstream channel of sufficient size and geometry to ensure that flow does not back into the flume (creating submergence issues).
6. Proper application and location of staff (head) gauges and secondary device/flow metering instrumentation.

## SITE INSPECTION

1. Ensure that sufficient channel reinforcement is present for localized scouring near the entrance or exit of the flume. Upstream scouring can lead to flow bypassing the flume, while downstream scouring can lead to flume settling. As a rule of thumb, downstream riprap protection should extend not less than 4 times the maximum normal depth of the downstream channel, nor less than 5 feet [1.50m].
2. Inspect the upstream and downstream channels and remove any growths of vegetation or accumulations of trash or silt.
3. There should be no restrictions to flow exiting the flume, such as obstructions, bends, or dips.
4. If baffles are used to correct and smooth the approach flow, they should be located at least 10 times the maximum anticipated level(head) at the point of measurement in the flume (10 H max) upstream of the flume.



## FLOW INSPECTION

1. The approaching flow should be laminar, tranquil, uniformly distributed across the channel and possessing a non-critical velocity.
2. To achieve the first criteria, the approach velocity should not exceed a Froude number of 0.5 at the flume or for a recommended upstream distance of 30 times the maximum anticipated level (head) at the point of measurement in the flume (30 H max). If feasible, the Froude number should be limited to no more than 0.2.

$$0.2\sqrt{g H_{\max}} \leq v_{\max} \leq 0.5\sqrt{g H_{\max}}, \text{ where } g = 32.2 \text{ fps}^2 \text{ or } 9.8 \text{ mps}^2$$

Remembering that to control aquatic pest the approach velocity should exceed 1 fps [0.205 mps]. To minimize sedimentation, the approach velocity should be above 1.8 fps [0.549 mps].

## FLUME POSITIONING

Verify that the flume is positioned correctly, especially noting that it is level. Consult the pertinent dimensional prints, installation instructions, or [vpcf fiberglass.com](http://vpcf fiberglass.com) tables.

## FLUME INSPECTION

1. Verify that the flume has not settled and is level; correct any site conditions that have led to settling.
2. Verify that the flume sidewalls and floor are structurally sound and not distorted in any way.
3. Verify that the flow meter (if used) is mounted at the correct point of measurement.
4. Inspect the surfaces of the flume for corrosion, algal growth, or surface residue. A mild detergent solution can be used to remove algal growths and surface residue. If there is doubt as to the chemical Compatibility of the detergent with the flume or its accessories, consult with the detergent manufacturer before proceeding. In surface water applications, make sure to use only environmentally suitable detergents.
5. If a staff-level gauge is present, verify that the gauge is legible; cleaning or replacing it as necessary.
6. Verify the flume dimensions, correcting any discrepancies, as necessary.