

Commercial Laundry Takes Advantage of Ozone System to Increase Profit

20% Delta of Savings Exceeds All Projections for Natural Gas;

Also Cut Costs for Chemicals and Water, while Gaining Wash Aisle Productivity



A single ozone system from this manufacturer handled all seven washers in use at the time, while other ozone systems for laundry handle only one or two washers each. The plant is processing at the rate of about 3,000,000 lbs/yr, operating seven days a week, with seasonal load variations calling for 8-12 hrs/day.

Table #1
Key Results

In spite of a 30.5% increase in soiled goods input:

- **15% decrease in chemical consumption**
- **6.3% reduction in purchased water consumption**
- **only 10% increase in natural gas consumption**

Also 12% increase in wash aisle productivity.



The system consists of one box including the ozone generators and most of the electronic controls, and another box for the oxygen concentrator, the rest of the electronics, and other equipment. The only maintenance required is to clean the incoming air filters daily, which is accomplished in five minutes or less with a simple compressed air blow-out.

Plant management for Sea Island Linen, a traditional commercial laundry operation serving greater Charleston, SC, reports significant positive impact on profit in 2011 through the installation of an ozone system at the end of 2010.

In particular, they realized a 15% decrease in chemical consumption; a 6.3% reduction in purchased water consumption; and only a 10% increase in natural gas consumption, all in spite of a 30.5% increase in soiled goods input. They also reported a 12% increase in wash aisle productivity.

“Payback was immediate and verifiable for every month,” noted Wade Reeves, vice president. “Renting the equipment was a good fit for our business model, and we are continuing ozonation as a key component of the expense part of that model as we continue to grow the business.”

Reeves said the ozone system, installed in December, 2010 to deliver 60 g/hr of dissolved ozone to his washer extractors, has now been replaced by a system from the same manufacturer to provide for 120 g/hr, which is giving the plant twice the ozone at lower power consumption. He also has added two washers to his wash aisle, preparing for a near-term increase in wash capacity of 40%, to 1400 lbs/hr, with the new wash and ozone equipment ready to handle further growth beyond that level.

The plant processes a combination of customer owned goods (C.O.G.) and its own products, from hospitality, hotel, beach resort, food and beverage (F&B), and health care sources that includes soiled sheets, pillow cases, and various terry items, including washcloths, and hand, bath, beach, and pool towels. All goods are classified by customer to insure there is no intermingling.

At the time of the ozone installation, the plant was processing at the rate of about 1,400,000-1,500,000 lbs/yr, and is now at about 3,000,000 lbs/yr, operating seven days a week, with seasonal load variations calling for 8-12 hrs/day.

“With the reduction in chemicals,” Reeves continued, “dryer times are shorter, linens are bright and white, and terry is soft, and there has been no increase in stain reject.”

“Meanwhile, with sheets, there has been zero impact on the cost of flatwork ironing. There has been no slowdown there whatsoever, contrary to what some fear about washing in cold water. And the 20% delta of savings on energy costs exceeded all projections we had about natural gas savings.”

The ozone is added to an original wash chemistry of alkali, detergent, bleach, and sour. Water is heated by a conventional, natural gas-fired hot water heater to reach a temperature of 140°F. For selected classifications of goods, steam from a natural gas-fired boiler is injected into the washer extractors to raise temperatures to 150-160°F.

“Since the plant startup in 2007, with the cost of natural gas firing two hot water generators, we were constantly seeking ways to control energy costs, as well as chemical costs,” recalled Reeves. “In particular, we decided to investigate ozone systems to meet those objectives. Having been around the ozone aspect of the laundry business since 1998, I had a very strong opinion on which system to use to reliably and efficiently introduce ozone directly into the laundry process.”

“I had seen a lot of over-pricing and under-delivering,” he continued. “There were a lot of systems that just couldn’t consistently perform. They couldn’t keep them running. There

were always issues with components. But I had seen the Guardian equipment run consistently every day. Quality was evident not only in the manufacturing of the equipment, but also in its application. In addition, it had special features.”

“There was an interface between their engineering center in Cocoa, FL and each of their installations. There was fault registration with notification and re-set. And in the unlikely event of a component issue, they had an immediate heads-up and could dispatch service. So we installed a system to deliver 60 g/hr into the incoming cold water line, which gave us ozone at 3 ppm in washer fill water.”

Ozone is added through a premium, Venturi-type injector, so that ozonated water is delivered to the washer extractor, with remote monitoring capability back at the engineering center. The system consists of one box including the ozone generators and most of the electronic controls, and another box for the oxygen concentrator, the rest of the electronics, and other equipment. It is entirely wall-mounted; there is no footprint.

The original system ran on a standard 110 volt line, with 60 cycle pulse power and a 20 amp input breaker. The new, larger system operates on 220 volts, but takes advantage of the plant’s existing compressed air system to generate oxygen. Therefore, the plant has twice the ozone, with lower power consumption.

The only maintenance required is to clean the incoming air filters daily, which is accomplished in five minutes or less with a simple compressed air blow-out.

“It’s been especially helpful for our custom operation to get to know what the cost reductions are going to be, and that they are going to be there every day,” Reeves concluded. “That allows us to reliably price our product based on a certain expense model, and continue to grow the business profitably.”

The Guardian Ensure-LCR™ ozone systems feature advanced generator components, integration engineering, and interface controls to significantly enhance performance and reliability. The company regards its success in ozone applications like Sea Island as deriving from long-term research and development for its products, and an integrated, customized approach to manufacturing and installing them.

Tom Allen, Guardian’s senior applications specialist for laundry operations, noted the company’s success across various types of laundry platforms as deriving especially from its advanced controls technology.

“The need has always been there for an ozone laundry process that contained not only quality ozone generators and oxygen systems, but for them to be combined with monitoring and control systems, with self-diagnostic software packages, to run them,” he said.

“We’ve also learned not only to carefully consider the chemistry of the wash water, but the derivation of the soiled goods, and consequent organic and inorganic introductions to the wash process.”

Thoram Charanda, senior scientist for Guardian and manager of its research and development laboratory, added the importance of energy efficiency.

“We also strive to maximize the amount of oxygen converted to ozone, using the least amount of energy,” he continued. “Ozone is converted at the rate of 5 to 10% by weight, aided significantly by

an oxygen concentrator that provides a source of oxygen that is consistent at 94%. And its very high frequency is also well above the audible range, so there is no high-pitched whine, which we had learned was an additional complaint about ozone.”

Charanda also noted the critical need for efficient delivery of the ozone into laundry wash water.

“We are injecting ozonated water directly into the wash wheel using a premium Venturi-type system that consistently provides mass transfer efficiency at the level of 90% or more,” he said.

Guardian has engineered almost 1000 ozone systems since 2003. For further information on Guardian Ensure-LCR™ ozone systems, and opportunities for preliminary site analysis, contact Guardian Integrated Services, 2971-A Oxbow Circle, Cocoa, FL 32926, Tel. 321-508-3392, Fax 321-631-4517, laundry@guardianmfg.com, www.guardianisd.com.



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