

December 18, 2003

Mr. Charles Barebo  
Otterbine Barebo, Inc.  
3840 Main Road East  
Emmaus, PA 18049

Reference: SAFL Letter Report 2003-CE  
Subject: Flowrate study conducted December 16-17, 2003  
Unit Series: Aqua Series Fractional Aerators  
Units tested: ¼ HP AquaGem  
¼ HP AquaBlast  
½ HP AquaGem  
½ HP AquaBlast

Dear Mr. Barebo:

This letter reports the findings of flowrate testing conducted at the St. Anthony Falls Laboratory (SAFL) December 16-17, 2003, for Otterbine Barebo on its ¼ HP and ½ HP AquaGem and AquaBlast Fractional Aerators. Flowrates were measured using the SAFL's Weighing Tank Facility. Ben Erickson and Christopher Ellis of the St. Anthony Falls Laboratory, University of Minnesota, conducted the testing and analyzed the data.

The results of the testing are summarized below:

| Unit           | Flowrate<br>(GPM) |
|----------------|-------------------|
| ¼ HP AquaGem   | 173.7             |
| ¼ HP AquaBlast | 210.9             |
| ½ HP AquaGem   | 196.6             |
| ½ HP AquaBlast | 260.8             |

### Flowrate Testing

Flowrate was measured for 4 fountain/aerator configurations. This was accomplished for all tested devices by placing a bulkhead in a 42" wide, 38" deep rectangular channel, maintaining a depth of water on one side of the bulkhead sufficient to keep the fountain/aerator floating, and diverting the fountain discharge to the SAFL Weighing Tank Facility.

The setup allowed the maintenance of a fixed upstream water surface elevation (sufficient to cause the fountain/aerator to float while in operation near the top of the flume) while diverting the vertical discharge of the fountain to the downstream side of the bulkhead. For all devices tested, this discharge was in turn conveyed to a pair of weighing tanks specifically designed for flowrate calibration. These tanks weigh water accumulated over a measured length of time. The volumetric flowrate is then calculated as

$$Q = W / (\gamma * t)$$

where Q = volumetric flowrate, W = weight of accumulated water, t = elapsed time, and  $\gamma$  = specific weight of water (= 62.425 lb/ft<sup>3</sup> at 34.75°F ± 0.75 °F, the water temperature during testing). Between 22000 and 29000 lb of water was accumulated for each test which lasted for 800-1000 seconds, and three tests per device were averaged to arrive at the final measured flowrate.

Flowrate data are presented in the following table:

| Unit           | Flowrate (GPM) |        |        |         |
|----------------|----------------|--------|--------|---------|
|                | Test 1         | Test 2 | Test 3 | Average |
| ¼ HP AquaGem   | 174.0          | 173.5  | 173.6  | 173.7   |
| ¼ HP AquaBlast | 210.8          | 211.0  | 211.0  | 210.9   |
| ½ HP AquaGem   | 196.6          | 196.4  | 196.7  | 196.6   |
| ½ HP AquaBlast | 260.5          | 260.9  | 261.0  | 260.8   |

Please feel free to contact me if you have any questions about the results presented in this report. I can be reached by phone at 612.624.4447 or by e-mail at [ellis005@umn.edu](mailto:ellis005@umn.edu). As always, we very much appreciate your continued use of our laboratory for your testing needs.

Sincerely,

Christopher Ellis  
Research Associate