



This fact sheet provides a definition of mass balance, how to calculate mass balance and explains the significance of mass balance in the produce industry.

Definition

Mass balance is the accounting for all sales, losses and of a given quantity of production.

$$\text{Mass In} = \text{Mass Out} + \text{Mass Stored}$$

$$\text{Raw Material} = \text{Product} + \text{Waste} + \text{Stored Material}$$

Why is Mass Balance Important?

In an instance where a product recall has to be conducted due to any food safety concerns, your site must be able to demonstrate the food traceability of a product, including its mass balance.

Identifying the Mass Balance of a Product

The total raw product weight (Nett weight) must equal the weight of the finished goods. Any discrepancies must be determined using the following:

- Weight Loss During Storage (Shelf life validation)
- Wastage during packing (to comply with customer specifications)
- Shelf life allowance (weight compensation to allow weight loss over declared product life)
- Over pack (degree of human and/or machine error)
- Point of sale

Example

In an audit, a traceability was conducted on punnets of blueberries for Retailer X. This product contained blueberries from three different growers: A, B, and C. The auditor wants to know the total material received from grower C. How can you explain this?

- Grower C sent 300kg blueberries.
- 180kg used for Retailer X
- 90kg used for Retailer Y
- 30kg was unaccounted for

To explain the unaccounted 30kg of blueberries, you need to know:

What is the shelf life validation of the product?

Check the validation record to identify any weight loss during storage for the product

What is the wastage on its packing?

Check the amount of total wastage during packing. Was any re-worked product taken into account?

Were samples retained for shelf life verification?

Check the shelf life verification record for product attributes such as size and weight.

Was over pack accurately recorded?

Check the packing record for over pack weight.

Was product sold elsewhere?

Check delivery or sale dockets for product sold to identify any product sold to customers other than Retailer Y or Retailer X. i.e. staff sales, retention samples, donations etc.

Your process control should be able to provide information on all of these points above. Once you have this information, you should be able to determine the reasons for the unaccounted 30kg of blueberries. Depending on product type, a tolerance percentage of allowable loss should also be considered.