

Maintenance programs

Effective maintenance of dairy manufacturing equipment and environments reduces the likelihood of equipment failure during processing operations, and minimises the risk of product contamination.

The importance of maintenance

Preventative maintenance programs are an important element of a manufacturer's food safety program. Inadequate equipment and environment maintenance can result in product contamination with food safety implications. Some examples of incidents caused by inadequate maintenance include:

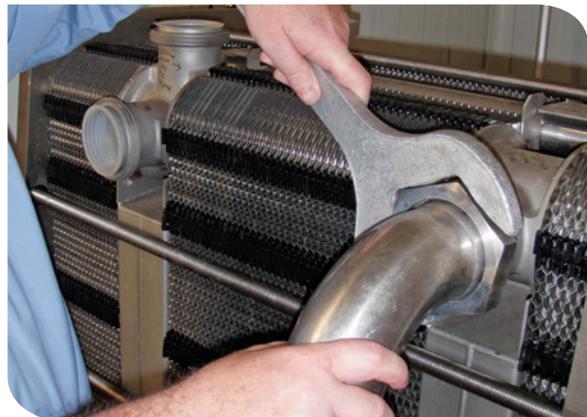
- cracks or pin holes in heat exchanger plates due to corrosion or metal fatigue resulting in contamination of pasteurised milk
- foreign material contamination of products due to fragmentation of plant equipment such as O-rings, pump impellers and filters
- microbial contamination due to leaking or cracked seals and gaskets.

Such incidents may result in product recall or disposal and time lost due to investigation and replacement of equipment. They may also diminish consumer confidence, compromise supply contracts, or result in litigation.

Implementing a preventative maintenance program

The implementation of a maintenance program provides an effective means of keeping equipment and premises in proper working condition. The main elements of such a program include:

- an equipment register and flow diagrams for manufacturing processes
- an inspection plan and schedule
- documentation and records of maintenance inspections and reviews
- a spare-parts stock register
- a lubrication schedule
- food safety training and competency standards for maintenance staff.



Equipment register and flow diagrams

The initial step in a maintenance program involves preparing a register of all manufacturing machinery and equipment in the premises requiring maintenance. Flow diagrams of production processes should highlight the sites where equipment monitoring and maintenance checks are required. All plant or equipment that is no longer being used should be removed to reduce potential sources of contamination.

Inspection plan and schedule

The register supports the development of a maintenance inspection plan and schedule, which should include:

- equipment and machinery to be inspected
- location of equipment and machinery
- inspection frequency
- staff responsible for maintenance inspection
- how the inspection is to be conducted
- performance indicators for the status of equipment and machinery
- actions to be taken when performance parameters are not within specification limits
- list of equipment parts and scheduled times for replacement *e.g.* gaskets, seals, filters.

Use the following resources to develop the plan and schedule.

- *Equipment specifications and manuals* – provide details on servicing, maintenance, and frequency.
- *Equipment history* – the date of commissioning of equipment, usage rates, and service history support assessments to determine frequency of inspections and maintenance.
- *Staff knowledge* – maintenance and production staff are an important source of information on the inherent characteristics and performance of equipment. Observations of deviations from the 'norm' can be critical. Examples include observation of wear and tear on surfaces, evidence of metal fatigue, or metal-on-metal rubbing noises.

A maintenance program should also include a schedule for inspection and maintenance of the processing environment and structural items such as floors, walls, ceilings, drains, and cool rooms and freezers.

Record keeping

Reporting and recording is an essential component of the maintenance program. Records for each machine or piece of equipment provide evidence of maintenance activity and confirm date of maintenance and actions taken. Records of unscheduled or non-routine work should also be captured.

A contact list of equipment and parts suppliers and maintenance contractors should be maintained.

Spare-parts stock register

Best practice includes stocking critical equipment components and spare-parts. At a minimum, consumables such as gaskets, O-rings, bearings, seals and lubricants should be on hand, as well as sufficient equipment spares and engineering accessories to cover basic service needs and repairs.

Lubrication schedule

Effective lubrication of equipment is a significant part of a maintenance program. The choice of appropriate lubricants is critical, hence expert advice on the selection, application, and use is recommended. Lubricants should be food grade when used in areas which may contact food.

Staff training and competency

The size and complexity of each manufacturing site will determine the number and skills of maintenance staff. Smaller operations may rely solely on independent contractors to perform these tasks. The manufacturer needs to identify staff responsible for supervising contractors undertaking maintenance.

Maintenance staff entering food production areas must be suitably trained, and understand their responsibilities when working in a food manufacturing environment. Maintenance staff must adopt the same level of hygiene as that practised by factory process operators, with additional training to include the use of dedicated tools in production areas, accountability for tools, and tool sanitation. Some sites may dedicate tools to specific processing areas to avoid contamination. Production staff need to ensure that effective cleaning follows all maintenance work.

The timing of maintenance programs should ensure the business performs effectively and efficiently.

Key points to consider

- A planned maintenance program is critical for all dairy manufacturers to minimise the likelihood of costly equipment failure or product contamination.
- All maintenance programs must be documented.

Further information

Further food safety technical information is available at www.dairysafe.vic.gov.au

Or contact Dairy Food Safety Victoria on (03) 9810 5900 or info@dairysafe.vic.gov.au

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