



LINER CARE INFORMATION

The information in the following pages will review some of the problems a consumer can face with their liner. It will also review causes and solutions to these problems.

Topics addressed in the following pages:

- Deterioration and Dry Rot above the water line
- Staining and Discoloration below the water line
 - Color Fading below the water line
 - Bacteria and Fungus Stains
 - Wrinkling of Vinyl
 - Pattern Flaking off the liner
 - Termites and Ants
 - Trichlor Sanitizers

IMPORTANT LINER CARE INFORMATION – PLEASE READ

Deterioration & Dry Rot

Discoloration, Deterioration and “Dry Rot” Above the Water Line

In most cases, these three problems are different stages of the same phenomenon. The causes of these problems are many and varied, but have a universal theme. In most cases, the discoloration (usually brown), the deterioration (stiffening of the vinyl) and then the complete failure of the vinyl, commonly referred to as “dry rotting,” is due to the extraction of the plasticizers and stabilizers from the vinyl. (Plasticizer is the additive which gives the vinyl its flexibility; stabilizers give the vinyl its high temperature stability.) Under normal circumstances, the volatility of these additives is very low and the vinyl will maintain its physical characteristics for many years.

Experience has taught us that under certain circumstances the area above the water line can begin to deteriorate very quickly. There are three main contributors to this problem; chemical attack, high temperatures and UV rays. The UV resistant characteristics of pool vinyl is excellent and by itself the UV rays do not present a significant problem. However, acid based vinyl cleaners, when not rinsed completely from the vinyl, exposed to extremely high temperatures and the effects of UV rays will accelerate deterioration of the vinyl liner. There are however, certain steps that can be taken to combat these problems.

We have found, through laboratory testing, that acid based vinyl cleaners will diversely affect the life of the vinyl. Exposure to sun light and high temperatures will greatly accelerate that deterioration process. From a vinyl standpoint, we do not recommend using any cleaners that contain acid. If you do use an acid based cleaner, you must rinse all traces of the cleaner from the vinyl. If you do not remove all traces of the cleaner, you are creating a situation where accelerated breakdown of plasticizer and stabilizer will take place, thereby significantly shortening the life of the liner. Use alkaline based cleaners. They are more vinyl friendly and they work just as well as the acid based cleaners. In all instances, rinse the liner fully.

Clean your pool often by taking a soft cloth and using the pool water to rinse contaminates from the vinyl. Substances such as body oil, sun tan lotion, baby oil, etc., will collect at the line. These substances, when exposed to the sun and the high temperature that can be found just above the water line, will often times turn brown and be very difficult to remove from the vinyl. Insist that the liner fit properly. Watch the installation of the liner. If it has to be “stretched in”, insist on a looser fitting liner. If the liner is too small it will tend to pull away from the wall above the waterline and especially in the corners. On the sun side of the pool, temperatures can reach in excess of 180 degrees Fahrenheit, between the liner and the sidewalls. These areas that pull away are the areas that generate the highest temperatures and are the places that will fail first. Remember: Stressed vinyl is more susceptible to chemical and environmental attack.

With proper cleaning and a properly fitted liner, there is no reason why your liner should not last many years. However, unless you follow these simple rules, your liner’s life will be significantly shortened.

Staining

Staining and Discoloration of the Vinyl below the Water Line

The most common cause of staining and discoloration of your liner below the water line is secretions by microorganisms. As these micro-organisms feed, they secrete dyes, which can be one of many colors that stain the vinyl. Although these stains are unsightly, they in no way degrade the performance of the vinyl. These dyes are compatible with the plasticizers in the vinyl, causing the stains to go all the way through the sheet. There is no proven method for removing these stains.

There is a common misconception that the microbial resistant additives used in pool liners will kill the micro-organisms in the area adjacent to the liner. Many people believe that there is a “protective zone” near the liner that will not support life. This is not the case. The additive in the vinyl prevents the vinyl from supporting life but in no way does it prevent life in areas adjacent to the liner. Extreme care must be taken during installation to insure that there is nothing behind the liner that may become a food source for these organisms.

