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SCRAPBOOK SNAPSHOTS

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How a manufacturer of housewares and commercial food service equipment achieves consistently high-quality plating

Filtration, regular replacement of cleaning solutions, good rinsing, solution recovery and reuse, and a number of maintenance and control practices in its electroplating operation have saved money and improved quality for Dripcut Corporation, Goleta, California.

Dripcut manufactures housewares such as salt and pepper shakers, sugar dispensers, napkin holders, creamers, and syrup pourers. The syrup dispensers have the familiar blade that slides forward to cut off the last drip, which explains how the company got its name.

Preplate Finishing. Most of the parts plated are Zamac (zinc plus 4% aluminum) die castings. Stamped brass and rolled steel parts also are finished on the same line. All require mechanical smoothing and deburring prior to plating.

Equipment in the preplate finishing department includes a 3 cu. ft. round bowl vibratory finishing machine made by Roto-Finish Company, a 13 cu. ft. round bowl and 2 tub-type vibratory finishers made by Electro-Deburring Co., 3 Grav-i-Flo spindle finishing machines, and automatic and hand polishing and buffing equipment.

The spindle finishers are used mainly for the Zamac castings although some of these parts are vibratory finished. Hand polishing is used to reach inaccessible areas missed in spindle finishing.

Besides the housewares and commercial food service products, Dripcut is also in the business of manufacturing replacement parts for classic and collectible automobiles. Doing business for Moss Motors, Ltd., a sister company, the firm turns out 'better than original' replica parts for cars made by MG, Austin-Healey, Jaguar and Triumph. These parts — bumper sections, wheel covers, trim pieces, headlight rings, etc. — are carefully polished, buffed and plated in the same facilities as the housewares.

Plating Machine. Brass, steel and Zamac castings are plated on the same machine, a 50 ft. long Udyllite Cyclemaster return-type machine. It has 24 tanks and 72 stations. The plating cycle is as follows:

Soak Clean. MacDermid SU-486, 160°F, 5 minutes. Air agitation.

Ultrasonic cleaning. MacDermid SU-486, 130°F, 30 seconds. Tank is fitted with Branson ultrasonic transducers. Agitation by up and down cathode rod movement.

Reverse Electroclean. MacDermid EN-1751, 130°F, 30 seconds. Air agitation. Voltage: 3 for brass parts; 5 for zinc (Zamac).

Rinse. Room temperature, 30 seconds. Air agitated. Overflowed at rate of 0.75 GPM.

Acid Dip. MacDermid M-629, room temperature, 30 seconds. Air agitation and cathode rod agitation.

Rinse. Room temperature, 30 seconds. Air agitated. Overflowed at rate of 0.75 GPM.

Cyanide Copper Strike. 2 stations, one minute, 120°F. Bath made up with M&T Chemicals' Rochelle salts. Current density: 50 asf. Anodes: oxygen-free copper slabs.

Cyanide Copper Plate. 5 stations, 5 minutes, 140°F. Air agitation. M&T Chemicals' Copperlume II. Anodes: oxygen-free copper slabs.

Rinsing. Following cyanide copper plating there is a drag-out rinse that is periodically returned to the plating tank. This is followed by an overflowing rinse. Dripcut plans in the near future to install a triple counterflow rinse with an evaporation unit on the first rinse for recovering copper solution.

Acid Dip. One station, 30 seconds. 2% by volume sulfuric acid.

Semi-bright Nickel Plate. 11 stations, 11 min., 135°F. Air agitation. M&T Perma-Lume G. Anodes: INCO S Rounds in titanium baskets, cotton bags.

Bright Nickel Plate. 9 stations, 9 minutes, 135°F. Air agitation. M&T Formula 1. Anodes: INCO S Rounds in titanium baskets, cotton bags.

Rinsing. Triple counterflow with drag-out recovery at first tank.

Chromium Plate. 2 stations, one minute, 110°F. M&T Lumachrome.

Rinsing. 6 station counterflow rinse line. Chromium recovery unit connected to fourth rinse tank.

Dryoff. Oven with air blow-off.

Bill Flewellyn manages the plating department at Dripcut. He takes pride in practices and procedures that he has instituted that have resulted in better quality and significant cost savings.

Preventive Maintenance. Mr. Flewellyn stresses the importance of excellent cleaning. That's why the plating line has soak cleaning, ultrasonic cleaning and electrocleaning.

"Cleaning baths lose their effectiveness as they become loaded with dirt and contamination. So we dump and replace our soak cleaner every other month. On the alternate months we dump and replace one-half of the tank volume. We change our ultrasonic cleaning and electrocleaning tank and acid tanks every other day," Mr. Flewellyn explains.

To ensure good nickel plating, anode bags in the semi-bright and bright nickel tanks, 210 bags in all, are replaced every six months. "An anode bag has porosity that allows metal ions to get out and into the plating solution. Yet many platers will allow their anode bags to become completely encrusted to the extent that the ions have no way out. Then problems occur and the plater wonders why. We prefer to buy inexpen-



Dripcut Corporation is a major manufacturer of products used in the food service industry. They are electroplated for durability and appearance.

sive cotton bags and change them frequently, preventing problems before they occur." Mr. Flewellyn says.

