

Tempering Chocolate

Basic Tempering Principles

The process of tempering chocolate involves incorporating a small amount, typically 2-4%, of solid, stable cocoa butter crystals into melted chocolate. Cocoa butter is capable of solidifying into several different polymorphic forms that, as they cool and set, affect the surface finish, setting time, snap, and mouthfeel of the chocolate. It is important that the cocoa butter crystals in tempered chocolate exist in the correct polymorphic form; we call these stable cocoa butter crystals. The objective in tempering is to crystallize a small amount of the liquid cocoa butter into small, stable solid cocoa butter crystals. When the tempered chocolate is solidified, these seed crystals will encourage the physical “packing” of stable cocoa butter in the remaining liquid fat phase.

The three critical variables that affect the type, size and number of cocoa butter crystals being formed during chocolate tempering are: temperature, time and agitation.

1.

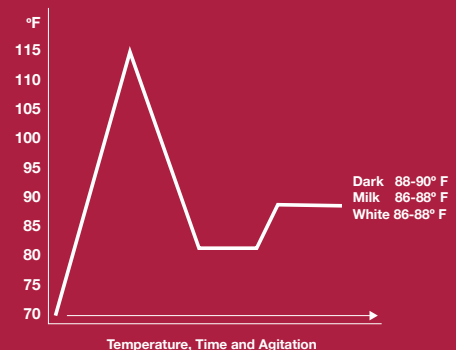
Temperature – critical because cocoa butter crystals both form and melt at specific temperatures

2.

Time – necessary for cocoa butter crystals to form and grow

3.

Agitation – needed to ensure the cocoa butter crystals are well distributed within the melted chocolate and to prevent their premature growth



Stable cocoa butter crystals will provide the following properties:

1. Snap
2. Gloss
3. Proper texture
4. Bloom resistance
5. Good contraction for moulding

Chocolate is in temper when 2-4% of the cocoa butter is in the stable crystal form.

There are six different forms of cocoa butter crystals and each one has a unique melting point.

Form I – melts between 61-67° F (unstable)

Form II – melts between 70-72° F (unstable)

Form III – melts at 78° F (unstable)

Form IV – melts between 81-84° F (unstable)

Form V – melts between 93-95° F (temper stable)

Form VI – melts at 97° F (bloom)

It is important to provide conditions that grow stable fat crystals and minimize unstable fat crystals.

Tempering Chocolate: Basic Tempering Principles

Understanding Proper Chocolate Temper

Properly tempered chocolate will have the following characteristics:

- Shiny/glossy surface
- Even color
- Good snap
- Smooth texture
- Good contraction
- No bloom

Improperly tempered chocolate will have the following characteristics:

- Dull finish
- Fat bloom
- Soft uneven texture
- Poor contraction
- Poor snap

Testing Temper: Manual Method

To check if chocolate is in good temper, dip a metal spatula or knife blade into chocolate and leave a small film on the blade. If the chocolate is firm and not tacky after five minutes at normal room temperature (68° F), it is in good temper. If it is still tacky, place the chocolate chunks back in the bowl and cool about 2° F. Repeat test until tempered.

Testing Temper: Using A Tempermeter

A tempermeter measures the quantity of stable cocoa butter crystals in the chocolate and the quality of the overall temper. A tempermeter produces a temper curve that represents temperature-versus-time resulting from uniform cooling of the chocolate sample over a specified period of time.

The slope of the temper curve provides a quantitative means of interpreting the amount of heat of crystallization (latent heat) produced during the cooling of the test sample. A negative slope indicates over-tempered chocolate and a positive slope indicates under-tempered chocolate.

A chocolate temper unit, or CTU, indicates the quality of the temper.



Tempered Chocolate



Untempered Chocolate

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