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LABORATORY TEST REPORT

**Endurance Test
For
SSI -AFD Disc
9 inch Disc Diffuser Unit**

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Stamford Scientific International, Inc.
SSI-AFD Disc Diffuser Endurance Test

Program Scope:

Stamford Scientific International, Inc. (SSI) conducted an off-site, long term endurance testing program on the EPDM rubber membrane used on SSI's SSI-AFD DISC9" Disc diffuser. The testing program commenced on July 15, 1999 and was completed on November 9, 1999. The test program was initiated to assess the material endurance and operating characteristics of the rubber membrane when subjected to repetitive on and off operating cycles. Each on/off cycle was 5 seconds on, then 5 seconds off. Airflow per disc was 2 SCFM/3.4 m³/hr.

Analytical Procedures:

Prior to and at the conclusion of the endurance test the following tests were conducted:

Dynamic Wet Pressure Test
Dimensional Analysis
Material Hardness
Back Flow Prevention Test

The dynamic wet pressure (DWP) test procedure employed for this test program is in accordance with the procedure outlined in the EPA Design Manual on Fine Pore Aeration Systems. DWP is a direct measure of the operating pressure or headloss through the diffuser media. DWP, uniformity and bubble size were noted at each airflow.

Dimensional analysis was performed by measuring wall thickness and circumference.

Material hardness was measured by Pacific Transducer Corporation type A durometer, model 306L.

Back Flow Prevention Test was performed at the conclusion of the 1,000,000 cycle test by measuring the amount of water in the diffuser plenum chamber.

Data Review:

1. The operating headloss or DWP changed only 0.108 PSI (3"WC)/76mm Aq over the duration of the test at the test airflow. Airflow uniformity remained constant and the bubble size actually decreased.
2. Physical inspection of the diffuser membrane showed no detectable change in material integrity or elasticity. The membrane slit size (perforation) showed no increase or decrease in size, distortion or mechanical degradation.
3. There was no detectable change in material hardness.
4. No measurable amount of water was found in the diffuser plenum chamber.

Summary:

1. The operating pressure characteristics remained constant over the 1,000,000 operating cycles.
2. Physical properties remained constant throughout the duration of the test program. No deterioration in elasticity or elongation was observed.
3. Airflow uniformity remained constant and bubble size decreased.
4. There was no measurable backflow into the diffuser plenum.

Conclusion:

SSI-AFD DISC9" Diffuser unit performed excellently over the 1,000,000 on/off cycles without any degradation. One of the applications for this product is an SBR, with on/off cycle once every 4 hours. It would take 456 years to reach 1,000,000 cycles in this application.

It is our opinion that the SSI-AFD DISC Diffuser unit would deliver superior performance in an on/off system