There have been cases of stains forming in pools soon after the installation of a replacement liner when there was never a problem with the original liner. Although there is no way that we can say for sure what has happened behind that new liner, it is believed that when the environment behind the liner is exposed to light and oxygen a “rebirth” of micro-organisms takes place. If the bottom and sidewalls of the pool are not properly treated, there is a chance that problems may arise.

There can also be changes in the ground water that introduce organisms into an area that had not been previously exposed. Extended periods of heavy rains will often cause significant changes in the microbiology of the ground water. Whenever there is a change in the environment around your pool, there is an opportunity for micro-organisms which hitherto were not present to move into the ground water, thereby creating the possibility of staining.

Color Fading

Color Fading Below the Water Line

There can be many contributing factors that lead to the fading of your liner. All of those factors can be grouped under the heading of chemical attack; however the leading cause is simply over-chlorinating. Just as excessive use of bleach will fade your clothes, over-chlorinating of your pool water will greatly accelerate the fading of your liner.

From the vinyl's standpoint, any chlorine level above 3 PPM will accelerate the fading process. The use of a chlorine based sanitizing system is going to bleach your liner. There is no way around this fact. The higher the active chlorine level, the quicker the fading will occur.

Be especially careful when shocking, closing or opening your pool. It is critical that you circulate the water for a minimum of 72 hours after any of these procedures. The average shock treatment is going to bring the chlorine level of your water to at least 25 PPM and as high as 50 PPM.

The specific gravity of the chlorine is higher (weighs more) than that of the water. It is therefore critical that you circulate your water long enough to ensure that the chlorine will not settle out of the water and concentrate in the deepest part of the pool.

It is also important that you do not cover your pool for at least 24 hours after one of these treatments. The covering of the pool will greatly restrict the chlorine's ability to dissipate, thereby greatly increasing the likelihood of damage.

Our experience has shown that of all the sanitizing systems, Trichloroisocyanuric acid has the greatest potential to bleach a vinyl liner. Alkaline sanitizers (Hydrochlorite) are much more vinyl-friendly and just as effective. No matter what system you use, always use the minimum amount of chemical that will get the job done.

Remember: Less is best when adding chemicals to your vinyl-lined pool.

Bacteria

Bacteria and Fungus Stains

Some types of bacteria and fungus found in the soil can actually penetrate through a vinyl liner and cause stains to appear on the liner. Usually they will start off as spotted or cloud-like formations on the liner. Algaecides used in the pool water have little if any effect on the stains caused from bacteria, since it doesn't get to the source of the bacteria in the soil. If a pool is known to have a problem with bacteria staining the liner, the ground underneath the liner may be treated with a solution of one-half household chlorine bleach and one-half water. Mix the bleach in the water and mist the floor of the pool with a small garden sprayer three or four times prior to dropping the new liner in the pool. After the last application of bleach solution, wait several hours before dropping the liner; making sure the solution has been absorbed into the ground.

If the liner has been recently replaced, one method which has been used several times is the use of Copper Iron Sulfate (FeSO₄) to change the pH of the soil around the pool, therefore killing off the source of the bacteria or fungus. This is not a guaranteed cure in all cases but in the last few years it has had some astonishing results for some of our customers. Best of all, this can be tried without having to drain the pool and replace the liner! Copper Iron Sulfate is a chemical used by tree nurseries for treating the pH of soil for some iron deficiencies in plants. For an average size pool, say an 18 x 36 rectangle, you need about twelve to fifteen pounds of this powdered chemical. Sprinkle it on the ground next to the pool deck on as many sides of the pool as possible. Then turn a lawn sprinkler on the ground for two or three days, long enough to get the ground around the pool thoroughly saturated with water. The idea is to get the powder to soak deep into the ground so it can change the pH of the soil and hopefully kill off the source of the bacteria. Usually results are not seen for a week or two since it has to get deep in the ground to have any effect on the bacteria. The Copper Iron Sulfate has not been known to have any harsh effects on grass and care should be taken when using around delicate flowers.

