# Chemical Usage and Cleaning in the Tunnel Environment

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Applying the correct chemicals in the proper manner can be daunting to a new car wash investor. Identifying the correct chemicals and delivering them to the vehicle with the correct pressure and titration has a long history. Chemical requirements are influenced by regional conditions, seasonal weather, customer preference, competitors, operating costs, revenue enhancing options, and a host of other parameters. The process is and will always be based on experience and personal preference because there is no "one size fits all" solution.

## Delivery of chemicals

Most chemicals are normally diluted into a solution with treated water or injected into the pumping plant at a constant rate to produce a desired titration. The titration (ratio of chemical to water) is recommended by the chemical manufacturer and adjusted accordingly within the pumping plant. The solution is pumped through low pressure pumping plants normally operating under 100 psi.

The importance of treated or softened water for mixing with chemicals, especially detergents, should never be overlooked. Any water with 1 grain per gallon or more of hardness is considered "hard" water. By softening water to below 1 grain per gallon, less cleaning chemicals are required, resulting in operating cost savings. Shown in the following chart are some industry estimates for savings.

| **Cleaning chemical savings by softening below 1 grain/gallon** | |
|---|---|
| **Original water hardness** | **Approximate savings** |
| 2-5 grains | 15% |
| 5-10 grains | 25% |
| 10-15 grains | 35% |
| 15-20 grains | 45% |
| 20+ grains | 50+% |

While the chemical is mixed and pumped from an equipment room, arches and applicators are mounted in the tunnel to apply the chemical mixture to the car as it passes through the tunnel on the conveyor. The number and type of nozzles in the arch may vary based on the specific type of chemicals being applied. As you can see it's important to have a clear understanding of how to deliver the chemicals to the vehicle but it is also essential to understand the function of the various chemicals.

## Chemical usage and applications

Chemicals are needed in the tunnel environment for many reasons. Tunnels usually require chemicals for cleaning, lubricating brushes, body protectants, and revenue generation. As you



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will see, cleaning agents have multiple categories based on PH and function. Foamed soap used for lubricating brushes can also come in a variety of options to provide better drying, easier rinsing, or further clean the vehicle. Body protectants or finishing chemicals refer to the many variations of polish waxes, clearcoats, polymer based protectants, and drying agents. Finally, chemicals like triple foam (wax, soap, and conditioner), body protectants and tire shine chemicals can be used as revenue enhancing options as part of the wash menu or ala carte. Each individual wash operator relies on his or her own experience along with the chemical and equipment supplier to formulate the proper chemical set for the tunnel.

High PH (Alkaline) and Low PH (Acid) are primarily used as cleaning agents. The Alkaline is used as a presoak chemical to breakdown organic materials like dirt, clay, etc. Seasonally, an alkaline may be applied to the front of the vehicle to remove bugs. Application of the bug remover could be applied prior to the presoak or as a replacement for the normal alkaline presoak. For instance, a bifurcated arch has the ability to apply bug remover to the front of the vehicle and presoak to the rear of the vehicle. The application to the front of the vehicle can be changed seasonally. It's important to review all the high PH chemicals available from a supplier to ensure different options are available for the various seasons.

Acids are normally utilized to remove inorganic materials often found in air pollutants or brake dust. Normally, an alkaline would be applied to the vehicle and given a period of time, referred to as the dwell time, to break down the organic materials. Then a low PH might be applied in regions with poor air quality to remove hydrocarbons. The low PH application is made after the proper dwell time to avoid neutralizing the two chemicals. Many areas do not even require an acid to clean vehicles adequately. It should also be noted that applying an acid after the alkaline can improve the ability to dry the vehicle. Evaluate your regional needs to better understand if you need a low PH cleaning agent.

Foamed soaps or conditioners are often applied before the brush station and to the brushes to lubricate the brushes. Water is oftentimes adequate lubrication, but the foamed soap can eliminate "squeaking" noises from modern foam brushes. Foamed soaps are normally low PH or neutral and are commonly available in single or multiple colors. Many operators will use the application of the foamed soap to the brushes as standard and charge a premium for the application to the vehicle. The addition of a scent can further enhance the customer experience and encourage selection of the foam option. Triple foams have become a common fixture in the tunnel wash so be aware many customers expect the option.

The finishing products can be confusing but we'll discuss them in terms of drying agents, polish wax, clearcoats, and polymer based body protectants. The drying agent is the most basic of the products with mineral seal as the active ingredient. The primary function of the drying agent is to coat the surface and facilitate the drying stage of the tunnel. The grade of the seal oil is typically how these products are measured and the higher the grade, the better to facilitate drying. The drying agent provides little shine and no surface protectant but is still a useful chemical in the tunnel. Polish waxes adhere to the vehicle surface but contain no mineral seal. The polish wax

gives the vehicle a shiny surface that isn't provided by the drying agent. These chemicals can be combined by applying the polish wax followed by the drying agent.

Clearcoats are also referred to as sealants. These products have surface protectants as well as mineral seal so they can be applied without a drying agent. The mineral seal utilized in clearcoat products are usually a higher grade than a standard drying agent. A clearcoat may be a middle wash option in a three menu wash and a drying agent part of the basic wash. The top wash might include a polymer or silicone based body protectant. These products adhere to the vehicle's finish similar to a clearcoat but the protection or coating on the vehicle should last longer. In some vendor specific testing, the coating can last 3-5 washes after being applied. In the end, the options utilized in the tunnel have to make sense for the specific market. Some operators may take advantage of a product with brand recognition and others will attempt to brand their wash with the products they use.

