



Keys to a Dry Vehicle after the Tunnel Wash

By Kevin Fairfield, Mark VII Equipment

Dryer systems are often compared by the horsepower. For example, a 180 HP system is perceived as better than a 120 HP or 90 HP system, but it's not always a correct assumption. Comparing dryer systems is a little more complicated than just horsepower. However, the process can be simplified by understanding a few key concepts regarding how the individual producers function, how the dryer system is configured, and what chemical applications improve or diminish drying capability. The ideal situation is to dry cars with the least amount of horsepower to minimize operating costs and the space required in the length of the tunnel wash.

Dryer Producers

Each individual dryer in the system is commonly called a producer. The design of an individual producer can be based on the horsepower of the unit, the required air flow, the required air velocity, and the placement of the producer in the dryer system. Any good dryer system starts with the thoughtful design of effective producers which maintain air velocity and flow well past the outlet nozzles. Many producers have high airflow and velocity at the producer outlet, but the velocity measured at the level of the vehicle is much less and lacks the force to effectively remove water from the vehicle.

Producers are traditionally offered in 10 HP and 15 HP. There are some basic assumptions with these two sizes of producers. The 10 HP uses less energy and has lower airflow. However, the air velocity doesn't necessarily need to be sacrificed. The 10 HP nozzles are smaller to ensure proper air velocity. Another important note is nozzles can be positioned and sized differently within the dryer system based on the producers' individual function.

Both 10 HP and 15 HP outlet nozzles should be round and converging to focus air flow and velocity. Square or rectangular nozzles have been the standard for many years but they can cause dramatic losses in air velocity and the ability to remove water when the air reaches the vehicle. Air velocity at the nozzle exit may be 150-200 mph but the velocity at the vehicle could be 50-150 mph depending on the nozzle design. One high efficiency producer and focused nozzle with 150 HP air velocity may remove more water from the vehicle than three inefficient producers with 50 mph air velocity at the car.

Dryer Systems

The dryer system design and layout appears fairly basic but the dramatic differences in vehicle sizes requires some thought and frankly, sometimes, a little trial and error. The producers are traditionally arranged in a V-shape where the bottom of the V starts in the middle of the vehicle and the rest of the producers fan out to push the water off the vehicle. It's important to note the dryer isn't literally drying the vehicle but pushing water off the vehicle. Proper chemicals application will cause the water to bead and then the dryer pushes the beads off the vehicle.

*It's not about the carwash,
it's about the carwash business.*

Mark VII Equipment Inc.
5981 Tennyson Street
Arvada, CO 80003
Phone: (303) 423-4910
Fax: (303) 430-0139
Web: www.markvii.net

The nozzle positioning in the dryer system is based on the function of the producer. The first producer in the system is intended to begin moving water from the center of the vehicle. This nozzle is likely at a forward angle so the water moves toward the back of the vehicle. Some systems may incorporate two producers to initially push all the water off the top of the vehicle in an effort to widen the second set of nozzles. The second set of nozzles will then continue the water movement towards the side of the vehicle or start to push water down the vehicle. These nozzles may still be tilted forward but less than the first nozzle/s. Once the water is effectively moved to the side of the vehicle the third and potentially fourth row of producers will simply blow down the sides of the vehicle and push the water to the floor. Some nozzles may be tilted back towards the front of the car to remove water from mirrors. The modern, high efficiency dryer systems can significantly reduce the required horsepower, tunnel length, and energy costs.

Some dryer systems are displayed with dryers mounted on the side of the support arch as opposed to the top. The key is to ensure the bay is wide enough to mount the producer on the side. The bay may need to be 3-4 feet wider which could impact other parts of the site layout and will add to the construction cost.

Heated dryers are sometimes utilized as a method to increase the drying potential. The added heat may help dry the car slightly but it's important to weigh the benefits versus the operating costs. The dryer system is simply blowing water off the car so if the system is sized properly for the conveyor speed and operating properly, there should be no need for any added heat other than possibly as a revenue enhancing option. Heating will encourage evaporation provide the heat is actually reaching the vehicle and has enough time based on the conveyor speed to warm the vehicle surface.

The motors with the dryer system require a great deal of energy to start each time a car enters the system. Some manufacturers are utilizing air gates and inverters to reduce the number of times the motors need to be started each day. An air gate might be used to block the inlet to the producer so the motor continues running but the required wattage is minimal because the fan inside the producer is simply spinning and not moving air. Inverters simply slow the motor so very little air is being moved and the energy required to bring the producer back up to operating speed from a slow setting is much less. The cost of an inverter or air gate can be justified by the operating cost reduction.

Helping the Dryer System

Vehicles with residual soap can make the vehicle more difficult to dry. Alkaline or high PH chemicals can be especially harmful to dryer performance. Low PH or acid chemicals can be used after the alkaline to minimize the issue and a high flow or high pressure flood rinse will ensure all soaps are removed. The dryer system needs the vehicle to be clean and free of soap to operate properly.

From polymer body protectants to simple drying agents, many options are available for applying finishing chemicals in the tunnel wash. Even though the drying agent is intuitively helpful to the

drying process it's important to understand the peculiarities of the drying agent and its effect on drying. The primary chemical in a drying agent is a mineral seal to provide a low friction vehicle surface to allow water to be removed easier. Mineral seals are also present in clearcoats. The quality of the mineral seal does vary so drying agents with higher quality mineral seal will have a positive effect on your drying capabilities. In addition, applying more mineral seal can be helpful to the drying process. Beading should occur as the final rinse is applied to the car to ensure a proper amount of mineral seal is applied.

Reverse osmosis systems remove minerals from water and allow a spot-free vehicle once all the water has evaporated. If minerals are not removed from the water, they will remain when the water evaporates resulting in spotting. For the RO water to be effective, soaps and dirt have to be removed. Minerals are removed with the RO process but even RO water will cling to dirty or soapy areas of the vehicle. Ideally a mineral seal will be applied to the vehicle through a drying agent or clearcoat prior to the final RO rinse. Final rinsing with RO water helps the drying system by eliminating vehicle spotting.

Allowing drip space after the RO rinse can also help the dryer system. By allowing water to run off the vehicle, the dryer system is required to remove less water. Instead of purchasing a 120 HP system, consider a 90 HP and allow the extra 3 to 4 feet of drip space. Modular systems allow an extra arch to be added to upgrade to the 120 HP system if necessary but the potential savings with 30 HP less could be over \$10K per year in operating costs.

Summary

When purchasing a new dryer system, look for an efficient system with high velocity focused nozzles with proper airflow. By selecting a dryer system which requires less horsepower to dry the vehicle, less energy will be used and the operating cost saving will pay for the system over time. If you've selected a high performance dryer or are struggling with an existing dryer consider making some changes within the tunnel wash to help the drying process as an alternative to replacing the dryer.