Laboratory Water Leak Prevention

Water damage can be costly and cause serious damage to the building, disrupt operations, and cause personal injury. Floods in laboratories are usually caused by building water that was intentionally left running or equipment failures involving running water. Before leaving running water unattended, review the guidelines below.

Figure 1: Water leaking through a lab ceiling from a flood above

Figure 2: Wet boxes due to a flooded floor

Unattended use

Review Unattended Operations fact sheet and verify your procedure is appropriate for leaving unattended. Follow best practices for leaving experiments running safely while unattended (e.g. post signage that communicates essential safety information when you're not there).

Alternatives to continuously flowing water

In general, it is best practice to not leave building water running unattended. Alternatives will conserve water and reduce the risk of a large water event.

Recirculating chillers: Recirculating ethylene glycol chillers are available through scientific supply companies and provide efficient, sustained cooling. A cheaper alternative is a bucket or cooler equipped with a recirculating pump (Figure 3). A variety of pumps with varying flow-rates provide a good fit for many applications. An insulated bucket or cooler with ice water can provide efficient cooling for an extended period of time.

Figure 3: Solvent still system with a recirculating chiller pump in a bucket on the floor

Alternatives to aspirator vacuum: A vacuum pump or house vacuum should be used instead of a flowing water aspirator.

The use of water aspirators are strongly discouraged because:

- The vacuum strength fluctuates unpredictably
- Waste water can become contaminated with organics that evaporate during your process
- Water can flow back into your glassware, and contaminate your materials
- They waste an excessive amount of water and can also result in a very large flooding event

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Laboratory Water Leak Prevention (cont.)

Check equipment and facilities

Figure 4: Split hose from a reflux condenser that flooded a lab

Check integrity of hoses and all in-line equipment (e.g., flow meters). Rubber and plastic hoses get brittle over time, causing them to split or crack (Figures 4 and 5). Before use, check condition of tube and ends for signs of wear such as cracks or splits. Plan to replace old hoses before they break. Also check all in-line equipment for cracks or obstructions.

Inspect all hose connections. Hose connections are a common failure point and all connectors need to be replaced periodically. Connectors may be susceptible to failure due to corrosion, fatigue, and brittleness.

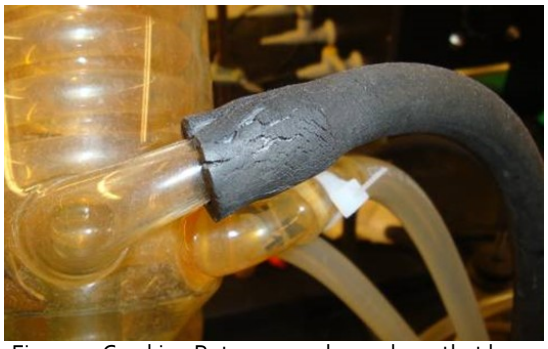

Figure 5: Cracking Rotovap condenser hose that has no securing tie

Metal wire ties should be **USED ONLY ONCE** to secure tubing as repeat bending weakens them and they are also susceptible to failure from corrosion. Zip ties can be considered more secure than metal ties because they resist corrosion but again have limited life spans. Using a metal wire tie together with zip-tie provides an extra fail-safe.

A threaded metal connection is stronger and more secure than a zip-tie or metal twist. However, even threaded hose clamps can become compromised over time, rust, break and cause a flood. Note: threaded metal clamps are not tight enough for thin lines.

Some condensers have threaded connections where the waterlines are screwed on via an adapter. This allows researchers to remove waterlines frequently without cutting tubing or discarding hose connectors every time. The hose connections should be inspected regularly and changed out when the integrity is questionable.

Inspect sinks and faucets before you leave the laboratory. Check that the faucet is tightly turned off and that the drain is free from obstructions. Keep paper towels, notebooks and equipment away from sinks/drains in an approximate radius of 2 to 3 feet.