Tire shine chemicals can be used along side triple foams and surface protectants as revenue enhancing options. Tire shine chemicals are normally applied at the end of the tunnel between the final or RO rinse and the dryer system. The operator must ensure these chemicals do not enter the reclaim system as they are generally not reclaim compatible. Tire shine chemicals can be a way to enhance revenue and gain preference with the customer base.

**Chemical safety**

It is essential to respect the chemicals used in the tunnel environment and have a clear understanding of safety. An operator can get started by requesting the chemical supplier provide safety training as well as product training to ensure the operator and employees are aware of the hazards for each chemical being used. Eventually, a hazardous communications program should be created. It's not enough to train all the employees once and expect information to get passed on to new employees. Chemicals, especially alkalines and acids can cause severe damage to skin, eyes, and internal organs if inhaled.

At a minimum, gloves and eye protection should be worn when handling any chemical in the equipment room. It's easy to feel rushed to complete a task and forget proper protection. Wash chemicals are more often than not, liquids. Liquids splash when they are poured and could contact with hands or eyes. The actual chemical may or may not have any effect on the skin, however, chemical residue, lotion, or sunscreen on hands may react with the chemicals being handled. It's far better to be safe each time chemicals are handled rather than a trip to the emergency room.

Chemicals should not be mixed unless the titration procedure by the manufacturer recommends the mixture as part of the normal process. Chemicals can react, creating toxic fumes and even more severe reactions can occur. If mixing any two chemicals would produce a better product, it's likely the manufacturer would recommend the solution. When mixing an acid and water, always add the acid to the water. When containers are empty, they should be washed, resealed and disposed of properly. Try to avoid placing empty containers in the sun where they may get

hot and burst. Procedures for handling chemicals should be clear and made available to every employee.

There are a handful of items important to remember as chemical safety is considered. Keep a copy of MSDS sheets for all the chemicals used in the wash process. These MSDS sheets can be laminated and attached to the container for easy reference. Eye wash stations should be located properly in the equipment room and signed appropriately. The person who'll be using the station may have impaired vision. Operators may find it helpful to encourage employees to report any accidents and make sure everyone is clear where the closest emergency room is located in case of an accident. www.osha.gov can be a helpful site for understanding an operator's legal obligation.

**Chemical damage to vehicles**

As discussed in the chemical safety section above, concentrated and even diluted wash chemicals are still very potent. Many of the chemicals used in the wash process have potential to damage vehicles. At the start of the wash, the presoak (normally an alkaline) can burn or blister the paint on a vehicle if the titration is too high. Titrations are sometimes increased beyond the manufacturer's recommendations accidentally, other times the goal is to improve the cleaning capability, or maybe decrease dwell time. This highlights the need for regular maintenance of the pumping plants to ensure titrations are correct. Operators can work with the chemical supplier to provide alternative presoak products rather than increase the titration and expense per car. An assessment of the wash operation and wash volume may allow for the conveyor speed to be reduced for increased dwell time. Remember, the presoak chemical has a standard dwell time and in many cases the chemical becomes less effective after the standard dwell time. In many regions presoaks are simply seasonal and as the seasons change so must the presoaks. For instance, if the vehicle surface temperature will be vastly different between summer and winter, the presoak will likely be changed or adjusted accordingly. In the end, it's very important to ensure the proper titration is being used for a given presoak.

Tire and wheel cleaners should also be reviewed closely. Custom and even factory upgraded wheels can be sensitive to harsh chemicals. Acids normally used to clean brake dust may not be right for all regions and all seasons. Wheels can become very hot during the summer months and applying a harsh acid may not be the right choice. During these months you may choose an alkaline cleaner to avoid damage to the finish of the wheels. Pay close attention during the winter months to assess what chemicals are being applied to the road to assure compatibility with the wheel cleaner as well as the presoak products. The key here is to think about the season and what cleaning products might need to be changed seasonally.

Another issue with brushes can arise due to poor balance of chemicals. If alkaline is used as a presoak and low PH or neutral PH is applied before the brush station buildup can occur on the brushes if the chemicals are imbalanced. The buildup occurs as a black coating on the brushes which start towards the inside of the brush. Vehicles will most likely not be damaged but the buildup may be brushed onto the car. If this begins to occur consult the chemical supplier. They will likely recommend increasing the alkaline or acid to correct the imbalance. PH at the brush

station is critical to avoid this issue. Again, preventative maintenance and understanding what to observe is the key.

**Chemical storage**

Chemical containers should be sealed to avoid chemical contamination or evaporation. Although chemical contamination may seem unlikely, imagine a small leak in a hose managing to flood into an acid container ruining the $500 worth of chemical remaining and potentially causing a severe reaction in the container. Alternatively, a wax product exposed to the open air could cause evaporation and thicken the chemical. The pumping plant may draw smaller portions because of the thicker, more concentrated solution and provide less than optimal results. Many manufacturers offer systems to allow the contents of the container to expand and contract without allowing evaporation. Most wash chemicals have a fairly stable shelf life but should be stored at room temperature. Always try to avoid freezing and excessively hot locations. Be aware of alkaline solutions which have the potential to crystallize at the bottom of the container if they are not used in a reasonable timeframe and when exposed to freezing temperature. It's usually best practice to use first in/first out inventory and avoid buying too many containers at one time even if it seems like a "good deal."

**Conclusion**

Make sure the right questions are asked with regards to which chemicals are right for the regional needs of the tunnel wash. Cleaning chemicals may need to be exchanged seasonally so it's important to select a chemical supplier who can provide options and expertise as to which chemicals for what seasons. Once the proper chemicals are selected, ensure employees fully understand the safety measures required for handling each of the chemicals and what to do in an emergency. And beware of the deal that sounds too good to be true because it probably isn't true. If chemicals are changed to achieve savings measure usage and be certain savings are actually realized as opposed to using more chemicals.