Little River Research & Design

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Sole Source Statement

Utility of two-dimensional flumes

Hydraulic flumes are narrow channels with transparent, rigid sides that provide a two-dimensional view of flow through a channel. Flumes demonstrate principles in fluid mechanics and sediment transport, which are essential to the studies of engineering, fisheries, geology and many more fields.

Emflume1

The Emflume1 is the world's first turnkey desktop flume. It weighs only 65 pounds (29 kg), and one person can easily lift and move the flume. The Emflume is quiet, and it uses an energy efficient ducted propeller recirculation system. It recirculates plastic modeling media to simulate sediment transport processes.

Photographs, video and full specifications of the Emflume1 are available at http://www.emriver.com.

Sole Source Justification

We know of no other teaching or research flumes on the market with the Emflume1's compact size, portability, and efficient ducted propeller recirculation system.

Armfield, Ltd. offers a teaching flume with a similar working area to that of the Emflume1. The overall unit is much larger, however, and weighs over 216 pounds (90 kg).

The Armfield unit features only three fixed discharge values. The Emflume1 offers infinitely variable flow with use of an electronic controller programmed with open source Arduino hardware. To our knowledge, the selling price for the Armfield model is about US$17,000. The Emflume does not exceed $13,000.

The Armfield system uses lithic sand, while unique Emriver plastic modeling media is included with the Emflume. Emriver plastic modeling media is lighter than quartz sand; it is easier to transport and demonstrates sediment transport processes with greater accuracy on the Emflume's compressed scale. Compared to lithic sand, Emriver modeling media is much less dense and abrasive, which results in greater longevity of moving parts in the Emflume.

A description of the Armfield unit can be found at http://discoverarmfield.com/en/products/view/s8/sediment-transport-demonstration-channel

Benefits of the Emflume1.

- A footprint of less than one square meter
- Total dry weight of 65 pounds (29 kg)
- Working area 3.7 inches by 6 inches by 14 inches (95 mm by 152 mm by 356 mm)
- Quiet and efficient ducted propeller system requires only 110 watts
- Recirculates 6 gallons (23 liters) of water
- Specially manufactured thermoset plastic modeling media for sediment transport demonstrations; 15 pounds modeling media (6.8 kg) included with flume
- Electronic flow controller allows infinitely variable flow rates
- Over eight degrees of tilt in positive or negative direction
- Lightweight and portable
- Use & Care manual
- Strong technical support by trained and experienced geoscientists

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