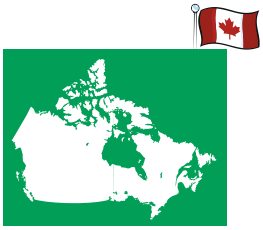
Powder creates one tough topcoat

Wanted! Electrical distribution enclosures with long lasting, scratch-resistant coating.

Found! Federal Pioneer switches and loadcentres and Square D capacitors with superb corrosion resistance (over 1000 salt spray hours), excellent finish quality, and scratch-resistance at the Schneider Electric Waterman plant's new leading-edge, automotive class, automated powder coating system!

Canada



Schneider Electric Waterman Plant
Toronto, Ontario

Electrical equipment metal enclosure powder coating

Graphic Magelis HMIs

Telemecanique
- **Modicon**
- **Compact PLCs**
- **Quantum PLCs**

Telemecanique Altivar 58 variable speed drives

Powder coating system improves productivity and quality

The compact, roll-on/roll-off spray booths facilitate quick colour changeovers.

"Our customers want products that are durable, attractive, scratch-resistant and long lasting," says Alan Dickinson, Schneider Electric's Vice President, Operations. "Powder coated finishes provide these attributes because they are more resistant to chipping, scratching, fading and wearing than other finishes and are economically feasible."

The new powder coating operation addresses other key concerns: it reduces environmental waste, improves productivity and has been built to accommodate future growth.

When Schneider Electric began planning the new powder line, they had two objectives to meet: to improve enclosure corrosion resistance and appearance, and to increase output from 4 million to 6 million square feet of electrical equipment enclosures per year.

Federal Pioneer
Merlin Gerin
Square D
Telemecanique

Schneider Electric

The new line has exceeded expectations.

The seven-stage pretreatment system has helped improve corrosion resistance on parts.

"The new powder coating system has significantly improved quality and productivity and has virtually eliminated air emissions from our topcoat process", Mr. Dickinson says." We're also realizing significant cost savings in materials, energy, maintenance and waste disposal."

Schneider Electric has increased the life of indoor and outdoor electrical equipment enclosures to more than 1000 salt spray hours, in excess of Canadian Standard Association (CSA) requirements of 200 hours for indoor and 600 hours for outdoor electrical equipment enclosures. It has also increased line speed from 8 to 12 feet per minute, which in turn has boosted annual output to 6 million square feet of metal.

The use of powder coatings is an environmental benefit in itself, but Schneider Electric has gone further by cutting waste and waste disposal costs. A closed loop rinse water recovery system has eliminated more than five million imperial gallons of sanitary sewer discharge waste.

High efficiency system is packed into a small footprint

The powder coating line has been laid out and configured to minimize its footprint within very limited plant space, and to ensure that all processes are tightly integrated. Reliable operation is enhanced by three leading-edge control systems, which include network-ready Schneider Electric Quantum and Compact PLCs; Graphic Magelis touchscreens; a Telemecanique Altivar58 variable speed drive; and a thermocouple input card. With the exception of the standalone powder booth and waste treatment systems, the paint system is controlled from a central location. To facilitate trouble-shooting, this central system features annunciation of conveyor emergency stop locations, pressure switches (which prove motor loads) and burner safety controls (which are also monitored). Safety is maximized with conveyor interlocks for the fire alarm system, infrared oven, powder booths, waste treatment system and chemical metering pumps. Even temperature profiles are maintained with advanced PID temperature controls for washer heat exchangers and oven burners, and oven and washer graphing for real-time HMI viewing.

The pretreatment tanks and pumps, located under the mezzanine, supply chemical solutions to the wash.

To save space, the washer housing, dry-off oven, cooling tunnel and most of the boiler water recirculation system are elevated on a mezzanine, sitting directly above the wash tanks. The heating, ventilation, air conditioning (HVAC) system and air make-up unit are roof-mounted.

Roll-on/roll-off paint booths allow quick colour changeovers

Advance Process Equipment Ltd., of Mississauga, Ontario, designed the line. Parts are conveyed through the plant on a 1,000-foot long, four-inch I-beam conveyor that runs at 12 feet per minute, designed and supplied by Canadian Industrial Conveyors, of Milton, Ontario.

The new operation consists of a seven-stage zinc phosphate system, and was designed with a non-chrome seal. PPG Chemfil Canada, of Windsor, ON, supplied the pretreatment chemicals, wastewater/ion exchange regeneration treatment chemistry, and maintenance products. "Chemfil was an integral part of the design process",

explains Mr. Dickinson. “Their product quality, service and support have guaranteed a smooth launch.”

Parts pass through a dry-off oven, a cooling tunnel and into the powder spray booth.

