

DAIRYSAFE has an obligation to actively promote food safety learnings that are important to your business.

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## Key points –

- Cooling milk quickly is the critical factor in controlling harmful and spoilage bacteria
  - The quicker milk is cooled after milking, the better the quality
  - Cooling milk immediately can also assist in managing tanker collections
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The cooling of bulk raw milk is critical in minimising contamination of milk by spoilage bacteria, pathogens and toxins. The Food Standards Code requires milk to be cooled and stored at temperatures that prevent or minimise the growth of microbial hazards in the milk. The guidelines to the Standard as well as the Australian Standard 1187-1996 'Farm milk cooling and storage systems' specify milk to be cooled to 5°C within 3.5 hours from start of milking.



This temperature/time requirement was identified as a trending non-conformance among dairy farms during Dairysafe audits in 2018.

### How quickly must I cool my raw milk?

Milk must be chilled to 5°C or less within 3.5 hours from the **start** of milking, or at

an alternative time/temperature combination that has been validated and approved.

### How can 3.5 hours apply if milking is longer than that?

The milking process should involve a system of instant cooling, normally using a combination of ice bank, plate cooler or heat exchanger, or vat refrigeration. This set-up ensures the milk is chilled once it enters the system, but you may need to consider additional cooling options if the time temperature requirements can't be met. Your milk cooling set-up must be able to deal with weather extremes, so also consider a light water spray on condenser fins at those times.

Some dairies have an ice bank operating overnight (cheap power / making ice) not running more than required (using excess power), others have 2 plate coolers, 1 for normal tank water (prechill) and then 1 for the ice bank. Instant milk cooling also means tankers won't be waiting around.

### Why is the milk cooling rate so important?

Bacteria can grow rapidly in raw milk above 7°C. The cooling of raw milk is the critical factor in controlling the risk of harmful bacteria growing – these are called pathogens. The rapid chilling process also controls spoilage bacteria known as Pseudomonas and is essential for milk quality.

### How do bacteria 'spoil' milk?

Pseudomonas are very good at spoiling protein foods by breaking down proteins into shorter chain molecules which causes bitter tastes and eventually smells associated with rotting flesh. The bacteria get their nutrition by sending enzymes to break down milk proteins which are then consumed by the bacteria. These are called extracellular enzymes, they're very heat stable, and they can persist through dairying processes such as pasteurisation and UHT treatment.

### **Are there any other impacts from not cooling milk quickly?**

Yes, POOR QUALITY. The extracellular enzymes created by the bacteria cause gelling of UHT milks, reduced casein yield for cheesemaking, and shorten the shelf life of pasteurised milk.

### **How can the impact of extracellular enzymes be controlled?**

Good dairy hygiene and reducing and keeping the temperature of raw milk as low as possible on farm, during transport to processing and during storage prior to processing takes care of extracellular enzyme problems. Active chilling on farm requires rapid removal of heat from milk expressed from the udder at around 40°C.

### **How should I manage the cooling of raw milk within my food safety plan?**

Your dairy's food safety program identifies how milk chilling capability is checked and the frequency of checks. Trained service technicians should service the dairy's cooling system in accordance with the food safety guidelines (eg every 12 months). Records must be kept demonstrating regular servicing occurs.

Your food safety program has records that show milk is maintained at 5°C or less after the primary chilling is completed. And finally, your food safety program also includes how the thermometers are checked for accuracy, how frequently the checks occur, and the records to demonstrate the milk cooling requirements have been achieved.

### **Who checks that the temperature/time requirement has been achieved?**

Dairy staff should monitor the vat temperature and cooling times during milking and at the end of milking. The milk temperature must be checked by the tanker operator at the time of collection.

### **What if the tanker turns up before my raw milk gets to 5°C?**

If milk is above 5°C at the time of collection (for example, if the tanker arrives before chilling is complete), it's the dairy processor's responsibility to ensure that temperature control procedures are validated and demonstrate equivalent control of food safety risks. **Approval** of the validated temperature/time parameters **is required prior to milk being collected**. If not, this is a breach of both the farmer's and processor's food safety plans.

### **Are there any guidelines with more information?**

Food Standards Australia New Zealand (FSANZ) guidelines for raw milk collection and cooling requirements can be found here:

<http://www.foodstandards.gov.au/code/primaryproduction/dairy/Pages/default.aspx>

Guidance on validating the time/temperature parameters can be found on the Commonwealth Department of Agriculture and Water Resources website at:

<http://www.agriculture.gov.au/export/controlled-goods/dairy/registered-establishment/raw-milk-temperatures>

Helpful information is also available on Dairy Australia's Manufacturing Resource Centre website at <https://manufacturing.dairyaustralia.com.au/resource-library/decision-tools>.