Wrinkling

Wrinkling of Vinyl

Hoffinger Industries has invested a great deal of time and money into discovering the causes of and the prevention of wrinkling. Wrinkles that develop in swimming pool liners after installation are caused by the vinyl absorbing water and thereby changing dimensions. Testing has shown that high levels of chlorine or bromine will initiate excessive water absorption into the vinyl liner and lead to wrinkles. Low pH and cyanuric acid stabilizer are also factors in wrinkle formation because the activity level of the chlorine is affected by the pH and stabilizer levels.

Our experience has shown that the use of trichloroisocyanuric acid sanitizer (Trichlor) and low pH levels can cause wrinkling of your vinyl liner. Alkaline sanitizers (Hydrochlorite) and non-chlorine sanitizer systems have been found to be safer to use with vinyl liners.

Pattern Flaking

Pattern Flaking Off the Liner

To understand why the pattern may flake off, there must be a basic understanding of the procedures involved in the printing of your pool liner. The print pattern is applied by a process called "roto-gravure" printing. The inks used are solvent based and when applied to the vinyl they actually bond themselves to the vinyl by "biting" into it. Then a clear "top coat" is applied to increase abrasion resistance and provide an added layer of UV protection.

The cause of ink flaking off the vinyl is low water pH. An acidic environment will weaken the bond by softening the coating and eventually the ink. The more acidic the environment the greater the likelihood of damage. The effect is cumulative and irreversible. Once this softening occurs, the coating and ink are susceptible to abrasion and flaking.

Always keep your pool at the recommended pH of 7.4 to 7.8. Deviation from these levels will adversely affect the performance of your liner.

Termites & Ants

For many years now it has been known and proven that termites and ants will sometimes attack a vinyl pool liner. It is suspected that termites are attracted to the pool area due to dampness in the soil around the pool. **Usually the first signs are very small holes in the liner above the water line.** The liner may have dozens of holes in it within a short period of time after they have begun their attack on the liner. Most of the time if the liner is taken out of the bead track and pulled away from the wall you may see trails that the termites have left behind. Usually the holes are relatively small, about an eighth of an inch to a quarter of an inch in diameter and are round or oval shaped holes.

If the pool liner has been attacked by termites or ants, the homeowner is advised to get an exterminator to treat the ground beneath the pool and the area around the perimeter of the pool deck when the liner has to be replaced.

Some of the more likely places for termites or ants to appear are: in the yard which has a stump or a tree removed, where a patio or a walkway has been removed, around wooden flower planters, or a wooden fence around the pool.

Trichlor Sanitizers

If Trichlor Sanitizer is used in a Vinyl Lined Pool:

DO NOT allow the pH of the pool to drop below 7.4. **Range 7.4-7.8.

DO NOT allow chlorine levels to exceed 3 ppm using Trichlor sanitizer.

DO NOT shock or super-chlorinate your vinyl-lined pool with Trichlor. Alkaline sanitizers (hypochlorite products) should be used.

DO NOT continuously heat your vinyl-lined pool to temperatures above 82 degrees Fahrenheit. Hot water will dissolve Trichlor sanitizer at a faster rate making the water very aggressive to the vinyl liner.

DO NOT allow true total carbonate alkalinity to drop below 90 ppm when acidic Trichlor is used as the sanitizing agent.
**Alkalinity range 90-125 ppm.

DO NOT forget to correct for cyanuric acid level when measuring true total alkalinity. True total alkalinity equals measured total alkalinity minus one third measured cyanuric acid level.

Failure to limit and control cyanuric acid level could result in the following:

1. low alkalinity
2. pH drop or bounce when Trichlor is added
3. increased chlorine demand (more Trichlor is needed)
4. aggressive water
5. bleached and/or wrinkled vinyl liner

DO NOT add trichlor to a floating dispenser and ALWAYS continuously run the water circulation system 24 hours a day during the pool season when Trichlor is used.

It should be understood that the absorption of water is a function of the PVC. However, the absorption will not take place with proper care. It should also be understood that the affects of the chemicals on the vinyl are cumulative and irreversible.

Remember: Less is best when adding chemicals to your vinyl-lined pool.