

Drying System

Its Supporting Actors in a Successful Production

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Car wash dryers are near the conclusion of a successful wash process. Although the dryer may not be center stage, it is commonly regarded as either the entire problem or the perfect solution. While it is true that conditions specific to the dryer such as outlet angle/placement, ductwork configuration, or the addition of heat may influence the outcome; they are only part of the total production.

It is important to note that most “dryers” do not use or produce heated air and therefore are not really dryers. Instead they are “blowers,” designed to strip residual water off of an already clean vehicle. An effective dry serves as a complement to an integrated, successful wash operation.

THE PLOT

Ideally, vehicle body styles would be uniform and remain unchanged for a number of years. Dimensions and contour angles would be the same for each vehicle. Crevices, moldings, and accessories would be located in the same position and of the same width and depth. Of course, this is not reality. The wash process must accommodate a wide variety of vehicles and still be adjustable to meet specific needs. That said, it takes a collaborative effort to deliver a clean, dry car in a timely, cost-effective manner to a satisfied customer.

SCENERY

Climate and geography are major influences in determining proper

facility design and operation. The effects of humidity, air temperature, altitude, and the prevailing wind direction through a car wash tunnel are all considerations to take into account.

Cold air cannot hold as much moisture as warm air. Generally, warm climate car washes are aided by the partial evaporation of water into the atmosphere. However, high humidity levels impede the drying process by preventing partial evaporation — air laden with condensation cannot absorb additional water.

Air density is a variable of elevation and temperature, and both variables affect the air production of a particular fan. A fan operating at higher temperature and elevation will move the same volume of air as it would at lower temperatures and elevation with less total pressure and less horsepower.

If the prevailing wind in a car wash is from entrance to exit, it is possible that misted air from the washing and rinsing equipment may be pulled into the air dryers and deposited back on the vehicle.

BACKSTAGE

If a reclaim system is utilized, proper maintenance of this system is critical to a successful wash process. Operators may choose to use combinations of fresh/reclaim water for the wash process followed by fresh/treated water during the rinse phase. Whatever the ratio, failure to follow manufacturer’s instructions prohibits the system from trapping residue and will

result in recirculation of chemicals and grime. The problem compounds with each wash and allows a dirty, viscous film to coat the vehicle preventing wax and drying agents from reaching the surface

PROMPTS/PROPS

While following a common theme, wash facilities are like fingerprints. Every facility is unique, requiring chemical and sometimes equipment modifications.

Chemical selection criteria: Is it a quality product and does it work with my specific water? What is the cost per car at the specified dilution rate? If possible, mixing warm water (70°F - 80°F) with the chemicals, in particular the rinse aid and final rinse, will increase the beading of the water and substantially assist the drying system. This is true in any climate and especially true during the worst winter weather.

Surfactant

Soap is first used in the prep area to remove excessive buildup of dirt and pre-treat areas, which lack coverage by standard equipment and chemicals. Soap is one of a class of chemical substances called surfactants. The word surfactant is an acronym for “surface active agents.” Generally speaking, surfactants consist of molecules having both hydrophilic (water-binding) properties and hydrophobic (water-repellent) properties. The hydrophilic part allows the hydrophobic part to bind with other hydrophobic substances, such as the dirt on the sur-

face that is being cleaned. Therefore, the vehicle surface must be sufficiently wetted, prior to the soap application, in order for the soap to begin its work. Adequate dwell time is then required to allow surface-grime adhesion to the soap's hydrophobic substances and encapsulation within the droplets of water. The dirt and grime, once suspended away from the surface, is ready

to be scrubbed off either by friction or pressure, and washed away.

Rinse

Soap film (approximately 98 percent water and 2 percent surfactant) may remain on the surface after the obvious dirt and grime have been removed. This film is a very thin layer — typically only a few microns (millionths of a meter) in

thickness. In order to continue a successful wash process, soap film must be completely removed during the rinse process. Failure to do so allows the viscous film to coat the vehicle, preventing wax and drying agents from reaching the surface. Generally, a series of rinse applications are required to successfully complete this portion of the process.

After rinsing off the grime, one or more optional versions of polish may be applied. Polish wax provides gloss and protects the surface from everyday harmful elements. Adequate flooding of clean rinse water is then required to remove the excessive volumes of foamy, showy waxes that are the trend today. Excess polish wax, left trapped in crevices and contours, may run out and create streaks, spots, and customer dissatisfaction.

