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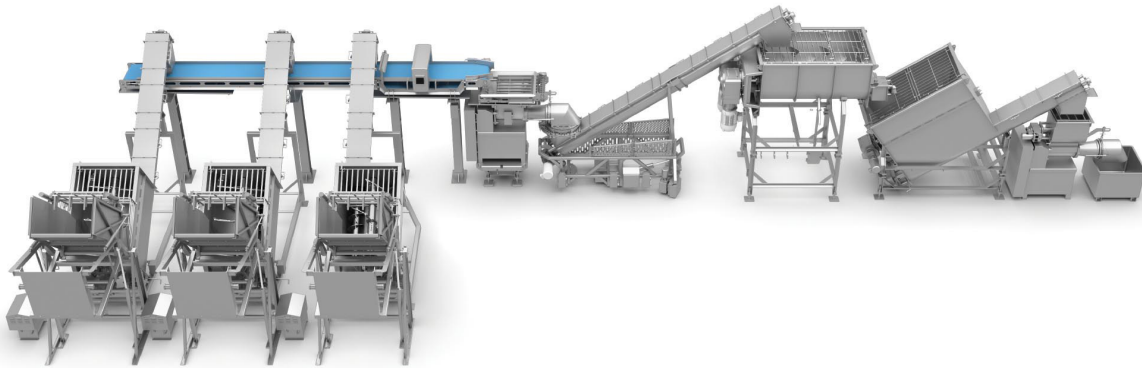
**MEAT
PROCESSING**

3 FORMULATION METHODS

To Reduce Lean Give-away
For Processed Meats

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METHOD 1: TESTING



This e book compares three formulation methods (testing, pre-blend, in-line) using an 85% lean and 50% fat content example to achieve a 73% lean point in a 5000 pound batch.

In the testing method, processors take a few samples from the batch to determine the lean point, or the ratio between fat and lean tissue. Differing lean points of whole-muscle trim are stored in surge loaders and can be metered out on demand. Using calculations based on the general lean point for each surge loader, the final mixer sends a request to the applicable loaders to begin discharging onto the metal-detecting belt and into the primary grinder to be loaded into the mixer. The surge loaders act in a loss-in-weight manner by using load cells to distribute product proportionally for formulation.

The final mixer is also on load cells to determine when the load cycle is complete; once finished, it will then transition to the mix cycle. Upon completing the mix cycle, product samples can be captured manually or through an optional vacuum sampling device, then prepared and analyzed to verify the accurate lean point of the batch. Corrections, if necessary, can then be completed to bring the final batch into compliance.

In a 5000-pound batch with a target of 73% lean product, for example, the testing program would calculate a requirement of 3286 pounds of 85% lean and 1714 pounds of 50% fat trim to reach the desired lean point of 73%. Should the manual process cause a variance, at 2% higher lean, there will be 285 lbs of lean giveaway per batch. If uncorrected, the lean giveaway can be thousands of pounds per day.

(Note: The method outlined above is batch-by-batch production. Some processors use continuous blending.)

Method 1: Testing OVERVIEW

Advantages

- ▶ Least expensive method
- ▶ Offers smallest footprint

Disadvantages

- ▶ Does not guarantee accuracy
- ▶ Consumes more time than other methods
- ▶ Requires manual process steps

FORMULATION RESULTS per 5000 lb batch

3286 lbs	85% lean
1714 lbs	50% fat
<hr/>	
Target	73% Lean
<hr/>	
IF ACTUAL is 75% Lean	
3571 lbs	85% lean
1429 lbs	50% fat
<hr/>	
285 lbs lean giveaway per batch with +2% higher variance	

In the Testing Method layout, the line starts with three dumpers. One dumper would contain fat, another lean and the third may be chuck or some other ingredient. These dumpers unload into a metering screw surge loader. The product travels out of the metering screw loader to a sanitary belt conveyor with metal detection. The product then goes into a primary grinder. A transfer screw transports the ground product into an overlapping paddle mixer blender. It is from this mixer blender that the samples are taken manually and analyzed to determine the actual lean point. The product is transferred into another metering screw and then to a final grinder.

METHOD 2: PRE-BLENDING



Pre-Blending offers a seamless, accurate solution, but the equipment costs, added footprint size, maintenance, and sanitation requirements must also be considered. In this method, lean and fat are transferred into one of two pre-blenders. The goal is to create a homogeneous batch of each lean point (pre-ground) from which the final mixer can draw.

As with the testing method, product is sampled from each pre-blender and the results are loaded into the formulation program in the control package. Once loaded, product can be formulated quickly, accurately, and without disruption into the final mixer using load cells on both the pre-blenders and the final mixer.

For example, using the same 5,000-pound batch and 73% lean point example from the testing method scenario, we begin by submitting the exact feedback from our analysis of the pre-blended material.

