

# Dosing and Mixing Principles

## Key Operating Results

1. Mixing fat
2. Chocolate temperature

## Key Operating Conditions

1. Sugar particle size
2. Liquor fat content
3. Milk powder fat content and type

## Dosing

The dosing system delivers the raw ingredients to the mixer in a precise way, according to a recipe. Each recipe will have a **target mixing fat**. The milk powder fat content and type will affect the mixing fat needed. The chocolate mixture needs to have the correct mixing fat to avoid problems with the roll refining processes down the line.



**Accurate dosing is critical!** Incorrect dosing will cause poor chocolate plasticity coming off the 2-roll refiner, and incorrect fineness coming off the 5-Roll refiner.

## Mixing

The purpose of the mixer is to:

- Uniformly combine the raw ingredients via mixing.
- Coat the dry raw ingredients with fat via mixing.
- Adjust the chocolate temperature to 40°C (104°F) via heating.

The chocolate mixing fat needs to provide enough liquid fat to properly coat all the dry raw ingredient particles. Natural variation in sugar particle size and liquor fat content may require changes to the amount of fat added to the mixer to ensure all dry ingredients are coated.



**The chocolate temperature must be 38-40 °C (100-104 °F).** For cocoa butter-based chocolates, if the temperature is lower than 38 °C (100 °F) the fat could solidify and no longer function as a proper coating of the dry ingredients. This will cause problems when the chocolate is roll refined.

# Equipment



**Operators are the first line of defense in maintaining equipment!** Observing equipment while operating it during a normal shift can help identify operational issues before they escalate into major problems or cause catastrophic failures.

## Pumps

Moving products through the plant is critical to making chocolate and chocolate compounds. Just like the circulatory systems of our body, we use various pumps and pipes to move solids, liquids and gases where they need to go.

**Low moisture solids** are moved using conveyors, blowers, rotary air locks, and other equipment.

**Slurries and liquids** are moved using various pumps and piping.

Most pumps used in chocolate manufacturing are positive displacement (PD) pumps, but centrifugal pumps are also used.

**Dynamic pumps**, such as centrifugal pumps, move product mechanically using a propeller or impeller.

**Positive displacement pumps** can also be driven mechanically, or move product using air or water pressure.

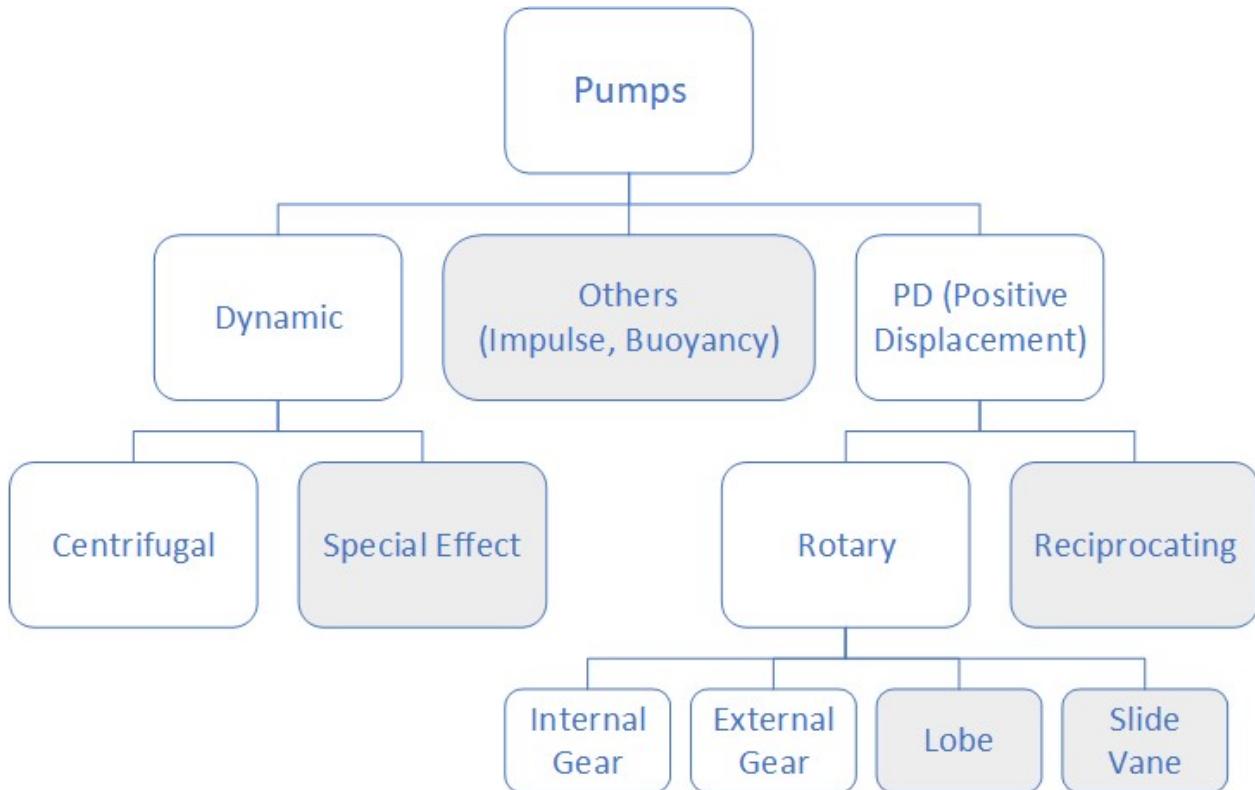


Figure 26. A diagram of pump categories and subcategories. Pumps that are grayed out are not discussed in this document.