

Chillers' Advanced Compressor Technology Delivers Reduced Energy Consumption at NFL Films Studio Complex



NFL Films headquarters complex in Mount Laurel, NJ.

The Tustin Group Installs New Smardt Chillers & Awarded Maintenance Contract for the Facility

For building owners, nothing generates complaints faster than the failure of the HVAC system. However, when the building owner is NFL Films, the failure can cause a lot more than discomfort — it can be catastrophic. The 200,000 sq. ft. NFL Films studio complex houses the world's largest sports film library. To keep the films preserved, the temperature in the vault needs to be maintained at 54°F. In addition, cool temperatures are critical during the production of television programs at the complex. Under the hot studio lights, if the air conditioning fails, the show's hosts and their makeup can quickly melt. For NFL Films, a reliable air conditioning system is a lot more critical than for a conventional office building.

Reliability Problems

No one knows this better than John Rauch, Operations Manager, of Marubeni Sustainable Energy, the company that provides building operations services for the NFL Films headquarters complex in Mount Laurel, New Jersey. When one of the two chillers (owned by Marubeni and leased back to NFL Films) began having problems, Rauch quickly sought a resolution. His mechanical contractor suggested replacing one part and then another. "We did not, however, have a high confidence level in their ability to understand what the problems were," said Rauch.

Looked for a New Contractor

At about that time Marubeni was beginning to solicit bids from other mechanical contractors, as the maintenance agreement on the chillers was about to expire. Tustin Mechanical Services of Hammonton, New Jersey was one of the contractors. "I liked what they had to offer," said Rauch. "I asked them to give me a second opinion on what our current contractor was saying was wrong with the machine." While Tustin was evaluating the problem chiller, Rauch said he was so impressed with their ability to understand the problem — and with their maintenance staff — that he signed them up for the contract.

Effects of a Catastrophe

Shortly after Tustin came on board, a catastrophic failure occurred in the HVAC system. "We lost 60% of our capacity and we were going into the summertime," said Rauch. "We needed an immediate temporary solution before we could even begin to make a decision on whether to repair the machines or buy new ones." Tustin installed a temporary chiller on site. "We spent twelve months using the temporary chiller while trying to repair the old chiller," said Rauch. "During those twelve months, we began researching the latest in chiller technology. That's when we came upon Smardt chillers, which feature a completely different technology than the chillers we were using."

New Chillers Are Highly Energy Efficient

When it was eventually determined that Marubeni couldn't be 100% confident in repairing the old chiller, the decision was made to replace not one, but both, machines with Smardt chillers. "The Smardt chillers utilize oil-free centrifugal compressor technology, which boosts energy efficiency and cuts operating costs," said Rauch. "It provides much better



450-ton Smardt chiller featuring 5 Danfoss Turbocor compressors



Danfoss Turboacor compressor (5 on each Smardt chiller) features oil-free compressor technology

efficiencies than the conventional oil-lubricated compressors on our old machines. Since we've installed the Smardt chillers, we've realized a 10-12% reduction in the consumption of electricity on a monthly basis. The NFL Films complex uses a lot of electricity — about 11 million kWh per year with the old machines. With these new machines, we should be under 10 million kWh this year, resulting in a 10% reduction."

Simple Design Enhances Reliability

The two 450-ton Smardt chillers have 5 Danfoss Turboacor compressors on each machine. "It's an amazingly simple design," said Rodney Moore, General Manager, at Tustin Mechanical Services. "With magnetic bearings and inlet guide vanes, the oil-free design translates into enhanced reliability and reduced maintenance." The chiller design includes variable frequency control. "This means that the machine consumes only the level of electricity that's required to meet the cooling need at a particular point in time," he explained. "Conventional machines have a big motor that's always running. With the Turboacor technology, you modulate the vanes for the refrigerant in order to achieve the level of cooling you need so you don't have the motor running all the time."

Quiet Running

Another feature of the Danfoss Turboacor compressor technology is that it enables the machines to run quietly. "They are significantly quieter," says Moore. "You can actually stand next to the machine and hold a normal conversation. Conventional machines are required to have vibration isolators. These machines don't require that. They are self-running, ultra-quiet and vibration free."

Remote Monitoring

The building automation system is tied into the chillers and can access all the data from the machines. "From a workstation you can look at the data and analyze performance," said Rauch. "A mechanic can log into one specific compressor, while the other four are running, and perform diagnostics to find out what, if anything, is wrong. If there is a problem with one of the compressors, it doesn't shut down the whole machine. The fact that you can replace a compressor on the machine while the other four are running was an important factor in our decision to go with the Smardt chillers."

Less Capacity Per Compressor Reduces Impact of Failure

"On the old chillers we had four compressors, two on each machine, with 25% of our capacity on each compressor," said Rauch. "With the Smardt chillers, we have 10 compressors, five on each machine. Now, instead of 25% capacity on each compressor, we have 10% per compressor so the impact of a failure on the operation is a lot less. This was also a deciding factor in choosing the Smardt chillers."

Easy Installation

No special foundation was required for installation of the chillers. "They just sit on the floor," said Moore. "It is incredible how simple the installation was from that standpoint." Tustin did all the piping and startup. "Marubeni allocated one week per machine to get them in and started up," said Moore. "However, the installation went much faster than expected. By day two we had the first machine on line producing chilled water. The installation of the second chiller was just as fast."

Eligible for Rebate

Because the oil-free, high-efficiency nature of the Turboacor compressor is environmentally attractive, NFL Films was eligible for a rebate offered by the state of New Jersey through its SmartStart Buildings® program. "Smardt submitted performance data," said Rauch. "SmartStart inspectors visited the site before and after the installation of the chillers. They saw how many kW of power were being used, calculated the efficiency of the machines, and validated that the machines do what the manufacturer says they do at different levels."

Best of Both Worlds

Marubeni's goal was to acquire reliable, energy-efficient chillers that would last 25 to 30 years. "With the Smardt chillers and their Turboacor technology, we believe that it's the best investment we could have made," concluded Rauch. "And with Tustin on board to maintain the machines, we believe we've got the best of both worlds."

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About Marubeni Group Marubeni Sustainable Energy, Inc. (MSEI) owns and operates renewable generation plants and on-site cogeneration for a wide range of utility, industrial and manufacturing facilities throughout the U.S. It is a subsidiary of Marubeni Corporation, headquartered in Tokyo, Japan. Marubeni Corporation is one of the world's largest companies and is involved in wide-ranging business fields. Marubeni is located in 71 countries with more than 5,000 employees worldwide and annual trading transaction volume in excess of \$80 billion.

About Tustin Mechanical Services Tustin Mechanical Services delivers high quality mechanical services in the areas of heating, ventilating, air conditioning, and refrigeration (HVACR) to building owners and managers. In 2005, Tustin Mechanical Services and Tustin Water Solutions became known as The Tustin Group to best represent its multi-market presence and expanded capabilities.

About NFL Films Winner of 95 Emmy awards, the Mount Laurel, NJ-based subsidiary of the National Football League is widely recognized as the most honored filmmaker in sports. NFL Films produces 1000 hours of original programming annually, for the NFL Network, ESPN, other NFL television partners, and for numerous clients outside of football.

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