With this analysis, it is quickly determined that the 50% fat is 52%, and the 85% lean is actually 83%, so the program will determine the batch now needs 3387-pounds of lean and 1613-pounds of fat to reach the desired lean point. Because the yield was properly assessed from the beginning instead of incorrectly assumed, no corrections are required during processing.

Automatic Vacuum Sampling System



Method 2: Pre-Blending OVERVIEW

Advantages

- ▶ Ensures improved accuracy
- ▶ Eliminates production delays by reducing mid-production downtime
- ▶ Utilizes measured lean points
- ▶ Eliminates the need for correction as testing is conducted prior to actual formulation
- ▶ Higher production volumes with greater lean-yield accuracy

Disadvantages

- ▶ Higher operational costs, including electricity, cleaning and other maintenance considerations
- ▶ Additional equipment requires larger footprint

FORMULATION RESULTS per 5000 lb batch

3286 lbs	85% lean
1714 lbs	50% fat

Target	73% Lean
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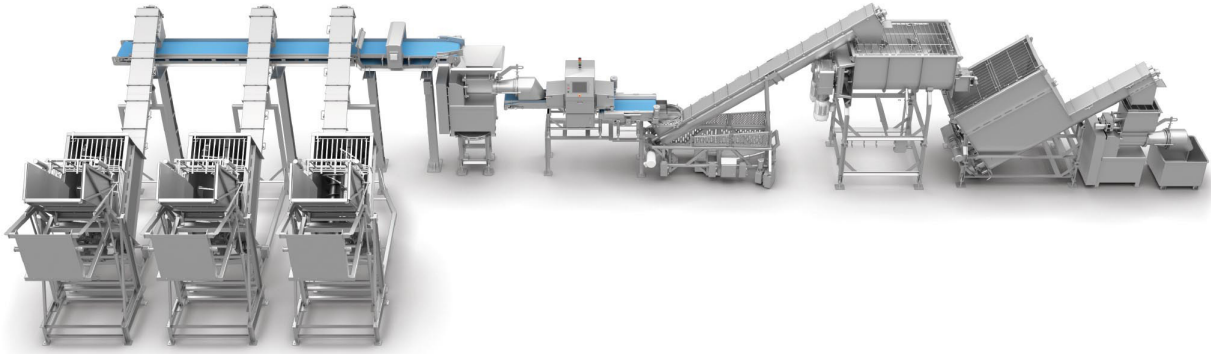
Processing Targets Determined	
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3387 lbs	83% lean
1613 lbs	52% fat

Accurate lean point during processing-
no corrections needed

In this layout, the dumper transfers product into a metering screw surge loader. The surge loader then transfers product to a sanitary belt conveyor with metal detection. The two-tier conveyor flips the trim meat for further inspection of contaminants and then product goes into the primary grinder. A pivoting incline screw conveyor transfers product into either mixer blender with both systems equipped with vacuum sampling for lean-point accuracy. The product is then transferred with another incline screw conveyor into a final mixer.

METHOD 3: INLINE FAT/LEAN ANALYSIS



In the testing method, processors take just a few samples from the batch to determine the lean point, or the ratio between fat and lean tissue. Differing lean points of whole-muscle trim are stored in metering screw surge loaders and can be metered out on demand. Using calculations based on the general lean point for each surge loader, the final mixer sends a request to the applicable metering screws to begin discharging onto the metal-detecting belt and into the primary grinder to be loaded into the mixer. The surge loaders act in a loss-in-weight manner by using load cells to distribute product proportionally for formulation.

In a 5000-pound batch with a target of 73% lean product, for example, the testing program would calculate a requirement of 3286 pounds of 85% lean and 1714 pounds of 50% fat trim to reach the desired lean point of 73%.

The final mixer is also on load cells to determine when the load cycle is complete; once finished, it will then transition to the mix cycle. Upon completing the mix cycle, product samples can be captured manually or through an optional vacuum sampling device, then prepared and analyzed to verify the accurate lean point of the batch. Corrections, if necessary, can then be completed to bring the final batch into compliance.

(Note: The method outlined above is batch-by-batch production. Some processors use continuous blending.)

Method 2: Pre-Blending OVERVIEW

Advantages

- ▶ Realize return on investment rather quickly despite higher upfront cost
- ▶ Ensures streamlined, continuous production with the added benefit of locating foreign material during processing

Disadvantages

- ▶ Most expensive method due to up front cost of x-ray units

FORMULATION RESULTS per 5000 lb batch

3286 lbs	85% lean
1714 lbs	50% fat
Target	73% Lean

Exact in-line calculation

This layout is like the testing method, with the addition of the in-line fat analyzer equipment. The three dumpers feed three metering screw surge loaders. The product is transferred to a sanitary belt conveyor with metal detection. The product then goes into a primary grinder. At this point, a fat analyzer is programmed for in-line testing and the upstream equipment will automatically adjust to tweak lean-points. Then the product travels the incline screw conveyor into an overlapping paddle mixer blender. The product is transferred into another surge loader and then to a final grinder.

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