The drying effect

Learn how to develop a high-performance drying system for your wash.

By Cheryl Dobie and Darryl Dobie

One standard procedure does not exist for achieving a clean, dry car in a timely, cost-effective manner. That begins at the wash entrance.

An effective drying system is the final compliment to an integrated, successful wash operation.

Before drying is needed

After thorough washing and rinsing, polish wax is 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 waxes and clear-coatings, as is the trend today. Excess polish wax, left trapped in crevices and contours, may run out and create streaks and spots.

The application of treated rinse water is critical prior to the vehicle entering the drying phase. Introducing rinse aids breaks down the surface tension of the water changing the characteristic of the water from a sheeting movement to a beading.

Establishing a beading of water is vital because beads 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.

The final solution

The industry has seen much advancement in its quest for a clean, dry car, and drip space is an important factor in that goal.

When water comes into contact with a hydrophobic — water repellent — surface, which it considers undesirable material, water will try to get away from that undesirable material.

Drip space acts as a safe zone to allow the occurrence of the natural reaction between these two opposing, sequential steps.

Carwash dryers are generally the final mechanical component in the wash process. Because of this position, the dryer is commonly regarded as either the problem, or the perfect solution for the wash process.

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, dryers are only part of the total equation.

Any dryer's performance can be enhanced or impeded by the process that precedes the dryer.

Go with the flow

Different fan types require dissimilar air delivery systems to achieve the required results.

In general, fan impellors work through the creation of a pressure differential, in that air moves from a high-pressure environment to a lower pressure environment.

The two general types of fans are

Systemeffect

System effect is a loss of pressure resulting from restrictions or conditions within the system's ductwork design, affecting fan performance.

This is sometimes difficult to quantify and robs the air system device of efficiency and increases noise and vibration. Therefore, properly engineered ductwork is as critical to the overall efficiency of the dryer as the fan itself.

— C.D. and D.D.

A failed attempt

If a reclaim system is used, proper maintenance of this system is critical to a successful wash process. Failure to follow manufacturer's instructions prohibits the system from trapping residue and will result in re-circulation of chemicals and grime.

This problem can become increasingly complicated with each wash cycle and will eventually allow a dirty, viscous film to coat the vehicle, preventing wax and drying agents from reaching the car's surface.

— C.D. and D.D.

axial-flow and centrifugal:

Axial-flow fans: Air passes through the fan parallel to the drive shaft. An axial-flow fan is suitable for a larger flow rate with relatively small pressure gain.

■ The effective progress of the air is straight through the impeller at a constant distance from the axis.

■ To accommodate the large air volume exiting the apparatus, the outlets are larger than those of a centrifugal system. Because air essentially flows directly through from inlet to outlet, increasing the size of the inlet will, to the extent of the fan and motor capabilities, allow the size of the outlet to also be increased.

Configuring the outlets to be too small may result in a fan stalling, whereas the back pressure has reached its maximum and the fan simply does not produce air with every rotation.

These fans are widely used for providing the required air flow in heat and mass transfer operations.

Centrifugal fans: Often called squirrel cage fans, centrifugals operate on the principle of throwing air away from the blade tips.

■ The air is led through an inlet pipe to the center of the impeller, which forces it outward into the volute from which it flows into the discharge pipe.

■ The blades can be forward curved, straight or backward curved at an incline.

Drying in your environment

Neither pressure alone, nor volume alone can effectively move fluid. The correct combination of both pressure and volume provides complete vehicle coverage with adequate force to remove properly treated rinse water.

Only a small amount of pressure is necessary to break the surface tension allowing the volume, along with its accompanying weight, to effectively move the debris or water on a vehicle.

— C.D. and D.D.

A centrifugal fan has a comparatively smaller flow rate with a larger pressure rise, and because of this pressure rise, the likelihood of stress fractures and fan failures is increased.

Improper sizing of ductwork or outlet assemblies in an effort to achieve specific results may increase back pressure and therefore lead to fan or motor failures.

Air flow broadens as it leaves ductwork constrictions, but flows in a straight path. A volume of pressurized air aimed at the top of a vehicle flows along the surface to the widest point of that vehicle. At this point, the straight path of air flow is interrupted and deflected away from the lower, tapered portion of the vehicle.

Consequently, to achieve an effective dry, air flow must also be directed at vertical surfaces in a slightly downward manner.

Stripping moisture first from the top portion of the vehicle, followed by the sides, conforms to natural gravitational forces.

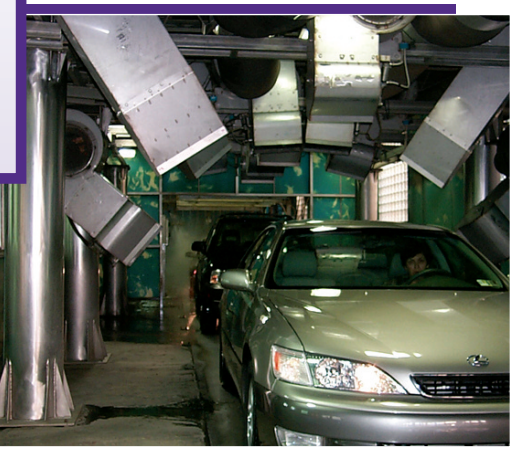
Outside factors

Air density is a variable of elevation and temperature and both affect fan air performance.

A fan operating at a higher temperature and elevation will move the same volume of air as it would at lower temperatures and elevations, with less total pressure and less horsepower.

Humidity can impede the drying process by preventing the partial evaporation of water into the atmosphere.

Today, some carwash operators have chosen to add heat to their drying process.



Science tells us that heat will increase the evaporative rate of water and warm the tunnel, which potentially benefits the wash process.

However, while heat may evaporate water droplets, any chemical residue encapsulated within the droplets does not evaporate, thus leaving dried spots on the surface of the vehicle.

Additionally, air drying utility costs may already account for a significant portion of the operating budget and attempting to heat a large, open-ended tunnel may not prove feasible.

An operator must research local utility costs, consider climate, assess the total system and most importantly, be aware of what pleases the customer before completing this upgrade. □

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