ULTRAVIOLET RADIATION:

Only a small portion of solar radiation consists of invisible ultraviolet (UV) light. But the light in this spectral range is responsible for photo degradation. Photo degradation results in discoloration, fading, embrittlement, cracking, chalking and/or loss of mechanical properties. Chalking gelcoat fiberglass, yellowing plastics, fading and weakening fabrics and sunburned skin are all familiar problems caused by UV light. Before UV light can cause harm, it must first be absorbed. If it is not turned into heat or transferred to a near-by stabilizer molecule called a quencher, it breaks weak chemical bonds. This is the beginning of UV damage.

Some materials absorb UV light more readily than other materials. Materials that readily absorb UV light are quickly damaged...rubber, vinyls, gelcoat fiberglass, and many other plastics. Acrylic is slow to absorb UV light and accordingly very resistant to photo degradation.

UV stabilizers are a group of chemical agents with the ability to counteract or neutralize the harmful effects of UV light. Competitive absorbers provide protection by converting UV light to heat so it can dissipate harmlessly (See Vol. I). Other UV stabilizers work differently. All UV stabilizers are consumed as they do their job. In a way, they serve as sacrificial molecules, taking the abuse from the UV light instead of the material they are protecting.

This brief overview greatly simplifies this very complex subject. Discoloring due to absorbers that have absorbility into the visible light range is a problem. And there are many others.

Two important points: UV stabilizers have to be periodically renewed or replenished if continuing UV protection is to be achieved. Second, there is no such thing as a permanent UV stabilizer. a matter of physics, not chemistry.

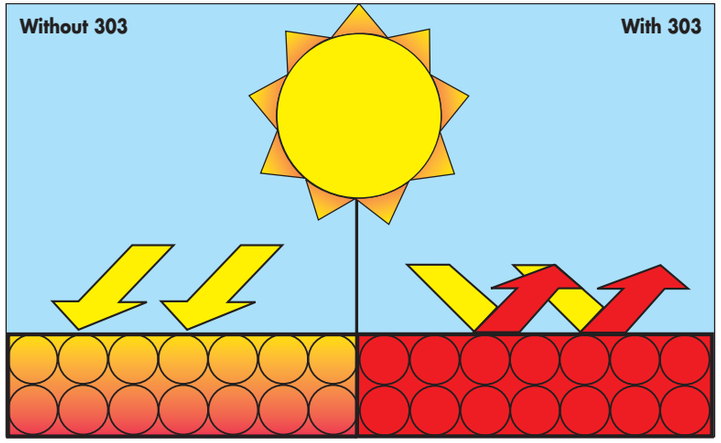
A FEW MORE FACTS. . .

When UV light is absorbed, it starts to break(cleave) weak chemical bonds which leads to bleaching (fading), discoloration, chalking, brittleness and cracking – all indications of UV deterioration.

The bond cleavages resulting from UV absorption cause the formation of "radicals." Each free radical can trigger a chain of reactions (in the presence of air), leading to more bond cleavages and destruction. These oxidating chain reactions require no further UV exposure, just the presence of air.

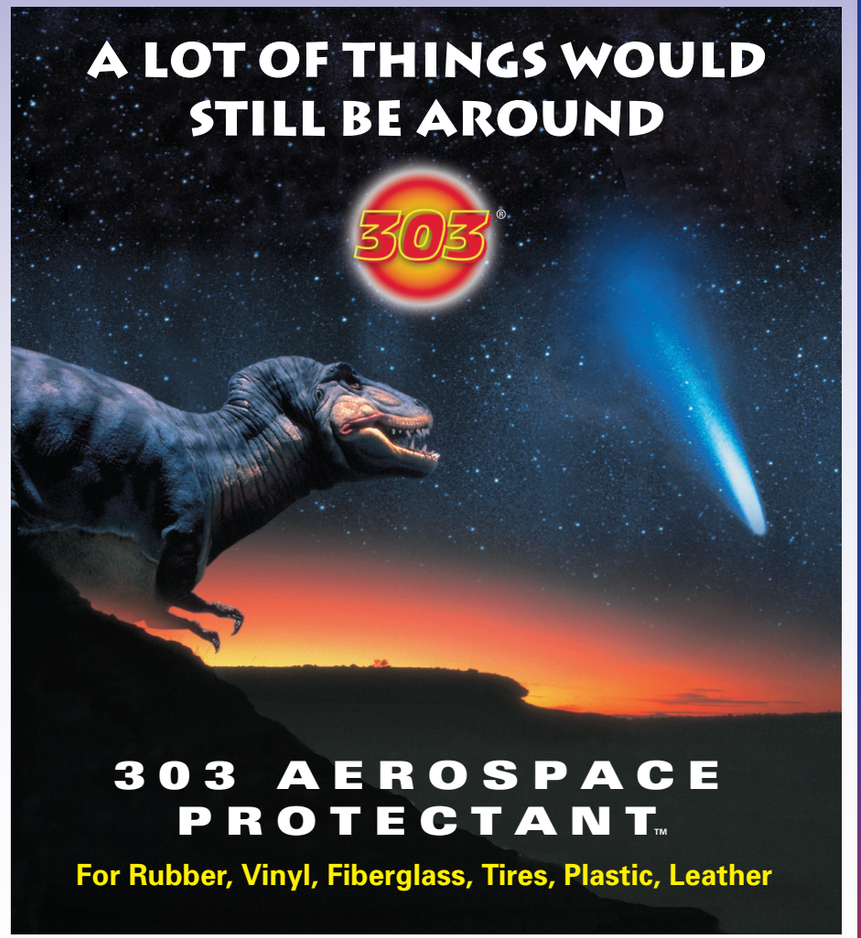
Thus, it is important to provide UV protection with agents that use competitive absorption to convert the light wave energy into harmless heat (like carbon black does in tires – refer to Vol. I). It is equally important to protect with quenching agents that have radical scavenging ability.

