Switch to Alkaline Non-Cyanide Zinc Pays Off

Premier reduced reject rates to less than one pct and doubled production...

For 23 years Premier Manufacturing Corporation, Cleveland, Ohio, has been plating wire products with zinc cyanide. These products are used in air conditioning units by companies such as Carrier, York and Granger.

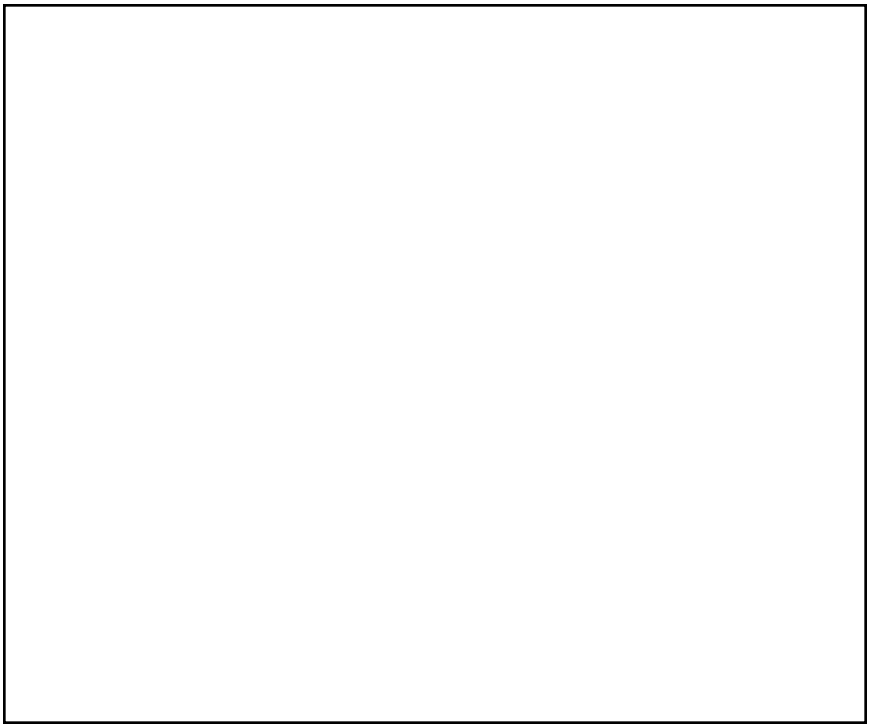
However, the company experienced problems with the zinc cyanide plating baths. It was difficult to decrease carbonates, and it was expensive to purchase and dispose of the bath. Also, the company experienced burning and other production problems. Nick Kaplafka, project engineer, was assigned to design a process to treat the carbonates as well as solve the other problems.

NICK KAPLAFKA, project engineer, shows plated parts.

Searching for a solution. Hull cell tests were performed on Premier's cyanide bath to determine how it could be improved. The company also had two other options: convert the bath to a non-cyanide alkaline zinc plating bath or an acid chloride plating bath.

As part of his search, Mr. Kaplafka was also searching for a better way to achieve the required 0.5 mil overall thickness on the wire parts.

Premier researched several non-cyanide plating baths before it chose



PARTS ENTER the alkaline cyanide-free plating tank

COLZINC ACF-II alkaline non-cyanide zinc process from Columbia Chemical Corp., Brunswick, Ohio. Mr. Kaplafka decided that the alkaline non-cyanide process achieved the company's major goal of consistent plating distribution.

The switch. Prior to the switch, the company loaded a maximum of 96 pieces per bar, to minimize burning. With the new process, it has nearly doubled its load to 160 to 200 pieces per bar. In conjunction, the reject rate has decreased to less than one pct.

Mr. Kaplafka explained, "We used to have 36 zinc baskets of parts and sometimes we had to use dummy bars because of burning problems. Now, we are depleting zinc so rapidly that we use 70 baskets. We are able to place parts right next to the anodes without any high-current-density burning.

Today, instead of plating four to five bars per hr, the company runs 10 bars per hr. Cycle time has decreased from 40 to 20 min.

The process also allows for plating at elevated temperatures with good results. "We used to plate with a maximum current of 3,500 amps on a

TABLE I — Production Steps at Premier

1. Soak Cleaner, eight to 10 min at 170F
2. Electroclean, 1,500 amps
3. Fresh water spray rinse
4. Pickling
5. Fresh water spray rinse
6. Alkaline non-cyanide zinc plating, 20 min
7. Fresh water spray rinse
8. Bright dip or yellow chromate
9. Fresh water spray rinse
10. Water-borne lacquer coating

generator, 500 of which went to the electrocleaning tank, and we still had burning," said Mr. Kaplafka.

Following the plating process conversion, the company also switched to a new alkaline cleaner. Pickle Pal™ inhibitor was added to the pickling tank to eliminate foaming and gassing when parts are lowered into it. According to Mr. Kaplafka, "We used to stop putting parts in the pickling tanks near the end of the day. Now we can leave the part in overnight with no metal degradation or hydrogen buildup. We are ahead of the game in the morning."

The company has also severed the generator connection between the zinc tank and the electrocleaning tank and installed a separate rectifier. A chiller maintains bath temperature at 85F. Up to 7,500 amps can be used in the zinc tank with no burning. An additional 1,500 amps are used for cleaning.

To assist in quality control, a minilab was installed to check bath concentrations weekly. The new system eliminated the need for large, manual chemical additions. The plating had not been consistent to enough to predetermine how much chemical to add, so Premier relied on the operator's visual inspection. Chemicals are metered in and chemical consumption has decreased significantly.

Until two years ago, the company employed two shifts each day, six days a week. Today, employees complete the same amount of work in two eight-hour shifts, five days a week.

Two years ago the company had metal bins full of stocked, unplated parts. There was no floor space in the warehouse. Now the company plates faster and always has floor space to stage ready-to-plate parts.

More Information?

To obtain more information on products or processes mentioned in this article, circle corresponding numbers on the Reader Service Card.

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