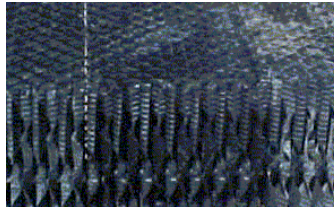


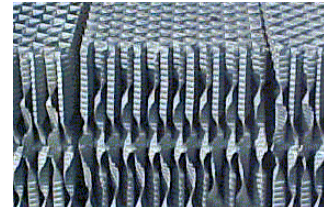
## Effect of ACCU-Shield Material in 18-Month Field Study

Tests were conducted to determine the effectiveness of the ACCU-Shield anti-microbial on fill weight gain due to accumulated deposits. Packs made from the ACCU-Shield anti-microbial and from standard rigid PVC material was installed in an industrial cooling tower with the cooling water having moderate levels of suspended solids and high mineral content and monitored for weight gain monthly for an 18 month period. The following graph shows the weight gain of the fill packs comparing the ACCU-Shield PVC media to standard Rigid PVC media.

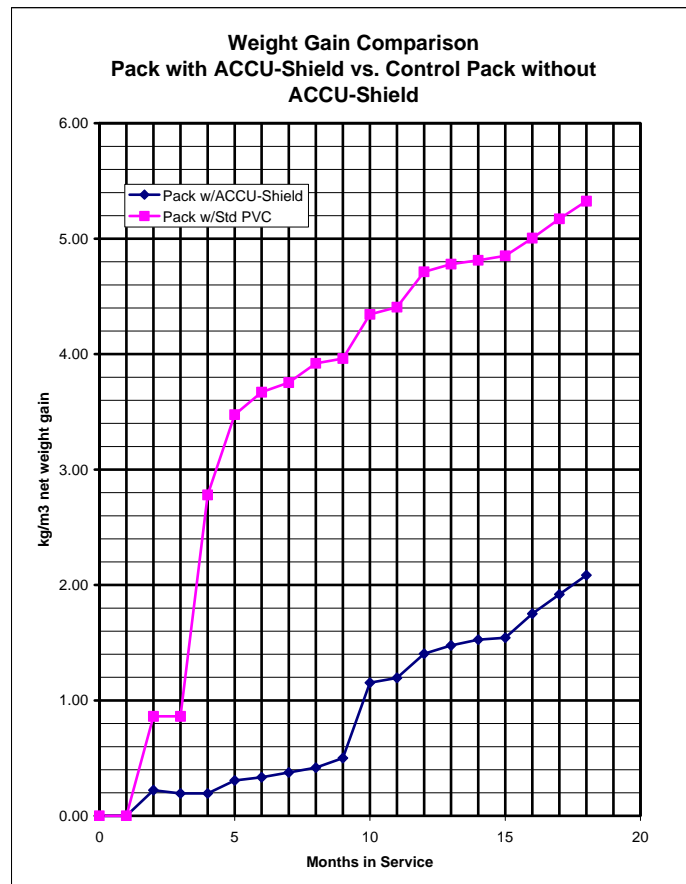
- ACCU-Shield recorded a 70% reduction in weight gain compared to the standard PVC media after one year.
- Deposit reduction correlates directly to decreased energy consumption and colder circulation water temperatures.
- The reduced fill weight gain is attributed to reduced biological growth on the fill which is the binder for airborne matter and suspended solids bonding to the fill media.
- The reduced biological load using ACCU-Shield addresses potential Health and Safety concerns. See CTI "Best Practices" regarding Legionella.
- The ACCU-Shield fill packs after 18 month of service had minimal deposit and these deposits could be washed-off with a low pressure spray. The standard PVC media could not be easily removed by a low pressure spray. This observation is attributed to ACCU-Shield inhibiting the growth of pseudomonas bacteria where their polysaccharide waste products bind with the suspended solids to create a fouling deposit.



Media w/o ACCU-Shield



Media with ACCU-Shield





## ACCU-Shield Efficacy – Summary of Laboratory Testing

Brentwood Industries tested the efficacy (the value of anti-microbial activity) of its ACCU-Shield PVC using industry standard quantitative test methods against the following bacteria commonly found in cooling systems; Staphylococcus aureus, Pseudomonas aeruginosa, Legionella pneumophila, and methicillin-resistant Staphylococcus aureus (MRSA). ACCU-Shield was also tested against E. Coli, a microbe not usually associated with cooling systems. The results of these tests are summarized below.

### Test Method & Procedure:

The test method used to determine ACCU-Shield efficacy is the Japanese Industrial Standard JIS Z 2801, “Antimicrobial Products - Test for anti-microbial activity and efficacy”.

The procedure requires that the bacteria be instilled on the test samples, covered and incubated at 35C (95F) for 24 hours. The number of viable bacteria was counted. The value of anti-microbial activity of each sample was calculated according to the following formula:

$$R = \text{Log} (B/C),$$

Where:

R = Value of antimicrobial activity

B = the average of the number of bacteria on the control (untreated) samples after 24 hour incubation

C = the average of the number of bacteria on the anti-microbial (treated) samples after 24 hour incubation

### Criteria for Judging Anti-microbial Activity

When the value of R is 2.0 or greater (2 orders of magnitude or greater), the treated sample is judged to have anti-microbial efficacy.

### Test Results

Tested Bacteria	Bacteria Count after 24hrs Incubation		Anti-microbial Activity (R)
	ACCU-Shield Sample	Untreated Sample (Control)	
Staphylococcus aureus	2.0x10 <sup>1</sup>	1.6x10 <sup>5</sup>	3.9
Pseudomonas aeruginosa	1.4x10 <sup>3</sup>	2.6x10 <sup>6</sup>	3.3
Legionella pneumophila	<10	5.7x10 <sup>5</sup>	4.8
E. Coli	<10	2.1x10 <sup>7</sup>	6.3
MRSA	<10	6.4x10 <sup>5</sup>	4.8