Dairy Food Safety VICTORIA

Developing a Food Safety Program: Pre-requisite programs
Preventative Maintenance

A food business must maintain food premises and all fixtures, fittings and equipment, having regard to their use, and those parts of vehicles that are used to transport food, and other items provided by the business to purchasers to transport food, in a good state of repair and working order having regard to their use.
Australia New Zealand Food Standards Code Std 3.2.2 Div 5 Clause 21 (1)

Introduction

A preventative maintenance program describes a series of recurring maintenance tasks that are regularly scheduled to ensure equipment continues to operate optimally and reliably. Preventative maintenance tasks can include inspection, repair, preparation, lubrication, replacement and adjustment of your equipment and premises.

Well-maintained dairy manufacturing equipment and environments reduce the likelihood of equipment failure during processing and minimise the risk of product contamination and equipment breakdowns. Regular maintenance of monitoring equipment reduces the risk of false readings of temperature of other important measurements.

Poorly maintained equipment can result in food safety incidents, for example:

- cracks or pin holes in heat exchanger plates due to corrosion or metal fatigue resulting in contamination of pasteurised milk
- foreign material contamination of products due to fragmentation of plant equipment such as O-rings, pump impellors and filters
- swarf (metal filings) in product caused by metal-to-metal contact between moving parts
- microbial contamination due to leaking or cracked seals and gaskets.

Preventative maintenance ensures that your processing equipment, premises and manufacturing environment remain in good working condition and aims to prevent unexpected breakdowns or failures. Minor flaws and faults that might not seem obvious during day-to-day operations can be uncovered during regular checks enabling repairs to be made before they lead to larger, more costly problems. This can also prevent unplanned downtime and loss of revenue.

Preparing and implementing a preventative maintenance program

Key elements of a preventative maintenance program include:

1. Equipment register or master list

A preventative maintenance program begins with a register of all manufacturing machinery, equipment and tools in your premises that require maintenance. It may be helpful to use the flow diagrams of production processes in your food safety program to highlight where equipment monitoring, and maintenance checks are required. Larger facilities may divide the equipment register into sections reflecting different processing lines or areas.

The preventative maintenance register should include all information that identifies equipment and where it used or located, such as descriptions and serial numbers. Information from sources such as manuals provided by equipment manufacturers can be added, for example recommended maintenance intervals and procedures. An example of a master list is shown in Figure 1.

Remember to include cool rooms, freezers and food transport vehicles in the program. Equipment that is no longer used should be removed from manufacturing areas to reduce potential sources of contamination and pest harbourage.

Figure 1: Example of preventative maintenance register

Equipment Name	Description	Location	Serial number	Maintenance schedule												Responsibility	Relevant procedures
				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
Grater 1 conveyor belt	Blue conveyor belt from Grater 1 to pack line 1	Cheese Room 1	TC61543	Y				Y				Y				Maintenance team	MI 64 – Maintenance of conveyor belt

2. Inspection plan and schedule

A plan to inspect equipment and undertake preventative maintenance can be developed from the preventative maintenance register and should consider:

- Locations of equipment and machinery to be inspected
- Inspection frequency for each piece of machinery or equipment
- Who is responsible for inspections and any associated maintenance tasks
- How the inspection is to be conducted and specific procedures for maintenance which minimise any risk to food safety
- Actions to be taken when performance parameters are not within expected or required limits
- List of equipment parts and scheduled times for replacement (e.g. gaskets, seals, filters)
- A specific lubrication schedule. Lubricants should be food grade when used in areas which may contact food, and expert advice on selection, application and use is recommended.

Your preventative maintenance program should also include a schedule for inspection and maintenance of the processing environment including floors, walls, ceilings, and drains.

Table 1: Examples of resources to help with development of the inspection plan and schedule

Resource type	Key information
Equipment specifications and manuals	Details about maintenance intervals or servicing frequency, and the maintenance tasks required.
Equipment history	Date of commissioning, usage rates, service history. Performance indicators may apply to some equipment and machinery, e.g. inspection required after a certain number of hours of operation.
Staff knowledge	Maintenance and production staff are an important source of information about the characteristics and performance of equipment. Routine observations can be critical. Examples include observation of wear and tear on surfaces, evidence of metal fatigue, or metal-on-metal rubbing noises.

