
Chocolate Enrobing: Troubleshooting

I would like to highlight certain points that are particularly relevant to the use of chocolate for enrobing.

Since it was discovered that food pieces could be coated with chocolate as a way of creating new and wonderful taste sensations, candy makers have accumulated a wide variety of shapes, sizes, textures and recipes for articles to be coated. Some pieces are tall and pointed with steep, sloping sides, such as creme drops, which shed chocolate relatively easily. Others are short with large, smooth, flat surfaces, like peppermint patties, or with detail in the top surface, like a marshmallow santa or snow "person," requiring a

relatively fluid coating to allow the design detail of the article to be recognized and enjoyed by the consumer. There are also nut clusters, which need a coating fluid enough to flow into all those small holes, but thick enough not to flow back out. The shape of the center is definitely a factor in specifying chocolate viscosity.

The size of a piece affects the requirements for cooling time, as it takes longer to cool and crystallize a piece of larger mass. A 1.25 oz cream egg, for instance, may require a 10 minute tunnel, while a 0.5 oz piece may set adequately in less than 6 minutes in the tunnel.

The composition of a center, i.e., the recipe, and the way it is formed, can also create challenges for the enrobing department. Loose coconut shreds or nut meats can accumulate in the enrober chocolate and contaminate the chocolate with their incompatible oils, or just thicken the chocolate due to the increase of solids. Higher moisture centers, such as marshmallow or those coconut shreds mentioned, tend to lose moisture to the chocolate in the enrober, causing a thickening. Excess starch dust on a mogul-cast piece can rinse off the centers and tend to thicken the chocolate at the curtain. These factors all affect the enrobing chocolate negatively.

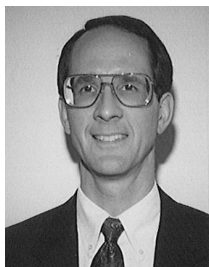
An accurate and concise definition of chocolate is "an intimate mixture of solid particles suspended in fat."

Because fat is the continuous phase of this mixture, though it is not the major portion, chocolate has physical properties more similar to the fat portion than to the solids. It melts and it hardens like a fat. By regulation, the primary fat in chocolate is cocoa butter, which of course must be tempered to achieve desired crystal formation and product functionality.

It is, in fact, the need to temper that is the primary cause of the trials and tribulations of enrobing with chocolate, versus enrobing with other coatings.

The exact temperatures at which those crystals form and melt vary depending on the variety of cocoa bean used and conditions of growth, the manufacturing processes used to prepare the butter and the recipe for the chocolate, including the amount and proportions of fats used. Of particular significance is the ratio of dairy fat to cocoa butter. The enrobing department must be aware of the potential need to adjust operating parameters to compensate for these variables. This is where the reliability of the chocolate manufacturer and his process controls are critical to minimize unexpected changes in tempering conditions.

The extreme importance of the exact flow characteristics of a chocolate to its effective use has been discussed in other papers. It must be clearly understood that a recipe must be written, a process for manufacture must be chosen and ingredients must be selected before a chocolate can be made. Then, an ardent persistence must be applied to combine those ingredients and operate that process to the specifications of that recipe, day after day, lot after lot. It is recipe, process and repeatability that establish the untempered viscosity and the yield value of a chocolate. And these are the measures of the inherent flow properties of a chocolate, which determine its suitability for a specific use. Once these criteria have been met, it is up to the enrob-



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