BLACK STAINING OF VINYL POOL LINERS

Black staining that appears on vinyl pool liners can originate from a number of sources, primarily falling into three categories: metal staining, black algae, and effects of “pool tar”. Depending on the type of the staining, different treatments are required to correct the problem. This bulletin focuses on stains resulting from metals and black algae as the “pool tar” issue is already covered in detail in Technical Bulletin #7 in the CGT Technical Manual.

METAL STAINING

Copper, Iron and Manganese will oxides in chlorinated pool water and can precipitate out of solution resulting in stains on the pool liner. These stains are generally black, brown or gray in colour. The metals may be introduced into the pool via the water source used to fill the pool. Copper can also dissolve from copper or brass fittings in the plumbing when pool water pH conditions of less than 7 occur. It may be present in some algaecides, although most now use copper in a chelated or complex form that remains in solution. The presence of metal staining can be confirmed by treating a small portion of the stained area with a pH reducer to dissolve the metals. If the stain can be removed by this treatment, the staining is a result of metal deposits and the remainder of the stains can be treated in a similar manner. If not, the stain is likely due to an organic source such as black algae (see below). If the staining is due to metals, the pool water may need to be treated with a metal treatment (referred to as sequestering or chelating agents) once the staining has been removed, to prevent a re-occurrence.

BLACK ALGAE

Black algae appears as a series of small black spots on the pool liner. They are very tenacious organisms with a chlorine resistant coating that requires a number of steps to remove: The algae spots must first be brushed (using a nylon brush) to open up the algae coating. Test the pH of the water and reduce it to the lower limit of the normal operating range (pH=7.2) to improve the effectiveness of the chlorine. Then, super-chlorinate the pool (normally to 10 ppm free available chlorine) and add a dose of a quaternary (quat) type algaecide. The quaternary algaecide will wet the algae’s coating to improve the penetration of chemicals. Make sure to follow the recommended dosage of quat algaecide from the manufacturer as excessive usage may result in foaming. Continue to brush the algae stains to maximize the penetration of the chemicals. Vacuum the dead algae to the drain once they have been killed, as they will now have been liberated from the vinyl liner. Twenty-four hours after super-chlorination, add a dose of a polymer algaecide (polyquat) as per the manufacturer’s recommendations. Polyquats are more expensive than regular quaternary algaecides, but are more effective in controlling these resistant types of algae. Once the staining has been removed, resume normal chlorination and water balance. Remember, the best protection against algae growth is a constantly held free chlorine level in the range of 1-3 ppm.

Note that normal water balance conditions should be held within the following ranges:
Total Alkalinity: 80 - 120 ppm
pH: 7.2 - 7.6
Calcium Hardness: 200 - 300 ppm

Another type of grey/black coloured stain can occur as a result of micro-organism activity on the back side of the liner. These micro-organisms can produce dyes that are soluble in the plasticizers used to make the vinyl liner pliable. The microbial dye becomes visible on the pool side of the liner as it wicks through the liner creating an unsightly, irregular shaped blotch. The stains can be diminished on the pool side through super chlorination, for a period of time, but will re-appear since the source of the stain originates from the back side of the liner. Low lying areas or those with high water tables may be more likely to contain these micro-organisms. Installation of a polyethylene barrier between the walls and Floor of the pool, and the vinyl liner, may provide a barrier to staining resulting from these types of organisms.