Computer Control. At Dripcut a computer is used to control solution temperatures. The result has been more precise control of the temperatures and this has led to significant energy savings. Mr. Flewellyn learned from the computer record just how long heaters were on and if and how long it took solutions to come to temperature. He was then able to make small adjustments in the settings to get more efficient use of the heaters. Through using this computer he was able to determine to what extent loads of different metals or parts absorb heat from the solutions. Now the computer can take this into account and control the heaters according to the workloads being processed.

In the first month of its operation, the computer control resulted in a 23% reduction in electric usage. Now lights, compressors and other electric devices have been tied into the computer controller. "If the last worker out forgets to turn off the lights, he won't have to worry about returning to the plant to do it. The computer will take care of it," Mr. Flewellyn says.

Filtration. Not only does Bill Flewellyn believe in clean cleaners, he also wants his plating baths to be very clean. SERFILCO filtration units were recently installed on the cyanide copper strike, cyanide copper plate, semi-bright nickel and bright nickel tanks. Previously, Dripcut's plating line had a bag filter and three cartridge filters. "Keeping the old filters working properly required a great deal of labor for cleaning and maintenance. We had reached the time when we had to upgrade filtering capacity," Mr. Flewellyn recalls.

The cyanide copper strike bath uses a 30-inch, single chamber filter with 10 inches of carbon and 20 inches of three micron, disposable type filter media. Mr. Flewellyn wanted the filter and carbon treatment unit on the strike solution to remove the organics that are brought in with the cleaners. "The strike is the most important plating step," he cautions. "If you don't have good adhesion of the copper strike, you won't have good adhesion of the subsequent plates. Because of the filtration, the copper strike bath is as clean now as it was when it was fresh. And it's giving the adherent plate that we must have."

The cyanide copper bath is filtered through a single chamber unit containing 12, 30-inch filter tubes rated at 5 microns holding capacity.

The nickel tanks each have single chamber units with 12, 30-inch filter tubes and a seven pound carbon pack. In addition, the filter for the bright nickel has an extra 14 pound carbon pack in a secondary filter. This is designed to remove brightener breakdown products resulting from the relatively high current densities used, approximately 90 asf.

Tank turnover rates in filtering the plating solutions are important in maintaining clean solutions and avoiding plate roughness. At their 2800 GPH flow rate the filters provide tank

turnovers of two times per hour on the cyanide copper strike, 5.6 times per hour on the cyanide copper plating tank, 2.5 times per hour on the semi-bright nickel solution and 2.9 times per hour on the bright nickel.

The filter cartridges have high dirt holding capacity. They are not cleaned, but replaced on a regular schedule. According to Mr. Flewellyn, the new filters have helped the company save money in three major areas: lower labor costs for filter cleaning; lower replacement cartridge costs; and reduced rejects. He has calculated the total savings to be over \$90,000 per year.

Metal Conservation. Dripcut uses dragout rinses as a way to recover plating solution for reuse. One such dragout rinse tank follows cyanide copper plating. Another dragout rinse follows bright nickel plating and is the first of three tanks in a counterflow arrangement. It works as follows:

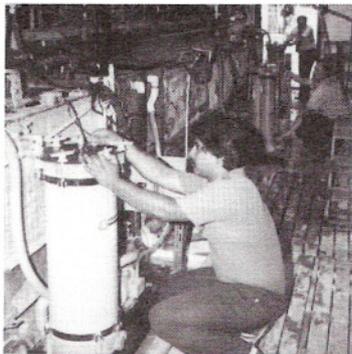
Fresh water enters the third rinse tank at a rate of 0.75 GPM. Tank three flows to tank two and tank two flows to tank one, the dragout rinse tank. Dragout rinse solution from the first tank is sent to the bright nickel tank at the rate of 0.5 GPM. A titanium electric bottom heater in the dragout tank evaporates water at the rate of 0.25 GPM to balance the flow through the counterflow system. An evaporation unit reduces the volume of the bright nickel solution by 0.5 GPM.

Recovering and reusing dragged out bright nickel plating chemicals has reduced the frequency of brightener additions from every 4,000 amp-hrs to every 5,000 amp-hrs. This has saved about \$4,000 annually, Mr. Flewellyn claims.

Chromium recovery is accomplished by an Innova ChromeNapper unit fed from the fourth rinse of the six-rinse line after chromium plating. The chromium solution concentrate goes to the plating tank. Water from the recovery unit is returned to the fourth rinse tank.

Quality First. Dripcut is concerned more with good adhesion, coverage and appearance of its electroplating than with thickness alone. Most of the plated parts come into contact with aggressive, corrosive foodstuffs — salt, fruit juices, pancake batter, syrup and milk, the latter being quite corrosive to zinc. So if there are voids or plate failures where these foods can contact the substrate metal, failures will occur, product life will be shortened and the customer will be displeased.

Dripcut is proud of the quality products it produces. Bill Flewellyn runs the plating department with the goal of maintaining consistent quality through attention to cleanliness of the operating solutions and well conceived maintenance and control procedures. His efforts are paying off, keeping Dripcut a leader in the commercial food service equipment and housewares industry.



Worker checks one of the filters located next to the plating machine at Dripcut Corporation. Improved filtration has saved money and reduced rejects.

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