

Sullair compressor systems supply high quality air for high tech paint plant

An innovative idea

In 1981, Ace Hardware Corporation accepted a big challenge when it decided to manufacture its own paint. Until then, Ace had handled private label paint merchandise in its 4,700 retail outlets across the country. Since paint accounts for 8 percent of the corporation's sales (which totaled more than \$1 billion in 1985), the manufacturing facility that Ace officials envisioned would produce the largest private label product category stocked in the stores. And since Ace Corporation is a co-op, with the corporation serving as a distribution system for individual member stores, Ace Paint Division would have to compete in quality and price with established paint manufacturers.

A state-of-the-art plant

Ace's decision to move into manufacturing included a commitment to build the most efficient plant possible. Completed in 1984, Ace Paint Division's multimillion dollar, 250,000 square foot facility in Matteson, IL, is a model of high tech automation.

The plant, which can produce 6 million gallons of paint a year with 38 hourly personnel operating in a single shift, has a gallonage output per employee that is more than four times the industry average. Ace expects to reach single shift capacity by the end of the decade. A total of 72 people work at the facility.

At the heart of the plant is a computer system that controls everything from delivery of raw materials to delivery of finished product. Since much of the equipment is pneumatically operated, a reliable compressed air system is essential.

How air is used

At Ace, air is used in three major ways: to operate the company's 90 diaphragm pumps, to convey dry powders and to operate packaging equipment. In addition, air is used for purging explosion-proof control panels.

Dry bulk raw materials (titanium dioxide, clays, calcium carbonate and mica) and liquids (slurries, latexes and additives) are unloaded from trucks and railcars by pneumatically operated equipment. Dry bulk is unloaded into silos and distributed to mixing tanks by a dense phase pneumatic system. Liquids are unloaded into storage tanks and distributed to mixing tanks by air diaphragm pumps, which also transport the blended paste to the final mixing area for reducing and shading, and convey it to the filling machines.

As cans are filled, they are conveyed through the packaging process into cartons, automatically palletized and stretch wrapped. Air is used to operate various functions on the filling, labeling and bailing machines; case packers; case elevators; palletizers and wrappers. Approximately 480 automatically controlled pneumatic valves convey the material through the mixing and packaging areas.

Two state-of-the-art compressor systems

According to Plant Engineer Dave Stewart, the Ace planning team recognized from the outset that large volumes of compressed air would be required for all phases of the manufacturing process. Since the air had to be clean and dry, they wanted the most advanced compressor system available. They specified Sullair.

That was in 1984, when the plant was being built. Four years later, when more air was needed, Ace Paint division again specified Sullair. "We use a lot of air-3000 cfm-and we use it from start to finish," Stewart said. "We have to be able to count on our compressed air systems. With Sullair, we knew we were getting reliable equipment."



Dave Stewart, Plant Engineer, and Joe LaRocca, Maintenance Electrician, check the Sullair Series 25, 24KT model rotary screw compressor at Ace Hardware Corporation's Paint Division facility in Matteson, IL.



The pigment storage area, showing part of the dense phase pneumatic conveying system for dry powders.

A Sullair system for dry, oil-free air

The first Sullair compressor system, installed in June, 1984, consists of two Series 32, 200 hp, 1000 cfm rotary screw air compressors; a 2000 cfm PSII refrigerated dryer; a 650 cfm PAR desiccant dryer; and filters.

This system supplies air for Aces dense phase dry bulk conveying of dry pigments and for instrument air used to purge electrical control panels. Stewart pointed out that the desiccant dryer provides the high quality air that is essential for handling dry powders. "Unless that air is dry and oil-free, the powders will 'cake' inside the lines," Stewart said.

The Sullair PAR regenerative desiccant dryer provides a continuous supply of dry compressed air. The Sullair PF filter removes liquid and solid particles of 0.3 micron.

A Sullair system for dry, contaminant-free air

The second Sullair system, installed in July, 1988, consists of a Series 25, 200 hp, 1000 cfm 24KT model air-cooled rotary screw compressor; a 1000 cfm PSII air-cooled refrigerated dryer a 1000 cfm PF filter and an EES heat recovery unit.

This system provides dry, contaminant-free air for Ace's diaphragm pumps and for the company's pneumatic packaging operation. The Sullair system was supplied by A-1 Air Compressor Corp., Addison, Illinois, one of Sullair's major distributors in the Chicago area.

24KT benefits cited

According to Dave Stewart, Ace specified the 24KT model primarily for two reasons: the 10-year warranty on the air end and the lower maintenance that could be expected. "The 24KT uses synthetic fluid, which requires no changing," he said. "Unlike petroleum-based oil, there's no varnish buildup in the air-operated switches, cylinders and pumps. I've used synthetics since they first came out," Stewart continued, "because they save fluid changes."

Stewart also likes the low maintenance and reduced downtime of the 24KT. Referring to compressor maintenance, he said, "Basically, we haven't had any." Admittedly the machine is just four months old, but Stewart doesn't anticipate anything more than routine maintenance down the road. "A synthetic fluid like 24KT virtually eliminates downtime in the pneumatic system," Stewart added. "It gives much more cycle life to component parts."

Series 25 cuts energy costs

Stewart noted that the new Sullair compressor has helped cut costs by reducing the amount of electricity required to operate the 90 diaphragm pumps. Much of the savings can be attributed to the internal capacity control system on the Sullair machine. This system, which consists of a spiral valve and an inlet butterfly valve, delivers greatly improved part load performance, especially when compared with compressors having suction throttling only.

The amount of air compressed is varied by rotating the spiral valve which opens and closes bypass ports in the stator and returns air to suction rather than throttling it. When there is no air demand, the pressure switch unloads the machine by allowing the blowdown valve to open. Receiver pressure is reduced, minimizing no-load power requirements to 25 percent of full load. By matching compressor displacement with output need, this energy-saving system can save as much as 17 percent power compared to suction throttling only.

Series 25 boosts production

Stewart also noted the increased production capacity that the compressor provides. "We've increased dry bulk flow by 20 percent," he said "This compressor allows us to handle materials through the diaphragm pump that are shear sensitive in positive displacement pumps."

EES provides comfort heating

The warmed air captured by the EES heat recovery unit installed on the compressor is used to heat Ace's rail car loading dock, which is equipped only with small auxiliary heaters. "We feel it's going to make the area more comfortable for our people. And we expect it to reduce dampness, which will help us speed up handling, too."

The Sullair advantage

"Basically, I've used Sullair products for 20 years, in four different plants," Stewart said, "and I've always had excellent service. Sullair people have been extremely helpful in working out solutions to specific problems, and the equipment has operated efficiently with relatively little downtime over the years. I've had difficulty coming up with a reason why I shouldn't buy Sullair."



Air diaphragm pumps are used to transport raw materials from storage tanks to mixing tanks, and to convey the blended paint products to the packaging area.



Machine operator checks the line as paint cans are automatically filled.



Entrance to the railcar unloading area, which is heated by warmed compressor air captured by the EES heat recovery unit installed on the new Sullair compressor.



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