Summary: No matter what it's called – UV protection, UV screening, sunblock - to provide true UV protection in a maintenance product form, it is necessary to utilize effective, active chemical agents called UV stabilizers.



Untreated rubber, vinyl and other plastics readily absorb, and are degraded by, UV light.

The best UV protection money can buy. 303 restores, beautifies and lasts longer. Guaranteed!



FREE 303 Products Sample Kit:

For just $6.00 Shipping and Handling you receive FREE 2oz. bottles of each of these 303 Products. **303 Aerospace Protectant** – The World's Most Powerful, Longest-Lasting UV-Screening Protection for Vinyl, Rubber, Fiberglass, Plastics and Leather. **303 Cleaner and Spot Remover** – For carpet & upholstery. Removes oil, grease, coffee, tea, ink, wine and pet stains. **303 Shower Shield** – Long Lasting Protection for people that **HATE** cleaning the shower. **303 Instant Windshield Washer Tablets** – One tablet makes 1 gallon of the best windshield washer cleaner you've ever used. **303 Wiper Treatment Packet** – Makes wiper blades work like new! Stops annoying chattering, skipping and streaking! Stops snow and ice from sticking to treated blades. Treats 2 - 3 wiper blades.

Shipped with information-packed brochures containing what you need to know about UV protection and maintaining vinyl, rubber, fiberglass and outdoor fabrics.

Send check or money order for $6.00 S&H to: Free Samples, 303 PRODUCTS, INC. P.O. Box 966, Palo Cedro, CA 96073. Allow 2 weeks for delivery.

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TECH FACTS

VOLUME 1

WHY ARE TIRES BLACK?

This and other questions you need answered are answered in 303's Tech Facts Vol.1

VOLUME 2

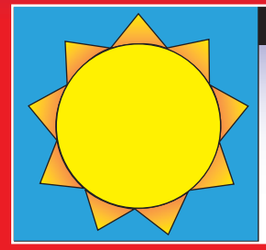
VINYL

Reveals what vinyl manufacturers recommend to properly maintain your vinyl (what to do and what not to do).

VOLUME 3

FIBERGLASS

How to keep colored gelcoat fiberglass looking brand new year after year and never, EVER buff and wax again!



VOLUME 4

ULTRAVIOLET RADIATION

What everyone should know about ultraviolet (UV) light and UV degradation.

WHY ARE TIRES BLACK?

The sidewalls of tires which are parked for extended periods dry, check and eventually crack and split. Annually, tire "dry-rot" is a multimillion dollar problem for RVers, trailer boaters and owners of classic cars. This engineering memorandum is a scientific examination of the whys of this process and explains in detail how 303 Protectant™ is an answer to the tire dry-rot problem.

Tire manufacturers blend into the tire polymer certain chemical ingredients which inhibit damage from ozone and ultraviolet light, the main environmental degradants of tires and all other types of synthetic and natural rubbers. Ozone is an odorless gas, but is commonly thought of as the "electric train smell". Though more severe in cities and manufacturing centers, ozone is part of the air we breathe everywhere on earth. Hastened by the hazardous effects of UV light, ozone eventually causes rubber to dry and become brittle no matter the locale.

ULTRAVIOLET LIGHT: The need to protect rubber against UV damage is why tires are black. For this purpose a common type of UV stabilizer called a 'competitive absorber' is used. Competitive absorbers work by capturing & absorbing harmful UV light wave energy (instead of the adjacent molecule of tire polymer. . .that's why it's called 'competitive'). Competitive absorbers have the added ability to convert harmful UV light wave energy into heat so it can dissipate harmlessly. **ALL** tire manufacturers use the same competitive absorber, carbon black… an extremely inexpensive compound. All other UV stabilizers are prohibitively expensive. This is why tires are black and why tires are not available in designer colors. **All** UV stabilizers are sacrificial, meaning they are gradually "used up" to where they can no longer protect against UV damage. As carbon black loses the ability to do its job, it turns gray. This is why rubber grays as it ages.

