

## Ozonated Laundering: A Refreshing Alternative To Chemicals

**Background:** Embassy Suites hotel in the Crystal City section of Arlington, Virginia, is part of the highly successful chain that began the "all-suites" concept in the early 1980s. Currently, there are more than 100 Embassy Suites hotels, and the company is on an aggressive growth path with new openings in strategically focused locations. Embassy Suites hotel-Crystal City, is a 267 suite hotel that caters to the needs of business people and visitors in the competitive lodging marketplace of Washington, DC and Northern Virginia. An innovator from the start, Embassy Suites has always been open to new ideas that provide better service to guests while improving operation efficiencies.

Laundry attendants, Rosa Escobar and Zewde Tefre, fold brighter, fluffier towels in a fresher-smelling, cooler working environment, thanks to ozone laundering.

Average washing time with conventional detergents-47 minutes.	Average washing time with ozone laundering-24 minutes.
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With ozone laundering, washing time can be reduced by nearly half since the rinse cycle can be eliminated.

Hotel General Manager David Norman and Virginia Power Associate Engineer Leslie Leahy discuss the fact that ozone will greatly reduce the amount of chemicals necessary to keep the hotel's swimming pool at a safe and clean level.

**The Opportunity:** While on a business trip to Florida in 1992, Mel Peterson, Embassy Suites, area engineer, discovered the benefits of ozone water treatment for laundering applications. After further studying the technology, Peterson recommended to David Norman, general manager, that the hotel conduct a test of ozonated laundering. Norman agreed, and in early 1994 an ozone washing system was installed for laundry.

**The Results:** For Embassy Suites, the results were immediate and significant. After just two months of operation, Peterson was able to document a savings of \$2,400 per month on the costs of water/sewage, chemicals and laundry labor. The hotel realized an additional 17% savings on gas since water was heated to only 115 degrees F instead of the previously required 140 degrees F. Further, since the rinse cycle was reduced, washing time was shortened from 47 minutes to 24 minutes per load, amounting to a savings of about four hours per day. Since the amount of detergent used was dropped by 57%, Embassy Suites also reduced the environmental impact of its laundry operation. And, according to Peterson, the hotel got an unexpected bonus: fluffier, fresher-feeling laundry and longer life of towels and linens. "For a while," he says, "We were concerned that because the washing cycle was so short, our laundry would pile up waiting for the dryers to finish. What actually happened was that laundry came out of the washer far dryer than before. Since less soap was used, towels and linens didn't compact as much, and they released more water. We reduced dryer time by 15 to 20%. What's more, with less wear and tear, fewer chemicals and lower temperatures, fabrics hold up better, so we're saving a lot by making our linens and towels last longer."

**The Ozone Laundering Process:** Ozone is created by passing dry air or oxygen through a high voltage electrical field. At Embassy Suites hotel-Crystal City, there are two ozone generators which create ozone and a compressor injects it into the laundry system's wash water. The ozonated water transforms insoluble soils (even greases, fats and oils) into soluble soils through a unique chemical reaction. Traditional detergents or other cleaning agents can be greatly reduced, if not eliminated entirely. Therefore, there's little chemical residue and no need for multiple rinsing cycles.

**The Future:** General Manager David Norman reports that Embassy Suites hotel-Crystal City, is so pleased with ozonated laundering that ozone water treatment is being implemented in other areas of the hotel's daily operation. Since ozone destroys bacteria 3,000 times faster than chlorine, it is being used to treat the hotel's swimming pool and spa. Plans are also underway to add ozone treatment to the dishwashing system, walk-in refrigerators and freezers, and even the lobby fish pond. "Ozone water treatment is not only a matter of cost savings," says Norman. "It also contributes to the safety and comfort of our guests. That's the number one priority of Embassy Suites, so it's a technology we're very interested in."

**Other Applications:** For over 80 years, ozone has been used in the treatment of drinking water and is still used in large city drinking water facilities. Because of its ability to destroy bacteria, viruses, mold, fungi and algae, as well as effectively remove stains, ozone is now spreading rapidly to many other areas of water treatment. Ozonation of cooling tower water has emerged as an effective alternative to chemical treatment. Ozone quickly acts as a biocide to clean cooling tower water without costly and environmentally hazardous chemicals. Another application of ozone technology is in the oxidation of wastewater streams in such industries as poultry processing, textiles, and pulp and paper making. This oxidation process reduces the amount of disinfectant, such as chlorine, needed to treat effluents in these industries.

# Laundry Water Treatment Systems

## Ozone Laundry System

The use of ozone in the pre treatment of laundry wash water can drastically reduce the amount of hot water, chemicals and detergents in the typical laundry process. Significant energy savings can be realized when using laundry wash water containing an ozone residual. Many laundry systems use very hot water (~175° F) to provide disinfection of the laundered materials and aid in the removal of dirt and oils. When ozone is injected into the wash water, it provides complete disinfection of the laundered garments, even at **ambient** water temperatures. Also, ozone is over 100 times more effective at killing bacteria than chlorine. In addition the ozone will aid in the break down and dissolving of the oils in the laundered goods. Reducing the temperature of the wash water and the use of chlorine can alone provide a cost saving of \$1,000's per week, depending on the size of the laundry system. The life of the garments is also extended do to the decrease in wear by the reduction of chlorine, hot water and wash cycles. The percentages of savings with an ozone pretreatment system that can be expected are:

- 3-12% Annual Savings on Laundry Labor
- 10-40% Annual Savings on Laundry Water/Sewer
- 50-75% Annual Savings on Laundry Chemicals
- 75-95% Annual Savings on Laundry Natural Gas or Electric for Hot Water

## Technical Information

The features of the ozone laundry systems are:

- Fully Automatic Operation
- Engineered Venturi Injection System
- Ozone Air Monitor Included
- Automatic Cycling Air Prep Supply or Oxygen Concentrator
- All electrical components and connectors are UL approved

## Laundry Water Recovery System

In addition to the savings that are realized when an ozone pre treatment is installed, these systems can be combined with a water recovery system. The laundry water recovery system can recycle at least 70% of the wastewater on its own. This means the total water savings of up to 95% can be expected with the combined systems.

By using the oxidizing ozone, and the free radicals it produces, not only are the dyes and organics oxidized, all bacteria and viruses are also deactivated. The employment of the powerful oxidizer will also ensure that there is no organic growth or build-up of algae and odor forming bacteria in the system filters. The recovered treated laundry water after passing through the filtration system will have very low total organic carbon (TOC) levels, be crystal clear, free of particulates and bacteriologically safe.