



### **Overview**

Approximately 85% of heat loss from swimming pool water is the result of evaporation. If evaporation can be reduced, not only is water retained in the pool but heat is retained as well.

### **The Science of Evaporation**

The temperature of pool water is a measure of the “average kinetic energy” of the molecules. Kinetic energy is simply the energy of motion. Higher temperature means a higher average kinetic energy. Thus our measurement of the temperature of the water is really a measurement of the frequencies and strengths of vibrations, rotations and the actual travel of molecules through the body of water as they jostle one another and change positions on a submicroscopic scale. We are sampling the average energy of motion of a very large number of molecules to get a temperature result.

It is important to understand that in a given moment different molecules have different kinetic energies. This is true even if they are otherwise identical molecules in the same body of water. For example, two water molecules in a pool will likely have very different kinetic energies after they collide with one another. Just like billiard balls, upon collision some kinetic energy in the form of momentum is routinely transferred from one molecule to another. This difference in kinetic energies is important in evaporation.

Evaporation is the escape of water molecules from the liquid state in the pool to the vapor state in the air above the pool. Obviously, since most of the water stays in the pool day after day, only a tiny fraction of it evaporates during a given day. The water tends to remain in the pool as a liquid because water molecules have a very strong attraction to one another. A lot of energy is required for a water molecule to overcome this attraction, break free of its neighbors, and become part of the moisture in the atmosphere.

Only the most energetic water molecules can overcome the binding attraction of their neighbors and that is why such a small fraction of the water evaporates in a given day. This is also why evaporation is responsible for so much heat loss from pool water – because only the hottest water molecules evaporate, leaving behind the less energetic water molecules, and so, a somewhat colder body of water.

## **How Monolayer Technology works**

When we reduce evaporation, we also reduce heat loss. Aqua Blanket™ is a non-toxic, naturally-based formulation, derived from plant material that creates a modified layer in the surface of the pool water just one molecule deep. It is too insubstantial to be seen or felt by bathers and it has no odor or flavor. But it is very effective in blocking energetic water molecules from escaping the water's surface. Consequently, evaporation is reduced up to 45% and heat loss is reduced by up to 85% when Aqua Blanket™ is used as recommended.

When agitation occurs at the water's surface and the Aqua Blanket™ material is submerged, as by bathers, water flow over a skimmer and through a pump, etc., it quickly redistributes itself at the surface of the water when the surface again becomes accessible. This is simply a thermodynamic property of the formulation. The Aqua Blanket™ molecules very strongly prefer to be at the air-water interface rather than be surrounded by water molecules within the bulk liquid.

## **Treatment**

Only 4 oz. of product are needed to treat 670 sq. ft. of water surface (approximately 20,000 gallons). Ultimately, the Aqua Blanket™ material leaves the pool in small degrees through bather drag-out, decomposition by chlorine, and capture on filtration media, and then the product needs to be replenished. In residential pools weekly treatment is effective. Some commercial pools have low-dose liquid feeders and these work especially well to deliver tiny doses of Aqua Blanket™ more frequently.

## **Safe and Effective**

Aqua Blanket™ with Monolayer Technology has been proven effective in countless applications. It is NSF 50 Certified and is safe and effective in all types of swimming pools.

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