OZONE: Tire manufacturers use waxes to protect against ozone. When tires are in use (regularly running up and down the road for example) they flex. Flexing causes the protective waxes to migrate to the surface where they form a physical barrier between the air (ozone and oxygen) and the tire polymer. This process ...the waxes migrating to the surface of the tire during flexing...is called "blooming". When tires are not regularly used (a parked RV, boat trailer or classic car, etc.), blooming does not occur. Ozone begins eating away the protective wax and before long reaches the tire polymer. Often by this time, the surface carbon black has lost its ability to protect against UV. With UV light and ozone working in concert, degradation starts. The tire dries, checks and will eventually crack.

OTHER DEGRADANTS: Petrochemicals and silicone oils can remove the protective waxes and increase the rate of degradation. Common automotive "protectants" and "tire dressings" are typically devoid of UV stabilizers of any type and contain petrochemicals and/or silicone oils which dissolve away the protective waxes and can actually aggress the sidewall. In the event of warranty sidewall failure, one of the first things tire manufacturers look for is evidence of the use of these types of products. When found, this is often cause for not warranting the sidewall failure.

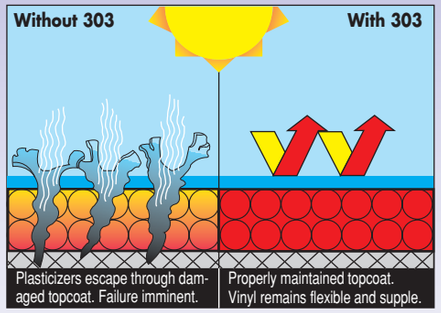
303 FOR TIRES: 303 contains no petrochemicals or silicone oils and does not remove the protective waxes. 303 is actually absorbed into tires, delivering its unique set of powerful UV stabilizers into the tire polymer, supplementing and surpassing the UV protective action of the carbon black, and leaving a long-lasting, flexible protective finish that is water repellent, detergent resistant and will not attract dust. Ozone must eat through the 303 before it can get to the wax. 303 is an extremely effective anti-oxidant and anti-ozonant. 303 is the longest lasting, most powerful protective and beautifying treatment for tires and all other synthetic and natural rubber.

TIPS FOR TIRES: 303 treated tires have the rich, waxy, almost vinyl-like, dark black look of new rubber. 303 tires look and feel like brand new, not greasy-new. **FOR MAXIMUM TIRE BEAUTY:** Spray 303 directly on a clean & dry tire until the sidewall is thoroughly wet with 303. Without touching the rubber, easily wipe away any 303 overspray from the rim. Do each tire the same way.

After 10 - 20 minutes, wipe around each tire once or twice with a dry rag to pick up any unabsorbed 303. Your tires will have the look and feel of fresh new rubber. **FIRST TIME USE:** On sidewalls that are excessively dried out, two treatments may be necessary the first time. To note: A) The regular use of 303 can entirely prevent the UV and ozone damage associated with parked tires. Reapply 303 every 20-30 days. B) 303 is 100% safe for all types of wheels, all alloys. Wheels regularly treated with 303 repel water, road grime and brake dust and clean up far easier than untreated wheels.

VINYL:

An enlarged sideview of common vinyl fabric would show raw PVC (polyvinyl chloride) covered by a thin layer of plastic called the "topcoat". The topcoat is the part of the vinyl you can see and touch. To keep vinyl fabric soft and flexible, manufacturers add agents known as plasticizers to the raw PVC. A major function of the topcoat is to hold in these plasticizers, which otherwise would quickly evaporate. If the topcoat is damaged or degraded, plasticizers begin to escape leading to embrittlement/cracking/ failure.



Protecting the topcoat, then, is the most crucial aspect of properly maintaining vinyl and the subject with which vinyl manufacturers are most concerned. Vinyl manufacturers agree on and recommend the following.

General Cleaning: Never use household cleaners, powdered or other abrasives, steelwool or industrial cleaners, dry cleaning fluids, solvents (petroleum distillates), bleach or detergents. Use a medium-soft brush, warm soapy water, (such as Ivory soap), rinse with cool water and then dry. Mildew Stains: To kill the bacteria creating the mildew, use a medium-soft brush and vigorously brush the stained area with a 4 to 1 mixture of water and ammonia; rinse with cool water. Tough Mildew Stains: Apply a mixture of one (1) teaspoon ammonia, one-fourth (1/4) cup of hydrogen peroxide and three-fourths (3/4) cup of distilled water; rinse with cool water. Note: All cleaning methods must be followed by a thorough rinse with water.

