

# Deionized Water Case Study: Par for the Course

How a portable deionization application was used to produce spot-free vehicles at a golf course.

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River Landing is a private residential golf community, located in Wallace, NC, along the Northeast Cape Fear River about 30 minutes from downtown Wilmington, NC.

When River Landing purchased a new fleet of golf carts for the course, provisions were made to keep the carts clean, spot-free and presentable to the membership for as long as possible.

At most golf courses, golf carts are cleaned by the cart staff at the end of each round by simply hosing them off with tap or well water.

Frequently this water is used without treatment, which can lead to spotting as the water dries on the carts. In fact, the original fleet of carts that River Landing was now replacing was plagued by spots that had permanently marred their finish.



## **Dissolved solids**

Hardness minerals, calcium and magnesium, as well as some other dissolved ions, will leave spots on rinsed surfaces if water is allowed to dry on them. At many full-service carwashes for instance, operators wipe down the cars after washing and rinsing to prevent these spots from forming.

Water trapped in window and door seams can form spots known as “racing stripes” as the water drains out of the seams as the owner drives away. Dissolved solids are invisible in water but are deposited on the surface as the water evaporates.

Golf course operations do not allow time for a manual wipe down of each cart after rinsing. Most of the carts are used for a morning round of golf, washed off and then immediately put into service for an afternoon round of golf. They are driven away wet.

To prevent spotting in this situation the offending ions must be removed from the rinse water. Dissolved solids or ions can be removed by ion exchange or by reverse osmosis.

Each method has its advantages and disadvantages, but ion exchange deionization is particularly suited to the golf course application.

### **Portable exchange deionization**

The type of ion exchange equipment chosen for this operation is known as portable exchange deionization (PEDI). In this application, a complete PEDI system consisting of cation, anion and mixed bed ion exchange for the total removal of dissolved solids was used. This purified water feeds a pressure washer that the operator uses to quickly and efficiently rinse down the golf carts after use.

PEDI is a method of providing DI water to locations that need water for situations ranging from ultrapure applications to rinsing needs. Vehicles can actually be rinsed with DI water and come quite clean. The main advantage of rinsing with DI water is that vehicles can be air-dried without spots forming.

In this case, the use of deionized water eliminates the need for soap and prevents the formation of spots on the golf carts. The only other labor required to maintain the finish on the cart fleet is an application of wax twice a year. The runoff from the operation is simply water - no soap, no chemicals, no disposal problem.

Portable exchange deionization is ideal for relatively low flow, low volume and intermittent deionized water requirements, such as vehicle rinsing. The water volume demands do not require large volumes of resin. Regeneration of the ion exchange resins takes place at a centralized facility off-site.

The golf course staff does not have to handle or come in contact with hazardous acid or caustic chemicals.

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## **What's the potential?**

PEDI can be used for vehicle washing in many markets. For example, new car dealers can use a portable setup of exchange tanks and pressure washers to clean new and used cars on the sales lot. Other fleet operations can also benefit from the use of DI water in the same manner.

## **Limitations**

Limitations of the DI water rinse are encountered when the vehicles being washed are extremely dirty with mud, road grime or salt. In these cases, the vehicles need to be washed with a soap solution before the spot-free rinse.

However, when soap is involved, care must be taken to make sure that any runoff is treated in accordance with local pollution control requirements.

Another concern for vehicle washing operations, especially heavy industrial applications like bus, train, or truck washing, is the potential for discharge of metal contaminants in the waste rinse water. These sophisticated jobs should be approached with caution and the effluent from the rinsing operation may need to be collected and treated before disposal to stay in compliance with surface water discharge regulations.

## **Levels of purity**

How pure does the rinse DI water need to be? The River Landing golf course uses the highest quality water available by PEDI – two bed cation/anion DI followed by a mixed bed polisher.

Some vehicle rinsing operations, however, achieve acceptable results with a partial deionization of the water. The treatment process consists of treating the water with hydrogen form cation resin, followed by a weak base anion resin.

The cation resin essentially removes all of the positively charged ions including calcium, magnesium and sodium, while the weak base anion resin only removes chlorides and sulfates. The weak base anion resin does not remove silica or alkalinity to any appreciable degree.

If the customer's water includes a moderate to high level of silica it may be necessary to include a strong base anion resin as the second step, or for the purest water, to include a mixed bed polisher.

Some dealers use 12 ppm silica as the highest amount that does not require strong base anion resin. Anything over 12 ppm requires full deionization of the water.

Keep in mind, what works for one application may not work for others due to geographic differences in TDS and ionic makeup of the water supply.

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