An inside look at in-bay dryers

How to choose the best drying system.

By **Daryl & Cheryl Dobie**

When adding a drying system to an automatic in-bay, the operator must keep four themes at the forefront of his decision:

- Regional characteristics;
- Customer base;
- Competition; and
- Payout.

Aside from these considerations, communication with experienced operators of similar wash facilities is the best resource.

Each phase in the process, as discussed here, is an important part of the formula for a clean, dry car delivered in a timely, cost-effective manner to a satisfied customer. Considering every aspect of how the system will work, as well as why it will work best for your facility, is essential to choosing the right dryer.

For more information:

Visit **www.carwash.com** and type in keyword: **Dryers**.

For more information on related products, visit **www.carwash.com**, select Supplier Search from the site menu, and enter product name: **Dryer systems**.

Wash process

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, molding and accessories would be located in the same position and of the same width and depth.

Then facilities, equipment and chemicals could be designed to achieve a perfectly clean, dry car with every wash. Of course, this scenario is only possible in a car manufacturing plant producing limited models. The wash process must accommodate a wide variety of vehicles and still be adjustable to meet specific needs.

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 surface 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 become encapsulated within the droplets of water. The dirt and grime, once suspended away from the surface, are ready to be scrubbed off, either by friction or pressure, and washed away.

Wash, rinse, rinse, rinse, repeat

Soap film (approx. 98% water and 2% surfactant) may remain on the surface after the obvious dirt and grime has 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 a thorough rinsing, polish wax (if opted by the customer) 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, showy waxes as is the trend today. Excess polish wax, left trapped in crevices and contours, may run out and create streaks and spots.

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.

Application of treated rinse water is critical prior to the vehicle entering the drying phase. Introducing 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.

One soap manufacturer emphasized the importance of establishing a bead through this simple scenario: 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.

Provided the chemicals being applied are metered in adequate amounts, properly timing the distribution system allows thorough application of these 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 steps in the sequence will be impaired.

Rushing through any phase of the process ultimately affects the quality of the final product.

Drying basics

Now, only after reviewing the various elements considered necessary to achieve a clean, dryer-friendly car, it is time to discuss the basics of the mechanical drying methods utilized in the carwash industry.

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

System Effect is defined as loss of pressure resulting from restrictions or conditions within the system (ductwork design) affecting fan performance. System Effect, which is sometimes difficult to quantify, robs the air-moving device of efficiency and increases noise and vibration. Different fan types require dissimilar air delivery designs to achieve the required results.

Air density is a variable of elevation and temperature and both variables affect fan air performance. 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. Humidity can impede the drying process

Dryer models

Two types of dryers exist for the in-bay automatic.

On-board dryers are attached to the wash equipment gantry and move over the stationary vehicle in the same way the gantry moved over the vehicle during the wash process.

More compact on-board dryers tend to slow the wash process. Because the vehicle remains stationary until the dryer has completed its cycle, subsequent customers are prevented from entering the tunnel and beginning their wash. Additionally, moisture that accumulated on the equipment during the wash cycle, may be pulled into the air dryers and deposited back on the vehicle.

Stand-alone dryers are separate from the wash system and may be located either inside the tunnel or on the exterior.

Stand-alone dryers allow some drip space between the wash system and the dryer. However slight, the movement of the vehicle the short distance to the dryer aids in the natural removal of water from the vehicle surface.

As the washed vehicle proceeds forward, another customer is allowed to begin the wash process, thus increasing the available number of washes/day.

Because the speed of the vehicle passing through the dryer is at the discretion of the driver, most owner/operators install signage and countdown timers to assist the driver in determining the correct speed. Rushing through the cycle may result in operation of the dryer after the vehicle has exited.

by preventing the partial evaporation of water into the atmosphere.

Location and sound levels

A successful automatic carwash must be located in close proximity to both retail establishments and residential areas. Noise generated by carwash traffic and equipment can pose a problem for all concerned.

Even though the property may be located near a busy intersection, ordinances governing noise produced by businesses are different from those governing thoroughfares. Therefore, noise generated at the carwash must be below any noise produced by the major intersection or roadway which may be in close proximity to the carwash property.

Local ordinances may impose restrictions or dictate hours of operation, depending on the noise generated by the carwash and heard on neighboring properties. Because carwashes have large entrance and exit doors, sound cannot be completely contained in the building.

The most effective sound absorption materials used in construction are porous and are not suitable for wet, harsh carwash environments. Consideration should be given to sound reduction when designing the building and premises. However, it is more effective to contain and reduce the power of sound waves emitted at the equipment source.

The chart is a helpful guide which lists typical sound pressure levels for daily activities.

The Occupational Safety and Health Administration (OSHA) sets the standard for occupational noise exposure. These standards govern the maximum levels of industrial noise an employee may be exposed to and they explain what action must be taken if these levels are excessive. While these guidelines may only apply to automatic washes with an attendant, local governmental agencies may use OSHA standards as a basis for their ordinances. □

Typical Sound Pressure Levels

Sound pressure level	Source	Subjective reaction
0	Threshold of excellent youthful hearing	Threshold of hearing
10	Threshold of good hearing	
20	Buzzing insect at three feet	Faint
30	Whispered conversation at 6 feet	
40	Quiet residential area	
50	Window air conditioner	Moderate
60	Conversational speech at 3 feet	
70	Freight train at 100 feet	
80	Computer print out room	Loud
90	Unmuffled large diesel engine at 130 feet	Very loud
110	Loud rock band	Threshold of discomfort
120	Passenger ramp at jet airliner (peak)	Threshold of paint
130	Artillery fire at 10 feet	Extreme danger
140	Military jet take off at 100 feet	Extreme danger

Darryl and Cheryl Dobie own Aerodry Systems, LLC, located in Denver, Colorado. They have successfully owned and operated carwashes, as well as manufactured drying systems, since the mid-1980's.