The powder application process is enclosed in a 3,400 square foot cleanroom that maintains a temperature of 72ºF. Two roll on/roll off ITW Gema Vortech powder spray booths are each equipped with 10 automatic electrostatic guns on rotary oscillators and one manual touch-up gun. The booths are built with Gema’s mini cyclone system that is capable of multiple colour recovery with virgin feed.

Gema’s powder coating system incorporates a vertical triggering zone and independent in/out gun position for either side of the booth. Each booth is controlled independently by a Compact PLC. A modem connection allows Gema’s control service group to remotely interface with the PLCs through an analog phone line from anywhere in the world to troubleshoot or enhance booth performance.

Says Mr. Dickinson, “We like Gema’s compact and flexible, pre-plumbed and pre-wired spray booth design and the roll-on/roll-off concept for quick colour changeover; the high performance spray guns (that feature self cleaning and fewer components to minimize parts inventory and maintenance); and user-friendly operator interfaces.” Equally important were Gema’s five-year service warranty and the system’s ability to reclaim and reuse powder, minimizing powder consumption and controlling material costs.

Based on their past performance and service, Protech Chemicals, St. Laurent, QC, was selected to supply the hybrid (epoxy/polyester) and TGIC polyester coatings. The hybrid coatings are used on products for interior use and the TGIC polyesters are used for products for exterior use that require additional durability.

The spray booths, controlled by Compact PLCs and Graphic Magelis operator interfaces, have a mini cyclone system capable of multiple colour recovery with virgin color feed.

Waste treatment system creates eco-friendly operation

As governments continue to tighten air and water regulations, companies are paying closer attention to waste discharge through stacks or sewers. Schneider Electric is no exception. “Powder coatings are one way Schneider Electric has transformed our plant into an eco-friendly operation which is very important to us”, says Sherry McKay, Safety, Maintenance and Environment Manager of Schneider Electric’s Waterman plant.

The closed loop, ion exchange waste treatment system was designed and installed by Kontek Ecology Systems Inc., Burlington, ON. “We liked Kontek’s leading-edge technology and their ability to custom-design the system to meet our rigorous environmental specifications”, says Mr. Dickinson. “Their knowledge of water treatment and of our phosphating process facilitated interlocking the washer, reverse osmosis and ion exchange systems.”

The system removes cations (iron, nickel, zinc, sodium, calcium, etc.) and anions (sulfates, phosphates, chlorides, etc.) from process rinse waters. Treated water is reused in the rinse stages of the pretreatment washer and for final rinsing of the parts.

The treatment process is initiated automatically or manually from the

The eco-friendly waste treatment process, controlled by a Quantum PLC, is initiated automatically or manually from the Graphic Magelis operator interface.

continued on the next page

Pretreatment process waste is chemically treated and produces a filter cake for disposal.

Graphic Magelis operator interface. Process sequencing is controlled by a Quantum PLC.

Waste from this process is chemically treated and produces a non-hazardous filter cake for disposal. The clear effluent is manually tested for verification of sanitary sewer compliance and processed through a second filter prior to disposal.

Waste is pumped to a bulk storage tank and subsequently transferred to the batch treatment system.

To avoid ground contamination, Epoxy Solutions (Mississauga, Ontario) coated the pretreatment and waste treatment flooring, trenches and pits with a secondary containment membrane. They also supplied and installed the epoxy floor coating in the clean room and adjacent area. Industrial Plastics, Inc. (Mississauga, Ontario) lined the process pits with fibreglass.

ISO 14001 Registration shows strong commitment to environmental stewardship

Schneider Electric's determination to create an eco-friendly operation at the Waterman plant resulted in obtaining an ISO 14001 registration in 2002.

An international standard for environmental management systems, the ISO 14001 registration indicates that the plant conforms to all applicable federal and provincial environmental regulations and permits involving air, water and solid waste control. External auditors were particularly impressed with the plant's preparation, employee knowledge and corporate support. All plant employees receive ongoing training in the environmental management system, including a review of their leadership's commitment, and of Schneider Electric's environmental policy procedures and practices.

"Our plant has always had a strong commitment to environmental compliance and stewardship", observes Ms. McKay. "Obtaining ISO 14001 registration – following nine months of plant-wide training and preparation – reflects Schneider Electric's commitment to achieving world-class environmental management systems." Management has encouraged all plant employees, contractors and suppliers to take personal roles in achieving environmental quality. Indeed, the plant's suppliers are required to know and observe the plant's ISO 14001 practices, and are encouraged to incorporate ISO 14001 principles into their own businesses.

Concludes Mr. Dickinson, "The new powder line has improved productivity and quality while creating an environmentally sound system."

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