Obviously abrasives should never be used on vinyl. Petroleum distillates are a universal "no no" for both vinyl and rubber. Waxes should never be used on vinyl because (a) Most waxes contain petroleum distillates; (b) Wax is a build-up product, holding in the heat absorbed from the sun and accelerating heat damage.

Virtually all vinyl manufacturers agree that no type of oil should be used on vinyl. Silicone oil vinyl treatments should not be used for several reasons: 1) Silicone oil formulations typically attack the vinyl topcoat. 2) Silicone oil formulations usually contain no effective UV screening ingredients. 3) Silicone oil formulations are build-up products which accelerate heat damage. 4) Silicone oil formulations are greasy and oily, attract dust, and soil more quickly. READ THE LABEL! Product directions suggesting more than one coat for better cosmetic enhancement are build-up products and are recommended against by vinyl manufacturers.

303 FOR VINYL 303 Protectant is a beautifying liquid sunscreen, the routine use of which keeps vinyl looking like new while dramatically extending its useful life. 303 contains no petrochemicals, silicone oils or petroleum distillates. 303 is not a build-up product. 303 treated surfaces dissipate heat normally.

303 is not oily or greasy and does not attract dust. In fact, 303 treated vinyl repels dust, dirt and stains, stays cleaner longer and is much easier to clean when finally soiled. Since 303 contains a tested-safe-for-vinyl cleaner and is a cleaner and protector combined, precleaners and precleaning usually are not required.

303 has been tested and is recommended by major vinyl and vinyl accessory manufacturers. As the leader in UV screening technology since 1980, 303 is the most powerful UV screening treatment available for vinyl, leather, rubber, gelcoat fiberglass and most plastics. Regular use of 303 can reduce UV caused slow-fade up to 100%.

303 FOR FIBERGLASS. . . Never buff or wax again!

Like vinyl, gelcoat fiberglass (polyester resin) is a UV sensitive plastic. Though manufacturers add UV stabilizers to vinyl and gelcoat fiberglass in the manufacturing process, these protective agents weaken over time and must be replenished if continuing UV protection is desired (See Volume 4). Colored gelcoat fiberglass is particularly sensitive to UV degradation and 303 Protectant is by far the easiest way to make colored fiberglass look like new again and to keep it that way. Nothing else is even close.

303 Protectant works by penetrating to restore a like-new color and gloss. Spray on enough 303 to thoroughly wet the surface (303 goes farther if it's sprayed on & then rubbed around & in). Wipe away excess with a soft, absorbent cloth. Wipe until completely dry, changing cloths as cloths become damp. Unlike wax, 303 is not left to dry before it is wiped off. If 303 has dried on the surface, it is easily removed by spraying the area with more 303 then wiping dry.

For best results, apply 303 out of direct sunlight so fiberglass surface is not overly warm. A hot surface causes 303 to evaporate before it can do its job.

Reapplying: Reapply by spraying 303 on the surface and wiping dry with a soft, absorbent cloth...very much like dusting furniture and just as easy! For trailered boats, a convenient time to reapply is after trailering, just before toweling it dry. Mist it lightly first with 303, then towel dry...takes an extra 30-40 seconds. This is an excellent way to keep up the UV screen and totally prevent UV caused slow-fade. Plus dirt, road grime and 60 mile-an-hour bugs will not stick to a 303'd surface (you'll love it!).

When To Reapply: 303 is water repellent (beads water). When the water repellency begins to diminish, reapply. Or if you think it may be time to reapply but don't know for sure, do a small spot with 303. If any of the color or luster comes back, reapply. Usually, a simple spray on/wipe off reapplication every 30 to 80 days of exposure is sufficient.

Does 303 Always Work? 303 always works unless there is something on the surface keeping 303 away from the fiberglass...teflon, silicone, polymer sealants or fresh wax. If the surface has been freshly waxed, it is not necessary to remove the wax. Just wait a few weeks and try again. Wax does not last long enough to warrant the effort required to remove it.

About 2% of the time prebuffing (compounding) is required. When required, be sure to use a rubbing compound that does not leave a coating or sealant. Use pure rubbing compound with only the finest abrasive.

Older Surfaces: Even after a few years without care, it may be unnecessary to compound before using 303. Use 303 to find out for sure.

First apply 303 normally. If this does not restore the like-new color and gloss typical with 303, try this: In the shade (or just before dark), spray a basketball-sized spot with 303. Rub it in and spray again to make sure the spot is thoroughly wet with 303. Let set for a few hours or overnight. Spray the spot again with 303 and wipe dry. This is often all it takes to make gelcoat look like new again without compounding.