Table 20.7 Chocolate recipes for dipping and enrobing high quality ice cream and frozen confectionery.

Ingredient	Real milk chocolate (%)	Real dark chocolate (%)	Real white chocolate (%)
Sugar	42	39	40
Skimmed milk powder	9		15
Full cream milk powder			
Milk fat	7	7[a]	8
Cocoa mass	8	39	
Cocoa butter	33.4[b]	14.4[b]	36.4[b]
Lecithin	0.6	0.6	0.6
Normal approximate total fat content	44.4	42	44

The above recipes can also be used for disc spraying, but for nozzle spraying replace a total of 5% of the sugar and skimmed milk powder with 5 % cocoa butter or CBE (cocoa butter equivalent).

[a] If regulations allow, if not replace with cocoa butter.

[b] 10% or more of the cocoa butter can be replaced with other vegetable fat, normally soft coconut oil, where regulations allow. The labelling will usually need to be changed to, for example: "chocolate with added vegetable fat".

if the chocolate is used for air or airless spraying. Recipes, including real chocolate, that are suitable for dipping and enrobing high quality ice cream and frozen confectionery are shown in Table 20.7.

White chocolate or coatings should always be stored in stainless steel containers and transported using stainless steel pumps and pipe work. The container water jacket temperature must be kept below 45 °C (113 °F) or "browning" of the white chocolate will occur.

The example of a milk chocolate recipe with added vegetable fat is "softer" at frozen temperatures and "cracks" less on the product and at the point of consumption. If local regulations do not allow the addition of vegetable fat (coconut oil, or similar soft fat) it can normally still be used, but with a description such as "chocolate flavoured" coating. The chocolate can be made as normal, but up to 20% of coconut oil is added at the point of use.

20.4.3.1 Chocolate flavour coatings for enrobing and dipping

The main fat used for ice cream coatings is coconut oil or a similar soft vegetable fat with a slip point (Chapter 7) of approximately 18–24 °C (64–75 °F). The percentage of fat in chocolate flavoured coatings suitable for the frozen food sector is in a range from 45% for cone spraying to 65% for thin layer enrobing and dipping. Recipes suitable for enrobing and dipping medium quality ice cream and frozen cake products are presented in Table 20.8. If it is necessary to make the milk recipe more "creamy", up to 5% of coconut fat can be replaced with milk fat.

Table 20.8 Coating recipes suitable for enrobing and dipping medium quality ice cream and frozen cake products.

Ingredient	Milk chocolate flavoured coating (%)	Dark chocolate flavoured coating (%)
Sugar	35	40
De-fatted cocoa powder	4	10
Skimmed milk powder	7	
De-mineralised whey powder	4	
Soft coconut fat	49.4	49.4
Lecithin	0.6	0.6
Approximate total fat content	49.4	49.4

For air or airless (disc) spraying of wafer cones or an ice cream barrier spray, an even thinner coating is needed, which means having even more fat. A typical recipe might have a total of 60% fat of which 56% might be coconut oil, with the remaining 4% being milk fat. Other ingredients could be 26% sugar, 7% skimmed milk powder and 7.5% de-fatted cocoa powder. If there is a problem of moisture permeating through the chocolate or chocolate flavour coating layer, it is advisable to omit the lecithin and adjust the viscosity with the addition of extra fat.

20.4.4 Bakery and biscuit products (including chocolate chips)

For many years, only chocolate flavoured coatings were used for cake products due to the warm atmosphere in bakeries, the exception being the Sacher Torte of Vienna with its very high butter oil content, which makes it cuttable at room temperatures, and the half and fully enrobed biscuits and chocolate chip cookies, which came via the United States to Europe.

Using real chocolate on cakes requires a reasonably soft chocolate, which can be easily cut without splintering at room temperature. The trick is to use a normal medium soft chocolate and add 3–4% milk fat to the milk chocolate and up to 8% of milk fat to plain chocolate. Very little white chocolate is used for cakes, due to its sweetness. Typical milk and dark recipes for enrobing a sponge cakes, gateaux or Swiss rolls are given in Table 20.9.

Owing to their high milk fat content, these chocolates need to be tempered approximately 1 °C (2 °F) lower than normal chocolate and the cooling tunnel dwell time may be 2–4 min longer than a normal confectionery product.

20.4.4.1 Half coated or fully enrobed biscuits

A medium hard, relatively fast setting, chocolate is desirable for two reasons:

1. Most biscuit plants run at a much faster speed than confectionery systems so fast setting is required.
2. To stop the half coated or enrobed biscuits from sticking together as they are packed.

Typical recipes for enrobing or half coating biscuits are given in Table 20.10.