

Spoilage of Items in Cold Storage

Strategies for Reducing Losses

1. Introduction

There is a potential for freezer spoilage claims and the resulting losses within a University environment can be extremely high. These losses can range from the spoilage of substances, loss of access to research material, which will need to be replaced over a period, and the potentially devastating loss of irreplaceable research material. These losses can cause significant delays in the completion of contract research and postgraduate research projects.

By far most spoilage losses are the result of undetected loss of refrigeration. In most instances, the spoilage occurs over a period of less than 24 hours and when personnel are not present to detect the problem. The rate at which spoilage can occur is dependent upon several variables. These include the amount of time the storage space can maintain temperature during a refrigeration outage, the perishable character of the products involved, ambient (outside) temperatures, and the nature of equipment operation during the spoilage period.

As a rule, the lower the average storage temperature and the larger the storage space, the more slowly spoilage is likely to develop. This is because the thermal mass of the product acts as a “safety net” to prevent spoilage. Smaller storage spaces, like display cases or small walk-in coolers and freezers, can experience a spoilage loss in just a matter of hours. This is particularly likely if the equipment gets “stuck” in a defrost mode of operation, resulting in the continuous transfer of heat into the space.

2. Risk Management Strategy

To assist in reducing the frequency and cost of these losses, set out below are a few simple steps:

- Identify loss exposures
- Analyse loss exposures.
- Examine risk treatment techniques
- Select the best techniques
- Implement the techniques
- Monitor the results

2.1. Identify loss exposures

Set up and maintain an inventory of all refrigeration units.

- The financial consequences of a loss exposure reflect both its loss frequency and loss severity. The financial significance of losses increases as loss frequency and/or severity increase.

2.2. Analyse loss exposures

Establish the approximate value of the contents within each unit. (Once you have set an approximate value on the contents of each unit, they can then be ranked by value.)

- Some units will have a high turnover of contents, but generally the volume and/or value remains reasonably stable.
- Regular updating of these values will also provide a key indication on the suitability (or not) of the storage unit.

To arrive at a value for chilled items which are not purchased, consideration will need to include the following factors;

- If it were destroyed, would it need to be replaced?
- What activity and associated costs would be required to obtain replacements?
- Would this involve the re-running of research projects?

2.3. Examine risk treatment techniques

Higher values obviously warrant a higher degree of care and protection. These can easily be split into several tiers to suit, an example being;

High Values / Sensitive Product:

- Dedicated unit.
- Centrally monitored high temperature alarm, including door monitoring capabilities (preferably including centrally accessible data logging capabilities).
- Power supply backed up with independent generators.
- Switch to alternative refrigeration plant.
- Identify suitable alternate chilled storage facilities, including transit/transfer arrangements, for swift relocation of the goods in the event of a fault occurring.

Medium Value

- Ideally a dedicated unit
- If not a monitored alarm, a minimum of an audible high temperature alarm, preferably including door monitoring capabilities.
- For free standing units, the power supply should be hard wired – a direct cable connection, not plugged in on a switched standard three pin plug. This avoids the risk of accidental disconnection.
- If not connected to any form of backup power generation, an estimate of how long the unit can hold an adequate minimum temperature should be entered into a central log. If the outage is nearing that limit with no firm indication of restoration of supply within the deadline, an alternative storage location (including transit to) will be needed.

Low Value

- Form of audible temperature alarm.
- For free standing units, the power supply should be hard wired – a direct cable connection, not plugged in on a switched standard three pin plug. This avoids the risk of accidental disconnection.
- An estimate of how long the unit can hold an adequate minimum temperature should be entered into a central log. If the outage is nearing that limit with no firm indication of restoration of supply within the deadline, an alternative storage location (including transit to) will be needed.

2.4. Select the best techniques

Based on a loss predictability v's risk treatment.

2.5. Implement the best techniques

Implement the chosen techniques

2.6. Monitor the results

Establish standards, measure how well performance meets the standards, and adjust the risk management program as needed.

3. Preventative Measures

All units should be subject to a regular schedule of checks and the completion of routine maintenance. This applies not only to the refrigeration plant, but also to the alarm and associated monitoring systems. These should be regularly tested to ensure they remain fully functional and capable of delivering the service anticipated.

Regular updating of this information as new chillers are purchased and when the value or mix of the content's changes will enable the continuous matching of goods to the appropriate level of temperature control and monitoring. This will assist in managing this exposure and thereby limiting the impact in the event of a fortuity occurring.

4. Temperature Alarms

The use of automated temperature alarm systems offers an inexpensive solution to the problem of undetected loss of refrigeration. These systems use temperature sensors to provide instantaneous warning whenever space conditions stray from ideal.

Most good quality systems are capable of reading and recording space temperatures hour-by-hour and storing the temperature data on local flash memory or a networked central data storage location. The stored temperature data can help avoid product liability disputes by providing proof that proper storage temperatures were maintained.

Insurance excess amounts are reduced significantly for claims where the loss occurred in a Temperature Controlled Environment (TCE) fitted with a proper alarm system. Refer to section 5 for detailed insurance information and a comparison of costs associated with alarmed and non-alarmed TCEs.

It is important that facilities using automated temperature alarms do not become complacent or over-confident that equipment problems will always trigger an alarm. These systems, like all other electrical or mechanical systems, can and do fail. Regular manual (backup) temperature readings combined with routine maintenance and testing serves as a second line of defence against potential equipment problems.

Considering the relatively low cost of purchasing and installing temperature alarms, combined with the reduced likelihood of having a spoilage loss and reduced retention costs for insurance claims, the use of temperature alarms makes good business sense.

5. Insurance

Please note: the lack of a maintenance program, a working alarm, or backup system significantly decreases an insurance claim payout. Insurance claims are able to be made following an event resulting in damage or loss of inventory. The following information regarding claims applies:

- The standard minimum excess on all freezer/fridge claims is **\$50,000**.
- For Spoilage losses in unalarmed Temperature Controlled Environments (TCE), the retention is 50% of the loss or the Member excess of \$50,000 **whichever is the higher**. For example: where estimated loss is \$200,000 the amount to pay would be 50% of \$200,000 or \$100,000 since this value is the **higher**.
- For Spoilage losses in alarmed Temperature Controlled Environments (TCE), the retention is 20% of the loss or the Member excess of \$50,000 **whichever is the higher**. For example: where estimated loss is \$200,000 the amount to pay would be the Member excess of \$50,000 since this value is the **higher** than 20% of \$200,000 (\$40,000)

In the event stock / samples within an ultralow freezer are damaged or destroyed, advice on whether to lodge an insurance claim should be sought from the Insurance Office. Please note that payment of claims will only occur after the excess has been paid and samples replaced.

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- (07) 3735 7971

6. References

- Standards Australia Australian/New Zealand Standard Risk Management (AS/NZS 4360:2004), 2004.
- Unimutual Limited
- ISO 31000 Guidelines on principles and implementation of risk management