Application of treated rinse water is critical prior to the vehicle entering the drying phase. Introducing a rinse aid (wax) breaks down the surface tension of the water, changing the characteristic of the water from sheets to beads. Establishing a bead is vital because beads of water are less weighty, have less surface tension, and therefore are easier for the drying system to remove. Water still possessing sheeting qualities tends to slide around and remain on the vehicle surface rather than leaving the surface. Using a household broom, is it easier to sweep a brick in its whole form or is it easier to sweep a brick broken into many tiny pieces? This same principle applies to water.

When it comes to the effectiveness of a drying system, the choice of rinse aid and its coverage of the vehicle are critical decisions. A water-repellent surface — such as a freshly waxed car — is hydrophobic. When the surface of water (hydrophilic) comes into contact with a hydrophobic surface, which it considers undesirable material, water will thrash about trying to get away from that undesirable material. A quality concentrate must be applied in the recommended dilution rate through the proper number of nozzles to achieve adequate coverage.

THE STAGE

Proper spacing of the distribution system allows thorough application of chemicals. Each chemical has optimum dwell time, which is the amount of time required for the chemical to complete its work. If complete vehicle coverage is not achieved, or if chemicals are not allowed recommended dwell times, subsequent step(s) in the sequence will be impaired.

Although sometimes overlooked, conveyor speed plays an important role in the car wash process. Reducing the tempo to as slow as is reasonable, delivers a cleaner, drier car. It allows thorough cleaning, rinsing, and drying by serving as an adjustment to achieve complete vehicle coverage and optimum chemical dwell time. Rushing through any phase of the process ultimately affects the quality of the final product.

Rain arches flood and gently envelop the entire vehicle surface while also penetrating crevices. Leftover residue is effectively removed without the splash-back and subsequent mist created by high-pressure rinse arches. This method of application becomes more valuable as the vehicle approaches the drying process.

Drip space between the rinse arches and the dryer should be maximized to allow some water to run off the vehicle before the produced air begins its process. Drip space also acts as a "safe zone" to allow the occurrence of the natural reaction between two opposing, yet sequential steps in the car wash process. Rinse arches located too close in proximity to the dryer will increase tunnel mist and interfere with dry down. Anticipating the dryer will be able to overcome previous system shortfalls is expecting the dryer to complete tasks it simply was not designed to do.

FINAL SCENE

Every vehicle will not dry equally well; therefore choose a drying system with the greatest impact on the largest number of vehicles. Choose a simple, reliable system over complication and glitz.

Whether airflow directs the water back, down, or to the side, it must be done in an orderly fashion.

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Everything starts at center line for the average vehicle. The initial overhead producers should provide adequate airflow intensity to remove most of the residual water. Placement and angling of subsequent producers is crucial to continue sweeping the water in one direction. Too often, conflicting airflows cancel each other by blowing water back onto areas previously dried. The water becomes trapped on the vehicle and chased everywhere, except off the vehicle.

Pay attention to the impact of the airflow as well as vehicle coverage. Some fans primarily produce volume with some pressure creating a wider swath across the vehicle. Comparatively, other fans produce more pressure and considerably less volume, thereby designed to deliver airflow in a narrow

stream. Configuring the proper outlet nozzle for the specific type of producer is key in obtaining adequate, effective vehicle coverage, not to mention motor life.

CURTAIN CALL

Employing lightweight foam material in a “curtain” to remove water and residue from the vehicle has significantly improved the wash process. Unlike previously used felt fabric, foam is not absorbent and therefore, does not become excessively heavy nor does it become contaminated with chemicals or grime. It gently breaks the surface tension and strips away moisture without an abrasive effect. Foam acts as a squeegee to wipe away any remaining beads of water.

REVIEW

In summary, any dryer’s performance can be enhanced or impeded by the cast of characters preceding the dryer. Remember, synergy throughout the entire wash system aids in achieving maximum performance from the dryer. Although no guarantee, observation of the process and the willingness to make adjustments go a long way to improve overall results and ultimately customer satisfaction. 

Darryl and Cheryl Dobie own Aerodry Systems, LLC located in Denver, CO. They have successfully owned and operated car washes, and manufactured drying systems, since the mid-1980s. For additional information, please visit www.aerodrysystems.com.