Optimise the timing of preventative maintenance by considering how it will fit best into your operational schedule. Options may include a regular early finish to take care of tasks on one day, or a regular rotation of tasks. It is important to ensure that the preventative maintenance schedule is adjusted for any equipment failures.

3. Documentation and record keeping

All activities relating to the implementation of your preventative maintenance program need to be supported by proper documentation and record keeping.

Records for each machine or piece of equipment provide evidence of maintenance activity and confirm the date work was carried out. Maintenance records should be retained for a defined period and made available for both internal and external auditors. They can provide useful follow-up information to help resolve product or processing incidents. Unscheduled or non-routine work should also be recorded. A list of contacts for equipment and parts suppliers and maintenance contractors is an additional useful record.

Table 2: Examples of preventative maintenance records

Completed work orders	Records of inspections of equipment post-maintenance	Handover records from maintenance to production – for example notification to operating staff and supervisors when servicing and repairs are complete.

4. Spare-parts stock register

A spare parts stock register can help minimise the amount of time equipment is out of use because of planned or unplanned maintenance. The range and number of items held on site will be determined by factors such as storage space and cost. Consumables such as gaskets, O-rings, bearings, seals and lubricants should be available, along with sufficient equipment spares and engineering accessories to cover basic service needs and repairs.

5. Maintenance staff food safety responsibilities

Preventative maintenance should only be conducted by suitably qualified and experienced personnel, whether on-site staff or independent contractors. Maintenance staff and contractors entering food production areas must be suitably trained in, and understand, food safety and hygiene practices. Maintenance staff need to comply with the same standard of hygiene as factory process operators and be particularly conscious of the risk of contaminating food contact surfaces and environment while completing their tasks. The use of dedicated tools and a focused post maintenance cleaning protocol are important to manage this.

Table 3: Examples of food safety and hygiene practices for maintenance staff and contractors		
Appropriate use of personal protective equipment such as hair nets and shoe covers.	Hygiene procedures including handwashing.	Conducting scheduled maintenance tasks outside production times to minimise disruption and reduce any associated contamination risk.
Notification to production staff about any potential risk to product through maintenance activities.	Use of dedicated tools in production areas and procedures for tool sanitation.	Accountability for tools – for (e.g. count in - count out procedures) to ensure that all tools, parts and debris are removed from production areas.
Handover back to production staff once maintenance complete (see records section above).	Production staff need to ensure that effective cleaning follows all maintenance work before any production resumes.	Effective induction procedure in place for contractors.

Considerations for small businesses

- Preventative maintenance is also important for small businesses. Even limited or simple equipment requires scheduled preventative maintenance
- A basic calendar or spreadsheet can be used to keep track of equipment requiring maintenance, when maintenance is due and when unplanned maintenance has been required
- If you do not have dedicated maintenance staff or the necessary technical skills, contractors can be used. Contractors should be competent in the required maintenance activity
- Many simple checks and lubrications can be done without specialist assistance
- Details of the equipment that needs to be inspected and maintained can be kept in a simple table or spreadsheet and ticked off when completed

Verification of your preventative maintenance program

Verification of pre-requisite programs is an important element of your food safety program and involves ensuring that activities designed to manage food safety have been effectively implemented and are working as intended.

Your preventative maintenance program can be verified by:

- Internal and external audits
- Routine GMP audits
- Document reviews and sign-off e.g. maintenance records, photos
- Completion of corrective actions raised from non-conformance and root cause analysis procedures.

Effective preventative maintenance is an important indicator of how well a business manages food safety hazards associated with the **structure and maintenance of premises**.

Further information

Further food safety technical information is available at www.dairysafe.vic.gov.au or by contacting Dairy Food Safety Victoria at info@dairysafe.vic.gov.au

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