

## CASE STUDY

# A Space Age FDA/USDA Compliant Metal Coating Extends Release Properties Of Multi-Metal Chocolate Extruders From 40 Hours To More Than Two Years

*By Corey Wesnitzer, General Magnaplate Corp.*

If the operation of a real-life candy processing facility were as delightful and exciting as that run by the fictional hero Willy Wonka, there would be little need for magazines such as Food Manufacturing or experts in troubleshooting candy processing operations. Unfortunately (or fortunately, depending on your perspective), decidedly unglamorous production challenges can arise. When they do, it is up to people like Harry Henderson of Gertrude Hawk Chocolates in Dunmore, Pennsylvania, and Wayne Cromwell of General Magnaplate Corporation in Linden, New Jersey, to tackle the challenges and assure the consistently high-quality production of chocolate-based specialty candies.

### **Chocolate Began To Stick After Only 40 Hours**

For Gertrude Hawk's Department Supervisor Henderson, one such challenge involved the company's enrobing process, which Henderson describes as "looking like a waterfall of chocolate."

Look more closely, though, and what you discover is an extrusion unit composed

of multiple metals - steel, aluminum and brass - that forms and sizes the chocolates. The extruder has two rollers - one running clockwise, and the other counter-clockwise. The confection is extruded through dies and is sliced at pre-determined lengths by metal fingers.

When Gertrude Hawk originally purchased the equipment it was coated with Teflon®. And when the Teflon® began to peel, Henderson became concerned. "Good release properties are critical to the enrobing process. When we began to lose the coating, we also began to lose the release because we were getting down to the bare metal."

To try and solve the peeling and release problems, Gertrude Hawk tried two different metal coating companies. Both were unable to tackle the problem successfully. "They would recoat the parts, but we would still get peeling within 40 hours, and the dies would again begin to show release problems," says Henderson.



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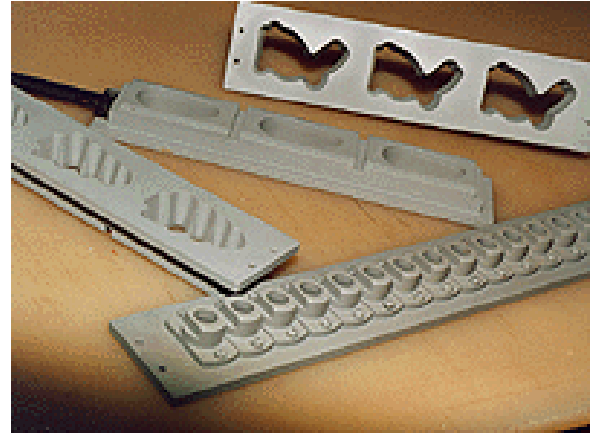
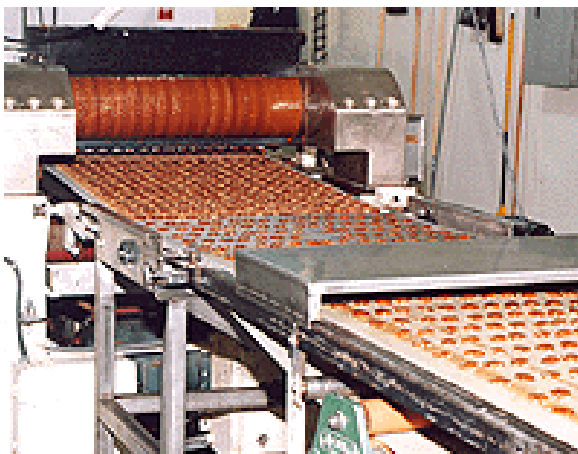
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### Finally, An Enhanced Composite Coating Did The Trick

Henderson then turned to General Magnaplate's eastern region operations manager Wayne Cromwell to help solve the peeling and release problem. Cromwell's solution was to coat the extrusion dies and fingers with Magnaplate's PLASMADIZE® FT-4.

As Cromwell explains, "PLASMADIZE FT-4 is a 'synergistic,' multi-step, composite coating that enhances resistance to corrosion and wear, producing a surface with lifelong dry lubricity. Release has shown to be excellent up to 500°F."

A true composite coating, PLASMADIZE FT-4 is compliant with the FDA, and approved by the USDA for food contact surfaces. It is made up of a matrix of high-tech materials including metals, ceramics, polymers and dry lubricants applied either simultaneously or in as many as three sequential process steps. The resultant surface is superior in performance both to the base metal and to the individual components of the PLASMADIZE coating. That's why it is called "synergistic."



### Over Two Years Of Success, Instead Of Forty Hours

The results have been excellent, as Gertrude Hawk Chocolates' experience with extrusion dies and fingers have shown. Reports Harry Henderson, "After coating with PLASMADIZE FT-4, our extrusion dies performed beautifully. No peeling. No bare metal. No release problems at all. That was over two years ago and those extruder dies and fingers are still exhibiting excellent on-the-job performance."

And there's a bonus to working with Magnaplate, Henderson reports: "An important extra that comes with General Magnaplate technical expertise is the support the company offers. Wayne Cromwell works extremely well with us on coating and engineering matters. With Wayne and the Magnaplate team you can be certain that it's not a one-shot deal. You know that if you have problems, they'll take care of you."



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## Background Data

### Space Age Coating Technology Brought Back To Earth

Founded in 1952, General Magnaplate pioneered the science of metal surface enhancement, coating a wide variety of parts on spacecraft and space exploration equipment used in every single NASA space mission since the beginning of the agency. And at surface enhancement Technology Centers in New Jersey, Texas, California, Wisconsin, Canada, and licensees around the world, Magnaplate coatings enhance metal surfaces used in just about any application imaginable.

Today, General Magnaplate continues to meet exotic challenges of space, but it also tackles down-to-earth challenges such as those presented by Gertrude Hawk Chocolates' extruders. In the food processing industry, for instance, Magnaplate coatings have also treated engraved cookie rolls, pasta making machines, meat packaging equipment, dry ice makers, PET bottle molds, doughnut extrusion nozzles, beverage pallet loaders, butter-pat machines, dried food grading equipment, muffin pans, and potato chip processing equipment.

Wherever metal parts are used to handle, process, or package food or beverage products, design engineers are looking for ways to achieve greater resistance to wear, abrasion, corrosion and chemical attack, as well as to provide dry lubrication, mold release, ease of sanitary maintenance and solution disposal by eliminating chemical sanitizers in favor of simple rinsing, and many other performance characteristics. Magnaplate has been leading this field for over four decades.

In the chocolate enrobing process, rollers turn clockwise and counter clockwise, sending confection through extrusion dies, forming and sizing the individual pieces of candy, which are deposited on the conveyer belt. A gray metal box above the roller houses the extrusion components coated with Magnaplate's PLASMADIZE® FT-4.

Although re-coated with Teflon®, these extrusion dies - forming chocolate in the shapes of Christmas trees, Easter eggs and bunnies - began exhibiting release problems in only 40 hours. After coating with General Magnaplate's PLASMADIZE® FT-4, the dies have been performing well for over two years.