

Cold, Controlled, and Secure: Optimizing Risk Management for Ultra-Low Temperature Freezers

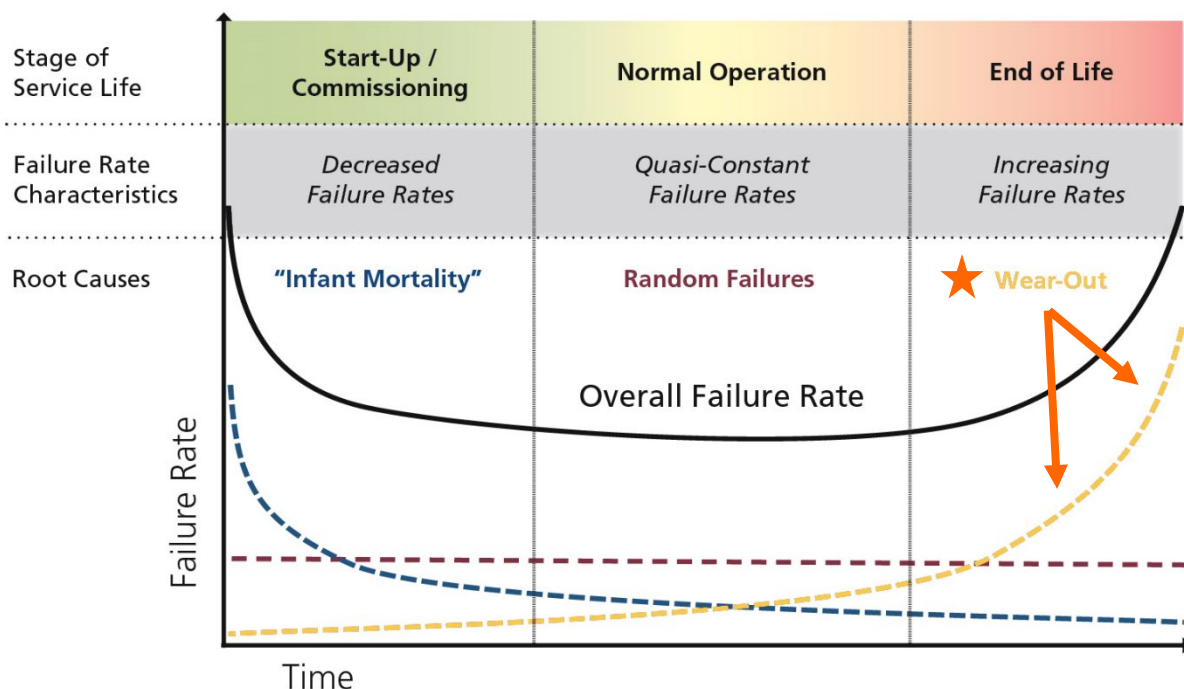
When do freezer failures occur?

Start-Up & Normal Operation

Failures during these stages are typically random and covered under warranty.

End of Life

Failure rates increase exponentially due to “wear-out”, even for those units who have received appropriate preventative maintenance.



This curve represents the typical failure patterns of electrified equipment: early failures (infant mortality), a stable operational period, and a wear-out period.

Contamination or sub-optimal environmental conditions can accelerate the wear-out stage.

When is your freezer's "end of life"?

Ultra-low temperature freezers have a predictable life expectancy of 10-15 years that takes into consideration optimal environmental conditions and usage.

An optimal operating environment for ULT Freezers includes:

- ✓ Ambient temperatures of 41F to 95F (or 5C to 35C)
- ✓ Humidity levels BELOW 80%
- ✓ Well-ventilated
- ✓ Limited direct sunlight
- ✓ Infrequent opening
- ✓ Routine preventative maintenance

When planning for equipment, **consider the environment and usage of your unit.** Sub-optimal conditions may cause your freezer to work harder to maintain its internal temperature. The result is limited efficiency and a shortened lifespan.

Boston University has approximately 550 freezers in operation.

121 freezers (22%)
aged between 10 - 15 years old

85 freezers (15%)
aged 15 years or older

For freezers that show no signs of stress, enhanced monitoring may identify issues early.

Consider developing robust contingency plans that include tested notification protocols and a backup freezer.

For freezers that exceed 15 years, please plan for replacement as soon as possible.

Failure to plan for replacement may compromise insurance protection due to a failure.

What are some signs of heightened risk of failure?

- ✓ Age (10+ years)
- ✓ Period adverse environmental condition

You should start closely monitoring your freezer for performance issues:

- ✓ Temperature fluctuations
- ✓ Excessive noise
- ✓ Frequent compressor cycling
- ✓ Visible signs of wear, such as damaged seals, or loose components

Does your lab have a back-up plan?

According to the NIH: When a freezer failure or power outage occurs, the average *new* ULT freezer (-80C) can warm to -60C in only **five hours**. At -60C samples start to degrade.

Researchers and lab technicians have only hours to transfer materials to a working freezer.



Test your alarms! Test your communication protocols!

A plan in place **PRIOR** to the failure is critical to preserving contents.

Is there insurance for a freezer failure?



Boston University's property insurance program provides broad coverage for *catastrophic* events that affect the campuses *at large*. **Changes in temperature and the impact in changes to humidity are EXCLUDED from this policy.**

Departments are responsible for the first \$5,000 for each and every loss.

If there might be insurance, why should I worry?

Insurance is a financial remedy only. It cannot make up for lost productivity, irreplicable research, loss of grant funding, delayed or inability to publish research, or reputational harm.