# Milk Fortification with Skim Milk Powder or by Evaporation

Skim milk powder to raise the solids-not-fat of milk to a target (for yoghurt or standardised milk), or the water to evaporate for the same result.

**Method:** Solids mass balance (Pearson square)

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Milk mass | 1,000.0 | kg |
| Solids (SNF) in the milk | 8.5000 | % |
| Solids (SNF) wanted | 11.000 | % |
| Solids (SNF) in the powder | 95.000 | % |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Powder to add | 29.762 | kg |
| Fortified milk mass | 1,029.8 | kg |
| Alternatively, water to evaporate | 227.27 | kg |
| Mass after evaporation | 772.73 | kg |

### Notes for this case

• A solids balance (the Pearson square) gives the powder: m_p = m(x_t − x_m)/(x_p − x_t). Yoghurt milk is usually fortified by 1–3 points of solids-not-fat for body and to reduce whey separation. Evaporation reaches the same solids by removing water instead, m(1 − x_m/x_t), with a smaller final mass. Membrane concentration or milk protein concentrates are other routes. Check the fat as a separate balance.

## Formula and method

$$m_p = m\frac{x_t - x_m}{x_p - x_t}, \quad m_w = m\left(1 - \frac{x_m}{x_t}\right)$$

### Variables

| | | |
|---|---|---|
| $m$ | Milk mass | kg |
| $x_m$ | Solids (SNF) in the milk | - |
| $x_t$ | Solids (SNF) wanted | - |
| $x_p$ | Solids (SNF) in the powder | - |
| $m_p$ | Powder to add | kg |
| $m_t$ | Fortified milk mass | kg |
| $m_w$ | Alternatively, water to evaporate | kg |
| $m_e$ | Mass after evaporation | kg |

### Method and standards

Milk fortification.

### Assumptions and limits

- Solids balance only.

### References

Solids mass balance (Pearson square)

## Report details

| | |
|---|---|
| Report reference | FCC-A57H-A5XC (the same inputs always give the same reference) |
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| Calculator | Milk Fortification with Skim Milk Powder or by Evaporation |
| Method last reviewed | 17 November 2026 |
| Software release | FireCAD Calc, release of 22 November 2026 |
| Release checks | 3 reference cases of this calculator, computed independently, are checked on every release |

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

### This calculator online

https://calc.firecad.com/chemical/food-dairy/milk-fortification-skim-powder

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.